Digital Transformation and Disruption of HIGHER EDUCATION

Edited by
Andreas Kaplan

DIGITAL TRANSFORMATION AND DISRUPTION OF HIGHER EDUCATION

This book analyses higher education's digital transformation and potential disruption from a holistic point of view, providing a balanced and critical account from a variety of interdisciplinary viewpoints. It looks at case studies on educational and emerging technology, their impact, and the potential risk of digitalisation disrupting higher education and also offers a glimpse into what the future of digitalisation will likely bring. Researchers and practitioners from countries including New Zealand, Russia, Eswatini, India, and the United States bring together their knowledge and understanding of this rapidly evolving field. The contributors analyse academia's digitalisation along the broad topics of the sector's general digital evolution. The book looks at changes in instructional formats from the Massive Open Online Courses to Small Private Online Courses and artificial intelligence. This work also provides analysis on how skills, competences and social networks demanded by future jobs and job markets can be further integrated into higher education.

PROFESSOR ANDREAS KAPLAN is Rector and Dean of the ESCP Business School, Paris, Sorbonne Alliance. He has over ten years of leadership experience in higher education and specialises in the study of artificial intelligence, social media and general analysis of the digital world. Kaplan has nearly 40,000 citations on Google Scholar and has been counted among the worldwide leading business authors.

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Dean ESCP Business School Paris, Sorbonne Alliance

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Contributors

MAMUN ALA
Australian Institute of Business (AIB)

LISA ALLEN
British Columbia Institute of Technology

MUHAMMAD ASIF IKRAM ANJUM
COMSATS University Islamabad, Lahore Campus

SHAZIA AZIZ
COMSATS University Islamabad, Lahore Campus

ZAKARIA BABUTSIDZE
SKEMA Business School

MEGAN BAKER
Australian Institute of Business (AIB)

NARASIMHA MURTHY KALANATHA BHATTA
Xavier Institute of Management & Entrepreneurship

ANDREA BIKFALVI
University of Girona

ANGELA BOATMAN
Lynch School of Education and Human Development, Boston College

KATRINA BOROWIEC
Lynch School of Education and Human Development, Boston College

RUSSELL BUTSON
University of Otago

JULIA CHEN
The Hong Kong Polytechnic University

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JOSÉ COBO-BENITA
ESCP Business School

LIZ COULTER-SMITH
University of Plymouth

INGRID DAY
Australian Institute of Business (AIB)

KENYTH ALVES DE FREITAS
Fundação Getulio Vargas – EAESP

ENIDO FABIANO DE RAMOS
Fundação Getulio Vargas – EAESP

LUIZ CARLOS DI SERIO
Fundação Getulio Vargas – EAESP

OKSANA DREMOVA
Center of Sociology of Higher Education, Institute of Education, National Research University Higher School of Economics

ABEL EBIEGA ENOKELA
Ambrose Alli University Nigeria

KAMARAN FATHULLA
University of Lincoln

DENNIS FOUNG
The University of British Columbia

ILEANA HAMBURG
IAT, Westfälische Hochschule GE Gelsenkirchen

MICHAEL HEALY
School of Education, University of Southern Queensland

ULRICH HOMMEL
EBS University of Business & Law

FRANCISCO INIESTO
The Institute of Educational Technology, The Open University

ANDREAS KAPLAN
ESCP Business School, Sorbonne Alliance

CHAVAN SHARMA KISSOON
University of Lincoln

ELIZABETH KNIGHT
Centre for International Research on Education Systems, Victoria University

ALEXANDER KNOTH
German Academic Exchange Service (DAAD)

VERONICA LIESAPUTRA
University of Otago

LINDA LIN
The Hong Kong Polytechnic University

KAROLINA MAŁAGOCKA
Kozminski University

PILAR MARQUES
University of Girona

GRZEGORZ MAZUREK
Kozminski University

VALERIE MC TAGGART
Institute of Technology Sligo

FRED MOONGA
University of Eswatini

SAMEERA MUBARAK
University of South Australia

VICTORIA L. MURPHY
The Faculty of Business and Law, The Open University

SUMESH NAIR
Australian Institute of Business (AIB)

CAROLINE NIXON
The University of Hong Kong

EMMA O'BRIEN
Faculty of Education, Mary Immaculate College, Limerick

KAIT O'CALLAHAN
Unitec Institute of Technology

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XIANGHAN O'DEA
York Business School, York St John University

CLAUDIA OTT
University of Otago

JOSHUA PATTERSON
University of Georgia

KAI PETERS
Coventry University

JESÚS PINEDA
German Academic Exchange Service (DAAD)

FRANCESCA PUCCIARELLI
ESCP Business School

MUBARAK RAHAMATHULLA
The University of Western Australia

TAREQ RASUL
Australian Institute of Business (AIB)

ALBERT ROF
University of Girona

ASHWATHANARAYANA SHASTRY
Xavier Institute of Management & Entrepreneurship

EILEEN SCANLON
The Institute of Educational Technology, The Open University

SILKE SCHÖNERT
Cologne University of Applied Sciences

MMABALEDI KEFILWE SEELETSO
Botswana Open University

IRINA SHCHEGLOVA
Center of Sociology of Higher Education, Institute of Education, National Research University Higher School of Economics

TOM STAUNTON
International Centre for Guidance Studies, University of Derby

NATALIA TIMUŞ
Université Côte d'Azur

KSENIA VILKOVA
Center of Sociology of Higher Education, Institute of Education, National Research University Higher School of Economics

SANTOSO WIBOWO
Central Queensland University

DAGMAR WILLEMS
German Academic Exchange Service (DAAD)

RONGBIN YANG
Kaplan Business School

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Preface
Digital Transformation and the Disruption of Higher Education

Somehow reflecting higher education's reputation of being fairly inflexible and highly change averse, the sector's digital transformation has been a rather moderate process until recently. A nearly unprecedented and worldwide health crisis, COVID-19, had to emerge in order to compel academia to advance and take huge steps forward in its digitalisation journey. Indeed, with universities and schools having moved entirely online both in their academics as well as in their extracurriculars within just days, the worldwide higher education sector might have witnessed the biggest edtech (educational technology) experiment ever conducted.

The post–COVID-19 period therefore seems both logical and sensible timing for a publication that decodes the current situation as well as the likely future of academia's digital transformation and potential disruption. As both a digitalisation and higher education researcher, but even more so as dean and rector of ESCP Business School (Sorbonne University Alliance) in Paris, I am thrilled at the prospect of this book, whose purpose and objective is to analyse the sector's digitalisation wholistically and to provide a balanced, critical account thereof. This volume will consider emerging educational technology – its impact, opportunities, as well as challenges – and exhibit a wide variety of opinions, hands-on experiences and theoretical and practical viewpoints.

In thirty chapters, researchers and practitioners alike from all continents, including such countries as Eswatini, India, New Zealand, Russia and the United States, bring together knowledge and know-how, analysing academia's digitalisation along the broad areas and topics of the sector's general digital (r)evolution, changes in instructional formats (MOOCS, SPOCS but also artificial intelligence are key concepts here), as well as changes in course content, alongside society's digitalisation, which also impacts the skills and competences demanded by future jobs and job markets.

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But studying is more than just acquiring knowledge and skills. Accordingly, later segments of this book analyse digitalisation's influence on universities' networking and social activities, the future of certifications and diplomas, as well as the domain of careers and professionalisation. Finally, futuristic and ultramodern higher education will be addressed in Part VII.

Last but not least, this compilation is also intended as an adamant call for action to higher education. Academia's digitalisation – propelled, accentuated and accelerated by the COVID pandemic – should push all universities and higher education institutions worldwide to reflect on what to do differently and what new paths and future directions they should take in order to fully benefit from the current digitalisation dynamic. During the pandemic, higher education proved its ability to pivot and rapidly adapt to unforeseen events. The sector should therefore clearly avoid falling back into old patterns of inflexibility and change aversion. Time tends toward tough transformations.

Professor Andreas Kaplan, MPA
Dean ESCP Business School Paris, Sorbonne Alliance

CHAPTER 1

Nothing Is Constant Except Change

Academia's Digital Transformation

Andreas Kaplan

'Nothing is constant except change', said the Greek philosopher Heraclitus, yet for a long time this quote appeared not to be applicable to higher education, with universities and other educational institutions considered highly reluctant to change. This, however, changed overnight with COVID-19, shaking up the sector, compelling it to move courses and entire programmes into the online sphere, in many cases overnight. Thus academia proved adaptable and flexible when there was a need.

Beyond its digitalisation process, higher education has been confronted with a series of profound challenges for some time now, such as an increase in worldwide competition, a decrease in financial means and (public) funding, as well as a more general questioning of its overall mission and broader role within society (Kaplan 2014; Pucciarelli and Kaplan 2019). Moreover, its digital transformation – some even speak of disruption – began long before the pandemic. As early as 2012, the *New York Times* solemnly proclaimed the Year of the MOOC (Massive Open Online Course; Kaplan 2017), predicting that online courses taught on platforms such as Coursera or Udacity would have the potential to disrupt the entire higher education sector (Kaplan and Haenlein 2016). Until now, this had not been the case; but the dynamic launched by COVID-19 might be a game-changer.

In this book's first chapter, I will show that with the pandemic's arrival, actually 'Everything has changed but nothing has changed' at all. Furthermore, consistent with the saying 'Nothing changes if nothing changes', the author espouses digitalisation as demanding real innovation beyond simply transferring offline courses into the cybersphere. At the same time, we should also avoid altering everything, as 'All change is not growth, as all movement is not forward'. Finally, this chapter focuses on the quote 'Things do not change; we change', advocating for academia's need to make a few changes to be able to definitively benefit from its digital transformation (Kaplan 2020, 2021).

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'Everything Has Changed, Yet Nothing Has Changed' – Mark Hamill

You might have heard claims that COVID-19 enabled higher education's digitalisation, which is valid to a certain extent. However, we must be clear that the necessary technology making online teaching and learning possible has existed for a long time. MOOCs, SPOCS (Small Private Online Courses), SMOCs (Synchronous Mass Online Courses) and SSOCs (Synchronous Small Online Courses) have been on the market for years now (Kaplan and Haenlein 2016). Artificial intelligence (AI) has already entered higher education via adaptive learning or AI-driven teaching assistants, such as Georgia Tech's Jill Watson (Kaplan 2021).

However, what changed due to the pandemic was the mindset of administration and faculty, who were largely reluctant to stand in front of a camera and go digital. Even hard-line enemies of online teaching and adamant opponents were compelled to take their first steps into the newly imposed digital world of pedagogy. Several among them are 'converts' from such entrenched opposition to digital instruction to being strong advocates of online pedagogy's possibilities. Even the most vehement adversaries among university administrators have been compelled to accept the new digital era of higher education and by now understand its many advantages and benefits (Kaplan 2020). So ultimately, at hand is a simple change of heart as much as a change in technologies. Therefore, we can state on this level: 'Everything has changed but nothing has changed.'

'Nothing Changes If Nothing Changes'

In our new era, higher education should avoid other sectors' mistakes and understand that 'going digital' means much more than merely moving an offline course onto a digital platform. Or to quote Radamiz, 'Nothing changes if nothing changes.' To truly benefit from academia's digitalisation, genuine pedagogical innovation is needed; changes on the margins will not suffice (Thibierge 2020). To give just one example, think of programmes wherein first-year students attend online courses to acquire the respective domain's basic knowledge while working part time at a company. The programme then could continue with a full-time on-campus period during which the students would dedicate their time to in-class discussions, the hands-on application of previously learned concepts and exchanges between fellow students in and outside the classroom, to add a networking perspective. Finally, the programme's last year could subsequently be spent working at the company, with the university still providing online tutoring and coaching (Kaplan 2020).

An additional application concerns multi-campus institutions, such as my employer and alma mater, ESCP (European School of Commerce Paris), which, as its name indicates, originated in France but now has campuses in Berlin, London, Madrid, Turin and Warsaw (Kaplan 2014, 2018a). Applying virtual elements could foster an additional connection between such campuses (Kaplan 2018b), as one could imagine, for example, core courses simultaneously taught at multiple sites bringing together students from various physical locations remotely working on group assignments as team members. Nurturing such a sense of closeness enabled by digital technology (Mucharraz and Venuti 2020) is also applicable to further contexts such as international exchange periods, where students physically spend time at partner institutions all over the world, or during internship periods, during which universities often lose contact with their students, who, nonetheless and ironically, spend many hours online.

'All Change Is Not Growth, as All Movement Is Not Forward' – Ellen Glasgow

A second mistake higher education should avoid besides merely transferring offline courses onto online platforms and thinking they're done (Kaplan 2009; Kaplan and Haenlein 2010) is to go to the other extreme and seek to digitalise everything. The quote 'All change is not growth, as all movement is not forward', is pertinent in this context, as aforementioned, the online world demands genuine pedagogical innovations. In other words: going digital has to make sense. There are more than a few situations where a live course is far more appropriate and efficacious than is an online course. Moreover, let's not forget that higher education is not only about learning and teaching but also about exchanging ideas with fellow students and faculty, as well as creating lifelong networks and friendships.

It would be fatal to believe that physical university buildings are a thing of the past owing to digitalisation. For the most part, socialising is still easier to do live than it is virtually, so future buildings will need to adapt to our new reality. Instead of large lecture halls, more space will be dedicated to teamwork as well as interfacing between fellow students, professors, alumni and the entire community built around a university. Accordingly, buildings need to foster a stimulating student life and radiate an enjoyable ambiance and climate. Only then will they motivate students and faculty to physically come to university, a sine qua non for their developing a strong attachment to their alma mater (Kaplan 2021).

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'Things Do Not Change; We Change' – Henry David Thoreau

To conclude, while the COVID-19 pandemic has inarguably accelerated academia's digital transformation, as aforementioned, it was actually a change of heart that spurred this, more than a modification of the environment or possibilities enabled by digital technologies. Thus 'Things do not change; we change' is a particularly relevant sentiment. It also must be stressed that there is still much to do. Although universities put their entire curricula online in almost no time, it did not mean that course quality was perfect; rather, the opposite was the case. However, during lockdown, few students complained about course quality, being instead grateful for universities' pivoting in these extraordinary times. Not only that, but surprisingly few faculty members requested clarifications about intellectual property rights or remuneration policies concerning teaching online. This atmosphere will definitely evolve in the future, and universities worldwide will face relevant academic, budgetary, legal and operational questions (Kaplan 2020).

Universities will have to reflect upon these questions very seriously in order to transform COVID-19 into a genuine opportunity and not find themselves threatened by the ongoing digital transformation and potential disruption of the higher education sector. On the one hand, higher education's digitalisation will generate new potential revenue sources, as the market will become even more global than currently is the case (Kaplan 2017). However, as a logical consequence, the higher education environment will also become more competitive (Kaplan and Pucciarelli 2016; Pucciarelli and Kaplan 2016) with online courses demanding considerable resources for their production, to mention just some of the issues that higher education institutions will be facing.

This book's intention is to respond to some of those questions, to elucidate further points of matters essential to undertake, as well as to foster and encourage constructive discussion among the field's research community, leadership teams, higher education institutions worldwide, investors and edtech (educational technology) actors, teaching professionals and employees within the sector but also the broader public with a stake in (higher) education's future. I hope you enjoy this compilation as much as I enjoyed putting it together. I hope you find the various authors' contributions as exciting and inspiring as I believe them to be, being more than grateful for their valuable insights and input. In brief, I hope you like this book as much as I do.

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PART I

(R)evolution of the Higher Education Sector

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CHAPTER 2

Higher Education's Digitalisation
Past, Present and Future

Victoria L. Murphy, Francisco Iniesto and Eileen Scanlon

The events following COVID-19 catalysed a transformation in the higher education sector, with many institutions forced to rapidly embrace the digital domain. However, as discussed in Chapter 1, this can be viewed as the acceleration of trends that have been observed for several decades (Weller 2020). It could even be argued that the development of distance learning supported by technology has been occurring for centuries, since the invention of the printing press (Kaplan and Haenlein 2016). Research in Technology Enhanced Learning (TEL) has explored how technological affordances can aid learners when judiciously introduced to learning settings. Examples include TEL being used to aid learners in regulating their learning (Zhang and Quintana 2012) and scaffolding dialogue (Murphy, Coiro and Kiili 2019). Due to these affordances, higher educational institutions have for many years been increasing their use of TEL. Nevertheless, the pace at which universities across the world introduced technology to enable distance and blended learning was unprecedented following COVID-19, and there is a need to consider whether and how it is likely to have changed the landscape of higher education forever. As universities embrace TEL, there are many lessons that can be learnt from past attempts at innovation. This chapter discusses three pressing topics that represent continuing debates in the TEL research community. We will use projects from OpenTEL (an Open University strategic research initiative) to illustrate state-of-the-art approaches to these topics. The chapter concludes with reflections on the relationship between universities and TEL post-COVID.

The Open University and OpenTEL

This chapter will detail projects from the OpenTEL research group. For context, a short introduction is provided here to the Open University (OU) and OpenTEL. The OU was founded in 1969 and has a mission to

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be 'open to people, places, methods and ideas'. In line with this mission, there are no minimum academic qualifications needed to start a degree with the OU. Since its inception, the OU has taken learning to learners, wherever they are, using an evolving range of technologies, supporting learners from across the United Kingdom and, more recently, across the globe (Cross et al. 2019). The university has pioneered new approaches to teaching in response to the needs of its diverse set of students who are learning at a distance. This has been especially prevalent in science, technology, engineering and maths (STEM) subjects, where learners have not had access to a traditional laboratory. A range of technologies are used to support learners, ranging from broadcasting information via the BBC, to using augmented reality to practice presentations (McFaul and FitzGerald 2020). At the start of 2021, courses at the OU predominantly used a blended approach, combining online study and, where appropriate, posted materials. Prior to COVID-19, it was the practice of the OU to also support learners by organising in-person and online tutorials held by hundreds of associate lecturers across the United Kingdom. During COVID-19, these tutorials were all moved to an online format.

Within the OU, OpenTEL has a unique position as a research group dedicated to the use of TEL in a manner befitting the OU's mission. Researchers have argued that TEL as a field is inherently applied and multidisciplinary (see, e.g., Scanlon and Conole 2018). Increasingly, the complex cross-disciplinary difficulties presented by technological and pedagogical challenges demand new approaches, a rich set of theoretical perspectives and innovative research methodologies. In response to the complexities of effectively using TEL to support learners, OpenTEL is an interdisciplinary group of researchers with backgrounds including educational technology, STEM, social science and organisational studies. The wide diversity of group members' backgrounds allows the exploration of openness and TEL in ways that can feed into the OU's teaching.

In 2021, OpenTEL had six main research areas:

- learning in an open, connected world and at scale,
- design and analytics in learning,
- language learning landscapes,
- citizen science,
- inclusion,
- professional and digital learning.

These areas represent aspects of TEL that are central to how the OU provides distance education.

The following sections present three questions that span these research areas. Example OpenTEL projects are used to demonstrate current thinking related to each question. The questions are as follows:

- What role will universities play in supporting lifelong learning in the future?
- How inclusive is open learning?
- What do technological and pedagogical innovations promise for science education?

What Role Will Universities Play in Supporting Lifelong Learning in the Future?

A Google Scholar search for articles on 'lifelong learning' published in 1990 returns around 3,000 results. The same search for articles published in 2020 returns around 41,000 results. In the thirty years between 1990 and 2020, learning technology has been truly transformed. The development of search engines, video hosting platforms and Massive Open Online Courses (MOOCs) has made knowledge more accessible to anyone with a stable internet connection. At the same time, the pace of technological change has meant that workplaces are constantly adapting, as new software and hardware is introduced to help employees perform tasks more effectively. In order to remain competitive, workplaces have needed to engage their employees in professional development, often involving TEL. The expansion of academic research on lifelong learning is a reflection of changed societal views, that is, increased expectations for people to continue growing their skills and knowledge throughout their lifespan. As demonstrated by standalone business-oriented courses offered by higher educational institutes (e.g., https://business.edx.org/), universities are starting to use TEL to offer professional qualifications alongside more traditional degrees. In 2021, micro-credentials are increasingly being offered by higher educational institutes (e.g., www.futurelearn.com/programs). The European MOOC Consortium – Labour Market (EMC-LM) exemplifies higher educational institutes engaging with MOOCs in the labour market, either by developing MOOCs that are aligned with continuing professional development or by carrying out research in this area (Farrow 2020).

TEL is also starting to be used to tackle global workplace issues, going beyond the sphere of formal learning. The Learning From Incidents and Implementing Action (LFIA) project examined how companies in the

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energy sector used TEL to learn after incidents and prevent major disasters. After an incident investigation, energy companies leverage TEL to allow individual workers to learn using a summary of an incident, reflecting on how that incident is relevant to their own work practices (Littlejohn et al. 2017). Teams of workers are guided through the events of an incident and its implications by a team leader. For these 'learning sessions' to result in safer behaviour, the way in which workers are guided through the material must be based on pedagogically sound principles (Murphy 2020). While research suggests it is not currently playing this role, TEL could be used to provide structure and underpinning pedagogy to these learning sessions. As with all settings, LFIA demonstrates the need to judiciously consider what affordances of TEL can help learners to achieve their goals.

The Fleming Fund: Tackling Antimicrobial Resistance (TAMR) is another example of an OU research project that examines how TEL can be utilised to educate a large population and change workplace behaviour. Antimicrobial resistance is one of the world's current biggest threats. Tackling this issue requires co-operation and exchange of knowledge across multiple professions and at local, national and global levels (Charitonos and Littlejohn 2021). In the energy sector, technology was used to support learning through the creation and distribution of learning materials, with the greatest opportunities relating to embedding effective pedagogy. In contrast, TAMR aims to use TEL to educate professionals in low-to-middle income countries; the biggest value of TEL could be seen as delivering a consistent experience across diverse settings. There are many barriers to successful implementation of TEL in such a varied context, such as internet access (Charitonos and Littlejohn 2021). TEL can provide a flexible learning environment that allows the same material to be presented in multiple ways, allowing learners to make use of whatever is available at the time. A full-blown learning management system could be supplemented by a mobile text message–based system to deliver the same content. Both LFIA and TAMR highlight the potential for TEL to contribute to educating workforces to address issues of global importance. However, the purpose of TEL in workplaces varies greatly, and consideration must be given to how the cultural and social norms of diverse groups of people will influence its use (Cole and Engeström 1993). Universities are uniquely placed to provide guidance and support on how to use TEL in a pedagogically effective manner with adult learners.

Outside of the workplace, TEL is evolving to support lifelong learning for those who need to learn new skills quickly, especially for those who have limited resources. Mobile phones in particular have the power to transform and empower disadvantaged sections of society due to their ubiquitous nature in many countries. For example, research projects conducted at the OU have provided evidence that carefully designed smartphone apps can aid migrants in learning languages, succeeding in social situations and navigating a new city (Kukulska-Hulme 2020). Similarly, OpenTEL's MAZI project (*mazi* means 'together' in Greek) demonstrated the power of mobile technologies, even when disconnected from the Internet. The MAZI project team piloted the use of local networks hosted by Raspberry Pi computers that created learning resources which could be accessed by anyone in the surrounding geographical area, without the need for a stable internet connection (Gaved et al. 2019). A follow-up project (ARCLIGHT, Action Research Community Led Initiative Guyana Health Team) is currently using the technology as a tool to build community mental health resilience in Guyana.

Following COVID-19, higher educational institutions must consider what role they will take beyond providing degrees. While there has been a mixed reaction to the online migration, universities have quickly developed knowledge on how to educate using technology, something that will likely become increasingly important in lifelong learning. Professionally oriented short courses and micro-credentials are avenues that institutions are already exploring, but there is the potential for universities to use their new-found expertise in even more enterprising ways (Farrow 2020). For example, while guidance on TEL implementation in workplaces is currently mostly managed by large specialist firms, there is scope for universities to provide consultancy on how to effectively use TEL to support adult learning. There is also an abundance of opportunities for universities to use their knowledge and materials for social justice, supporting those in less privileged positions in developing the skills that could allow them to thrive. However higher educational institutions choose to support lifelong learning, and technology is likely to be at the core and require flexibility to cater to diverse learners.

How Inclusive Is Open Learning?

Perhaps in response to the potential for contributing to social justice mentioned in the previous section, higher educational institutions from across the world are showing increasing dedication to creating educational resources that are open to all. As previously discussed, the OU is a forerunner in that regard, providing education with no barriers to entry. Open education, however, has come to take on several meanings in the

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higher educational sector other than providing qualifications without barriers, incorporating many ways to expand existing approaches to knowledge construction, citizenship models and theories of identity. Taking advantage of technology, open forms of education could achieve scale and bring benefits to learners, teachers and organisations through diverse media in a wide range of social, cultural and disciplinary settings (Scanlon, McAndrew and O'Shea 2015).

The different ways that education can be 'opened up' are demonstrated through the work of the Global OER Graduate Network (GO-GN). GO-GN is a network of PhD candidates from around the world whose research projects include a focus on open education, open educational resources (OERs) and open educational practices. The network connects PhD students, experts, supervisors, mentors and interested parties to form an international community of practice (Weller, Farrow and Pitt 2019). Many participants in the network examine how learning content and practices can be made open, for example, through the creation of OERs, MOOCs or open textbooks (Pitt et al. 2020). Universities are already creating an abundance of high-quality content that is freely available online. As this trend continues post COVID-19, universities will need to carefully consider how the content they create adds value to what already exists or whether it is better to engage in reusing content with public copyright licenses supported by OERs.

However, open education goes beyond an ability to access a resource, and increasingly researchers are considering the accessibility of OERs and what values underpin their creation. Central to all open education initiatives are the values of diversity, equity and inclusion (Bossu et al. 2019). This means considering how resources might be used by diverse cultures, including recognising intergenerational barriers and historical legacies. For example, the language in which an OER is written has implications for its openness. Research has found that OERs are sometimes written in a relatively complex way, making them only accessible and useful to those who have a grasp of academic English (Rets et al. 2020). In response to these needs, tools are being created to empower learners in navigating the ever-increasing pool of OERs. YourMOOC4all, for example, is a MOOC aggregator which allows learners to evaluate and discuss the accessibility of a course in an open environment, following principles of universal design for learning (Iniesto and Rodrigo 2019). There are numerous reasons for universities to invest in creating OERs, from promoting their brand to addressing societal inequalities. As universities look at the possibilities of open digital education, they will need to consider not only what content they are creating but how that content is accessed and used for learning. Consideration of accessibility should be explicitly incorporated into the design process of OERs (Iniesto 2020).

Another example of a barrier that can prevent education from being open is a frequent task of contemporary life: form filling. The need to fill in online forms and complete administrative processes is ubiquitous and particularly an issue for learners with accessibility needs. Forms are commonly required before learners with accessibility requirements can access the support they need and are entitled to. However, navigating complex paperwork can be a near-impossible task for some of these learners without any help or support. This can prevent formal education from being 'open' to learners who would otherwise be able to succeed. The ADMINS (Assistants to the Disclosure and Management of Information about Needs and Support) project is creating a virtual assistant to tackle this issue. The virtual assistant can talk learners through the disability disclosure process, offering generic advice and guidance, and obtain more nuanced and relevant data from the learner. There is untapped potential for adaptable and accessible chatbots to reduce the burden of having to fill in forms and other administrative tasks (Lister et al. 2020).

The move to digital technologies following COVID-19 is in some senses making education more open, offering opportunities to integrate accessibility-related tools and start discussions on the experiences of learners. While the ADMINS project tackles a well-defined accessibility context, Our Journey (Coughlan, Lister and Freear 2019) is a tool that opens education by providing visibility into learners' journeys in education, using novel interfaces to provide insights into learners' mental health and well-being. Our Journey is a digital tool where learners can enter different events from their educational experiences and visualise their emotional journey in a board game–style display. Not only does this allow learners to consider their emotional expressions and see their progress, but the feedback can be used to inform educational design and learning pathways (Edwards and Gaved 2020). An increasingly digitised higher education system offers opportunities to collect data in different ways that are meaningful to learners and useful to institutions (Coughlan et al. 2019).

What Do Technological and Pedagogical Innovations Promise for Science Education?

Whilst many parts of higher education have moved online, there could be an argument made that some subjects, especially STEM, will always be

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primarily face-to-face due to the need for laboratory work. However, in this section of the chapter, we make the argument that fifty years of OU experience, together with several recent prospects, show that science education could be taken to learners wherever they are with due pedagogical consideration. We can identify a number of trends in contemporary pedagogy which have had and will continue to have an impact on science education. These include the realisation that we need to consider both formal and informal learning and to consider journeys between formal and informal learning as part of the learning process. In addition, there is also increasing recognition of collaborative work as important for STEM. The importance of facilitating remote collaborative learning, particularly through accessing remote laboratories, has been developing over the last twenty years.

One project that highlights the potential for universities, who choose to invest in online facilities for science, is the openSTEM Labs project. The openSTEM Labs project is changing the way scientists and engineers of the future are educated by making authentic online laboratory experiences possible (Jones et al. 2020). The Labs give STEM learners in any location access to a potentially unlimited range of cutting-edge scientific equipment and data through collaborative robots, electron microscopes, engineering workstations, particle detector cameras and more. All activities are underpinned by pedagogic research. From a learning perspective, lab work is essential for two reasons: it can offer learners immediate feedback on whether they understand fundamental principles and it develops practical skills that will be needed after university. OpenSTEM Labs provides opportunities for learners to benefit from these types of experiences, without the need to be physically in the same location as the equipment. As STEM workplaces move to incorporate new technologies, online laboratories offer learners the chance to develop practical skills by using software, remote equipment and simulations. From the perspective of receiving immediate feedback on whether underpinning theoretical concepts have been understood and can be applied, the Labs offers a similar experience to in-person laboratory experiments. A number of openTEL research studies have contributed to the development and evaluation of the laboratory for this purpose. For example, studies have evaluated the use of virtual microscopes (Herodotou, Sharples and Scanlon 2018), virtual field trips (Minocha, Tudor and Tilling 2017) and inquiry tools to support experiments (Herodotou, Villasclaras-Fernández and Sharples 2015).

With regard to the second pedagogical aim of STEM labs, developing the skills to collect accurate data, one option that is becoming increasingly popular is utilising mobile devices to contribute to citizen science projects. Citizen science platforms provide learners with the ability to collect and analyse data, contributing to large-scale projects (Scanlon et al. 2020). Building on studies of inquiry tools, research by members of the OpenTEL group led to the development of nQuire, a platform which was built to support personal inquiry learning among schoolchildren (Sharples et al. 2014) and then extended to work in different settings. The platform allows learners to engage with and contribute to ongoing scientific inquiry. One example of an activity using this approach is an exercise developed for the openSTEM lab, where postgraduate students accessed and studied moonrocks (Villasclaras et al. 2013). Developments on the nQuire platform have contributed to supporting the design and implementation of personally meaningful investigations outside the classroom, by young people but also citizens of all ages. With support from the BBC OU partnership, a version of the BBC's 'Tomorrow's World nQuire' platform has been developed to host multiple types of citizen science projects. Awareness about contemporary issues has increased in thousands of nQuire participants, including on the protection of pollinators and climate change. Citizen science allows learners to plan experiments and collect accurate data, skills which are key to STEM. Furthermore, it allows learners to begin to engage in a large collaborative scientific network.

Discussion and Conclusion

While the press has talked about the acceleration of the digital revolution brought about by COVID-19 (Times Higher Education 2020), the reality is that higher education has been making increasing use of TEL for decades. COVID-19 has catalysed this, highlighting both opportunities and potential stumbling-blocks for the future. The global experiment of most universities moving to online over the course of a few months has been a baptism of fire for many in the sector. There have, nevertheless, been success stories which are likely to leave many learners questioning whether they really need to physically relocate to receive a quality higher education. On the other hand, others will have had a suboptimal experience of online learning, leading them to question its value. The increased availability of OERs and the development of platforms, such as nQuire and OpenSTEM Labs, means that there is the potential for a revolution in terms of how universities provide degrees. While many learners will see the value of physically attending a prestigious university to establish social networks that will be a resource for life, others will perhaps question if the

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cost is too high amongst discussions of grade inflation and the decreased value of a degree (Bachan 2017). However, on a more optimistic note, embracing the digital has led to universities gaining valuable expertise and knowledge that will create many more opportunities for different modes of study.

One of the biggest opportunities comes with the developing notion of education being something for everyone throughout their life, wherever they are. Our discussion of the potential of citizen science demonstrates an interactive way of engaging learners with science, making use of the pedagogical benefits of inquiry-based learning at a large scale. Science is brought closer to the everyday life of learners, helping them understand and appreciate its value by developing bridges between formal and informal education. In this approach, science and education are not something that are done by experts in a bounded geographical location; instead, knowledge is created collaboratively and geographical dispersion becomes an advantage rather than a limitation. OERs are similarly leading to open and high-quality resources that individuals can take advantage of depending on their needs and interests. Both citizen science and OERs emphasise the importance of learning across settings, supporting self-regulated learning with the help of technology and social interactions and promoting lifelong learning aspirations. While universities have traditionally been seen as gatekeepers that guarantee the standard of formal skills associated with a qualification, their role is changing to be enablers of learning for people in both formal and informal settings. This evolving place in society means that there are many opportunities for universities, such as becoming consultants for workplaces on how to effectively integrate TEL.

However, as universities embrace the possibilities for supporting both formal and informal lifelong learning enabled by digital technologies, there must also be caution. As the OU has long been aware, diverse learners have diverse needs. TEL can tear down barriers to education but equally can create others. How technology is used to enhance any kind of education requires careful consideration of not only pedagogical principles but accessibility.

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CHAPTER 3

Online Learning
Expectations versus Reality

Irina Shcheglova, Ksenia Vilkova and Oksana Dremova

The products of digitalised higher education potentially could disrupt traditional higher education. The potential varies from big social goals, such as free access to quality higher education for all (Kizilcec et al. 2017), to smaller ones, such as flexibility with full control of the schedule including more time for sleep and accountability for student learning (Saunders 2019). Various types of students are supposed to benefit from this opportunity. Overseas students can enrol and study at their first-choice university without leaving home and therefore save the cost of relocating and living abroad. Students who experience problems being actively involved in traditional classrooms, for example, those who are hesitant to speak in seminars, may do better in online learning (Khalili and Ostafichuk 2020). Employed students can study at their own pace due to the freedom provided by online learning (Saunders 2019).

In 2012, based on the Future of Higher Education report, 60 per cent of surveyed experts said that higher education would be different in twenty-five years and predicted the mass adoption of web conferencing and distance learning (Roscorla 2012). Six years later, in 2018, some researchers even started predicting that physical campuses will not exist in the near future (Pradella 2018). However, studies which have investigated the achievements of students enrolled in online courses and their attitude toward online learning show mixed results (Paul and Jefferson

The data was collected in the study 'Monitoring of Student Experience' of the Consortium 'Evidence-based digitalization for student success' (https://en.edtechdata.ru/conso). We express our special gratitude to the coordinators of the universities participating in this study: Tatyana Apollonova (Yaroslavl State Technical University), Yulia Tsofina (Yaroslavl Demidov State University), Ksenia Lyakh (Novosibirsk State Technical University), Ksenia Mertins (Tomsk Polytechnic University), Olesya Shulezhko (Ilya Ulyanov Ulyanovsk State Pedagogical University), Kirill Zakharyin (Siberian Federal University), Natalia Zagritsenko (Southern Federal University), Evgeny Ledkov and Nikita Tutykhin (Far Eastern Federal University). The authors would like to express their gratitude to Jamie Costley for his valuable comments and recommendations which helped significantly improve the chapter.

2019; Chirikov et al. 2020). Until now, there hasn't been sufficient evidence to judge whether online education can disrupt traditional higher education.

The COVID-19 pandemic measures, including online teaching and learning, serve as a natural experiment to test the promises of online education and put the whole system of higher education in the spotlight. This chapter discusses how there is more to be known about the gap between the expectations and the reality of implementing online learning in higher education and describes some of the benefits and challenges of online learning during the lockdown and formulates the lessons learned from the experiment.

The Promise of Online Education

Online education has promised to provide equity in educational opportunities among students with different backgrounds in various regions (Li et al. 2014; Kizilcec et al. 2017). This was to be achieved with the help of the Internet, making information resources, lectures and seminars from different universities available to students in all parts of the world. The flexibility of online education allows students to save time, effort and money on commuting to the university campus, which is especially significant for students with disabilities and for those who live far from the university. Online education also makes it easier to invite an instructor from a remote geographical location to deliver online lectures or seminars. As a result, students may have a chance to meet and ask world-class experts about different questions of interest in real time, which makes their learning experience more compelling. Because less economically advantaged students may not have an opportunity to afford either high-speed internet or the necessary technology needed to access high-speed internet, this is one of the most important barriers to quality online education for all (Kizilcec et al. 2017). More specifically, as the impact of COVID-19 on higher education has shown, universities in developing countries have faced serious IT infrastructure and internet access difficulties during the transition (Salmi 2020).

Information and communication technologies (ICT) are supposed to offer great opportunities for effective communication and interaction in the online classroom (Markova et al. 2017). Some research shows that students are generally satisfied with online learning, not only due to its convenience but also due to new methods of virtual instruction and interaction (Markova et al. 2017). Therefore, teaching in the online

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learning environment may be more student-centred and stimulate greater student participation than in offline classes (Ni 2013). Other studies demonstrate that students may feel uncomfortable asking questions during online lectures or seminars because of the fast pace of the class, students' shyness, low self-confidence or fear of peer/educator's judgements (Khalili and Ostafichuk 2020). In order to tackle this issue, students are offered different online platforms, forums and chats to write their questions, so the instructors can collect them from students who are usually reluctant to speak in a traditional classroom. Students feel more confident to comment in the chat, forums or other platforms, as they reduce the pressure of giving opinions and provide more time for reflection. Thus, online education increases students' learning potential, especially for those 'shy' students who might never ask a question during face-to-face instruction (Driscoll et al. 2012).

The flexibility and self-paced structure of online learning was meant to allow learners more time to sleep. This is important because the majority of students suffer from a lack of sleep (Huen et al. 2007). Previous studies found a strong relationship between sleep duration and academic outcomes in traditional education. The results demonstrate that sleep deprivation can negatively impact students' memory and concentration, leading to poor academic performance and health problems (Rose and Ramanan 2017). Online education provides a solution to this issue as it allows students the flexibility to choose the best time for studying according to their biological clock (Horzum, Önder and Beşoluk 2014).

One more benefit of online learning is a possibility to create one's own learning environment. Students have an opportunity to choose any study place with the internet access that suits them most or easily adjust it to their lifestyle, so they are less distracted from online classes (Bray et al. 2008). Such flexibility provides students with mobility; for instance, working students can access study materials while commuting to and from work (Saunders 2019). This allows students enrolled in online courses to do academically better compared to those in traditional format courses (Paul and Jefferson 2019).

However, despite the potential benefits of online learning, there are studies that do not find significant variance in student academic results between online and traditional education (Urtel 2008; Chirikov et al. 2020). The flexibility of choosing a convenient time and place for studying makes it more difficult for students to actually study, as they may have issues with finding such a place or with self-organisation and time-managements skills (Markova et al. 2017). It is mainly students who already have high levels of self-regulation and intrinsic motivation that can benefit from online learning (Kaplan and Haenlein 2016). Not many students understand how to make their learning process more efficient, for example, setting learning objectives, monitoring and reflecting on their achievements (Zimmerman 2008). Markova et al. state that online education itself stimulates the development of self-study skills, organisational competencies, time-management skills and the ability to work under pressure (2017). Nevertheless, the development of all those skills in an online environment is still challenging, which is why the effectiveness of online learning is controversial.

To sum up, online education provides much promise for learners even though it requires many conditions to be met. Based on the literature review, we highlight some significant and at the same time contentious promises of online learning:

- students can easily adjust their working space to have productive online classes;
- students feel more comfortable asking questions during online classes;
- students enrolled in online courses have more time for rest and sleep;
- students' overall estimation of online learning is higher than that of traditional learning.

In this chapter, we test the fulfilment of these promises. We also examine student experiences of online learning during the COVID-19 pandemic and discuss whether online education can substitute the traditional educational format.

Analytical Strategy

As previous studies show, before the COVID-19 pandemic neither the instructors nor the students at Russian universities had much experience with online learning (Roshchina et al. 2018). However, from March 2020, all Russian universities, following the recommendations issued by the Russian Ministry of Science and Higher Education, had to move the learning process online.[1] Although some universities were more ready than others to go fully online, universities had no other choice. In Russia, universities are under governmental control and 95 per cent of budgetary funding is federal (Platonova and Semenov 2018). The Russian Ministry of Science and Higher Education has the right to provide strict recommendations to universities that the universities must follow and also to

[1] https://5top100.ru/en/news/119882/.

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assign admission quotas, implement federal programmes, grant licenses and accredit institutions (Platonova and Semenov 2018).

The empirical data were collected through the project 'The monitoring of student experience at Russian universities', carried out in spring 2020. We gathered the data through an online survey using the Enjoy Survey software. During April and May 2020, students of eight Russian universities were recruited through administrative mailing, placing personalised links on university online platforms and in the social network VKontakte. The response rate ranged from 2 per cent to 54 per cent in different universities with a mean response rate of 16 per cent.

The survey monitored student experience at universities before the COVID-19 pandemic and during the lockdown. The following topics were covered: motivation to get a degree, student engagement, time-use, extracurricular activities, student satisfaction, future career opportunities, attitudes toward digital technologies and the learning process during the COVID-19 pandemic. The questions included in the analysis for this chapter are related to students' educational experiences during the COVID-19 pandemic: how distance learning was organised at their university, what obstacles students met during distance learning and what changes the lockdown brought into students' lives. Distance learning as one of the measures to manage the pandemic has influenced students' daily routine; however, we cannot clearly separate the effects of lockdown and distance learning.

Participants

The sample consists of 5,464 undergraduate students from eight Russian universities, 61 per cent of the respondents are female. The sample is slightly shifted toward first- (29 per cent) and second-year students (26 per cent); third-year students are 22 per cent of the sample, fourth-year students represent 19 per cent and fifth-year students 4 per cent of the respondents. Most of the students are majoring in engineering and technology (53 per cent), 22 per cent of students are specialising in education, 17 per cent of students in mathematics and natural sciences, 6 per cent in social sciences and 2 per cent in other majors.

Results

Based on the literature review, it was hypothesised that students can easily adjust their working space to have productive online classes. However, the

Table 3.1. *Distance learning formats: Difficulties*

Checked, per cent	
It is difficult to study at home or in the dormitory	42
It is difficult to concentrate when studying the material on my own	42
I experience a lack of communication with my classmates	36
I find it difficult to keep my attention when watching video lectures	25
I feel more alone and isolated	24
I find it difficult to understand the interface of online courses and programmes	13
I don't have any suitable devices (for example, a computer with Internet connection)	7
I haven't had any obstacles related to the learning process	11

sudden directive to leave university campuses and study from home was hard for all students. According to the results, only 11 per cent of the surveyed students did not have any obstacles related to the learning process during the lockdown. Most of them struggled with the 'clumsy' transition to distance learning (Table 3.1).

Leaving campuses for online learning from their home or a dormitory negatively affected students' learning experiences during the lockdown: 42 per cent of them mentioned difficulties with finding a convenient place to study at home or in the dormitory; 25 per cent of students found it difficult to maintain their attention during video lectures; and for 42 per cent of surveyed students, it was difficult to concentrate when they were studying the material on their own. Obstacles related to self-regulated learning skills were even more prominent than technical issues like an absence of technology (7 per cent of students) or difficulties related to working with the online platform or software used for distance learning (13 per cent of students).

It was hypothesised that students feel more comfortable asking questions during online classes. However, assessing their experience, students complained that they were deprived of socialising with their peers and instructors not only because of the pandemic measures but also due to the nature of online distance learning. Only 23 per cent of students found it easier to ask questions and participate in discussions during online classes (Figure 3.1).

Our data partly support the hypothesis that, during distance learning, students have had more time for rest and sleep. Most students (61 per cent) said that the new learning mode helped them to get more time for sleep (Figure 3.1). However, it seems to be one of the few positive

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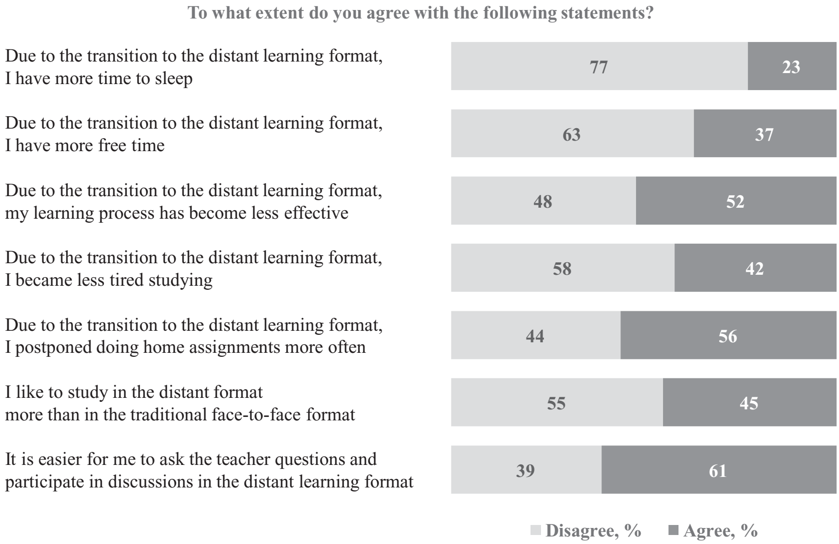

Figure 3.1 Student experience evaluation of distance learning

outcomes. After switching to the distance learning format, 55 per cent of students mentioned that they had less free time despite having a much less active social life. It seems that this should result in students spending more time devoted to learning, however, instead of this, students started to spend more time procrastinating: 55 per cent of them more often postponed doing assignments during distance learning than during offline classes.

Students also reduced the time or stopped doing extracurricular activities (47 per cent), going to the gym (50 per cent), attending cultural events such as concerts and exhibitions (63 per cent), visiting relatives, friends, going to parties and meeting friends (69 per cent). As a result, 24 per cent of students said that they have started to feel lonelier and more isolated even though communication with friends and relatives via social networks and messengers became more frequent for 26 per cent of students.

As a result, 56 per cent of students considered their experience with online learning as less effective, and 63 per cent of them reported that they liked offline classes more than online ones. We can conclude, contrary to our hypothesis, that students' overall estimation of online learning is lower than traditional learning.

Conclusion and Discussion

Although much hope was placed on online learning, until recently there has been no opportunity to test whether it can be a widespread viable alternative to traditional higher education. The year 2020 showed that some predictions educators made about the future of online learning, including questioning the need for physical campuses, are realistic (Roscorla 2012; Pradella 2018). However, the suspension of face-to-face classes in 2020 was a forced step caused by the COVID-19 pandemic, not a free choice. It brought uncertainty to all levels of education, affecting nearly 1.6 billion learners in more than 190 countries.[2] Nevertheless, this created special conditions for a natural experiment that allows us to compare some of the expectations to the outcomes of the implementation of online learning in higher education.

As the results demonstrate, a fully online learning mode is possible, but it does not make students' lives easier or more enjoyable. This study shows that students could not easily adjust their working space to have productive online classes. During fully online distance learning, students complained that they found it difficult to ask questions, focus their attention when a teacher delivered material or find a comfortable place for studying. Therefore, they spent more time procrastinating than learning. Although students had more time to sleep, they reported that they were not less tired than in traditional educational environments. The major problem of the online format was lack of both formal and informal communication with teachers and peers. Consequently, the majority of students estimated their learning as less effective and expressed a desire to return to the traditional classroom.

Although the results of the study suggest that the expectations of online learning were not fully met, there are some good lessons to be learned from the experiment which could help online distance education live up to its promise in the future.

Lessons learned:

- Space for study and academic infrastructure are essential elements of productive learning. It might be thought that there is no more comfortable place than home. However, the home atmosphere may distract

[2] United Nations, Policy Brief: Education during COVID-19 and Beyond. www.un.org/development/desa/dspd/wpcontent/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf.

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some students from studying. Those students find it difficult to organise their study environment properly and it leads to procrastination.

- Emotional ties are highly important for education. Students suffered from a lack of face-to-face communication, the absence of personal feedback and missed the atmosphere of the physical campus. Therefore, we should not expect that university campuses will disappear any time soon.
- Strong self-regulated learning skills are necessary for students to learn productively in the online format. Therefore, it is a priority for universities and teachers to help students develop these skills. There are various techniques which help to foster and assess student learning (as an example, see the course 'Rationale and goals of involving students: improved learning & self-regulation').[3]
- New formats of delivering and practicing materials have to be created and implemented in online learning. Just sending out materials for self-study will not satisfy learners. Therefore, pedagogical practices and learning models require transformation. Creative courses with emotional depth could become a new trend while trivial and boring content will fade. Digital learning systems which model real life situations and offer students tasks in a game format or simulations with the help of artificial intelligence (AI) could make online learning more effective.
- The latter can be achieved if faculty members get the necessary training on how to employ new ICT tools and AI mechanisms and adapt teaching methods to online learning, so that they are able to evaluate and keep track of students' progress more efficiently. This may also lead to higher quality online education.

As the studies conducted during the active phase of COVID-19 outbreak in various parts of the world showed, moving to a new learning context can be a painful process (Kaplan 2020; Agasisti and Soncin 2021; de Boer 2021). However, pain is often the signal of new developments. As correctly stated in the first chapter of this book: 'Nothing is constant except change', even within such an inflexible and risk-averse context as academia, one can transform under certain circumstances. The circumstances, caused by the coronavirus pandemic, boosted innovative initiatives at some universities. Just to name a few initiatives, Tsinghua University in China managed to move online not only teaching but also various extra-curricular activities

[3] www.coursera.org/lecture/learning-assessment/rationale-and-goals-of-involving-students-improved-learning-self-regulation-WghWh.

(Yang and Huang 2021). Students' Union of Tsinghua University launched a series of online extra-curricular activities 'Charging at Home – 1 hour indoor exercise plan', which required participants to exercise at home daily for at least one hour under the online supervision of a coach. HSE University in Russia launched HSE Minecraft – an online project that brings together students to all HSE campuses under one virtual roof.[4] NEOMA Business School in France opened a 100 per cent digital campus that allowed the mirroring of the interactions and atmosphere of a real campus from a remote location.[5] These initiatives are clear proof that the pandemic did not put learning on hold. Instead, novel endeavours in online education have emerged. The pandemic managed to change not only how things work in academia, but it also changed people in academia. Returning to the main question whether the virtual university can replace the physical campus one day, we think it is not likely now or in the nearest future. For this to happen, the five lessons elaborated above and in the first chapter have to be embraced and internalised in the field of education.

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[4] www.hse.ru/en/minecraft.

[5] https://thepienews.com/news/europe-first-100-virtual-campus-opens.

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CHAPTER 4

Social Exclusion and the Digital Divide
Digitalisation's Dark Side

Mmabaledi Kefilwe Seeletso

In this advent of the Fourth Industrial Revolution (4IR), the whole world is embracing technology for various practices. The education sector has also been affected by these winds of change. Institutions of higher learning are now bracing themselves for this major shift resulting from digitalisation, as characterised by migration from the conventional, face-to-face to online teaching and learning. This chapter, which is conceptual in nature, explores the use of technology in the delivery and support of programmes in institutions of higher education in the digital era. In the chapter, it shall be argued that digitalisation is a good and noble initiative that institutions of higher education need to adopt to facilitate successful online teaching and learning. However, this chapter will further discuss the dark side of digitalisation, especially in developing countries, where it often leads to the disruption of higher education. It is the author's view that in some developing countries, especially in Africa, digitalisation has resulted in both social exclusion and the widening of the digital divide.

In this era of digitalisation, it is important to align technology to the processes of teaching and learning. Nowadays, most people have smartphones. In the developing countries of Africa, mobile phones were never allowed in schools in the past. Their use in learning institutions was almost non-existent. They have only been embraced as learning tools at the advent of COVID-19. This goes to show that in most developing countries benefits of mobile phones only get recognised during crisis situations. This is in spite of the acknowledgement that digital technologies can boost growth, expand opportunities and improve service delivery (World Bank 2016, p. 2). As such, technology tools need to be embraced and used as catalysts for development by all sectors.

Technology has totally changed the education landscape and made learning more interactive. The Internet has enabled the introduction of e-learning, commonly known as online learning. Farley and Willems (2017, p. 69) note that 'on May 16, 2011, the United Nations declared that access to the internet was a human right'. This clearly has implications on higher learning institutions to ensure the provision of internet services for students to access the technologies they need. O'Malley (2020) has warned that the rush to digitalisation at the outbreak of COVID-19 has created a digital divide which might be catastrophic for many students, especially those who have been depending on institutional resources having to now fund their own resources. O'Malley further cautioned that students from poorer backgrounds may have to stop studying due to lack of resources that enable them to continue with their studies. It means, therefore, that access to technology alone is not enough. Students need to be shown how to use the very technology they now have to access.

This chapter is divided into four sections. In the first section, the introduction and definitions to key words as used in the chapter are provided, namely: crises situations, developing countries, digital transformation, digital divide, disruption of education, higher education, social exclusion and online education. The second section will foreground the topic through the lens of van Dijk's Resources and Appropriation theory, which contends that the inequality that exists in society is a direct result of unequal access to the Internet. The third section discusses pertinent issues on digitalisation of higher education. In this section, possibilities and challenges of digitalisation will be discussed. This section appreciates that though digitalisation is a noble process that has revolutionised higher education, it also presented barriers that brought to fore its dark side. The fourth section, will present the conclusion. Here, the author highlights key issues that have impacted on digitalisation of higher education in developing countries.

Defining Keywords

In this section, key words as used in the context of the chapter have been defined. Though there are definitions as provided by authorities, there are common definitions to the keywords that the author defined as used in the context of the chapter.

- *COVID-19* is defined by Zu et al. (2020) as 'pneumonia associated with a novel coronavirus, severe acute respiratory syndrome (SARS) coronavirus 2'. This definition has been corroborated by (Zheng et al. 2020).
- *Crisis situations* involves a period in life characterised by turmoil and stressful periods. In crisis situations, normal daily activities are greatly

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disrupted. These situations can arise as a result of wars, floods, pandemics (at the moment we are faced with the COVID-19 pandemic), amongst others.

- *Developing countries* refers to those countries of the world on the verge of adopting technology which may prove to have an impact on the growth of their economies, though with challenges. We continue to witness rapid spread of technology in developing countries fuelled by the Internet.
- *Digital divide* refers to the gap or uneven access to computers and internet connection to people. Digital divide can be linked to digital exclusion which reduces chances of interacting online. Digital divide further increases inequality in access to technologies and can thus worsen exclusion. Digital divide has the potential to create a gap between people who are not able to benefit from the digital revolution and those who are able to benefit. This remains clear because of the inequalities that exist in the world we live in. Furthermore, digital divide assumes that a gap exists which sets digitalisation and user(s) apart. In the technology terminology, this can be referred to as those with digital access and those without. One can, therefore, argue that digital divide can indeed limit access to knowledge. Digital divide leads to digital exclusion, which, as argued by Martica, Hope and Zubairi (2016, p. 2), 'involves unequal access and capacity to use technology that is seen as essential to fully participate in society'.
- *Digital transformation* can be viewed as technological changes that we are currently experiencing in the advent of digitalisation. Serafino (2019, p. 2) explains that 'technological change means that digital skills are increasingly important for connecting with others, accessing information and services meeting the changing demands on the work-place and economy'. Rossikhina, Rossikhin and Kaganovska (2019, p. 741) note that 'digital transformation refers to the process of digitalisation, which simplifies access to information'. Digital transformation needs internet access to happen. Internet access can be viewed as being 'able to access internet by whatever means . . . digital skills refer to those skills that are needed to safely and competently use the internet' (Serafino 2019, p. 2).
- For this chapter, *disruption of higher education* has been used to explain a negative change to higher education due to digitalisation. The education sector had to respond to the rapid changes in education caused by the introduction of technology. This change continues to bring with it all sorts of uncertainties; from barriers to access, lack of resources and lack of expertise, among others.

- *Online learning* allows content to be accessed across geographical borders, with teaching and learning taking place anywhere, anytime. In this chapter, online learning will be used to mean the same concept as electronic learning (e-learning).
- *Social exclusion* is a multidimensional phenomenon and there is no one word that can adequately explain what it means. The concept can involve depriving people resources, especially the already disadvantaged or marginalised sections of the population. People who are socially excluded are unable to fully participate in activities that directly affect them. Social exclusion also involves individuals denied access to various factors they need to improve their livelihoods. Martica, Hope and Zubairi (2016, p. 4) view social exclusion as '(in)capability to take part in life of the community that affects individual quality of life and the equity and cohesion of society'.

Research Questions

The following research questions will guide the discussion in the chapter:

- What does digital transformation involve?
- What are the possible effects of digital transformation to institutions of higher education in the developing countries?

Theoretical Framework

This chapter is informed by van Dijk's Resources and Appropriation theory. The theory argues that 'inequality in society produce an unequal distribution of resources and that an unequal distribution of resources causes unequal access to the internet' (van Deursen and van Dijk 2019, p. 356). The scholars further state that in the context of the theory, access to internet refers to 'a process of appropriation that starts with general attitudes toward the internet and advances to having physical and material access' (p. 356). Van Dijk (2005) identifies and argues that a sequential relationship exists between social inequality and unequal access to digital technologies. The Resources and Appropriation theory further contends that there is a direct connection between digital exclusion and social exclusion. This is corroborated by Elliot (2018, p. 38) in the report on 'Building the Digitally Inclusive Community', where an observation was

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made that 'digital participation can help to mitigate the social exclusion by introducing disadvantaged groups access to benefits of internet use. However, as long as social inequalities remain offline these will translate into inequalities online as those who are socially excluded are less likely to have access to the internet and lack of digital skills'.

Pertinent Issues on Digitalisation of Higher Education

With pandemics such as COVID-19, digital transformation has become an overnight priority in higher education. In Chapter 1 of this book, Kaplan makes an observation that when the COVID-19 pandemic continued to disrupt the education sector across the globe, even academics proved that they can indeed be flexible to change as they immediately shifted to online delivery. However, Adnan and Anwar (2020, p. 49) observed that 'online learning cannot produce desired results in underdeveloped countries' due to a number of challenges. These include among others, internet access. This holds true for some developing countries in Africa. This is the reason why in some developing countries such as Botswana, South Africa and Kenya some internet providers and learning institutions have collaborated to subsidise internet access for institutions' websites to support online learning. Through this arrangement, students were able to freely access the Internet. This helped, as it minimised disparity between those with access and those without. However, the arrangement was only for a short term as an immediate response to the COVID-19 pandemic.

Virtual classes have proved to be a turnoff to some students who prefer face-to-face contact and classroom socialisation. Lack of campus interaction, which leads to lack of socialisation and delayed response from instructors that characterise online learning seem to worsen the already volatile situation of rejecting technology by some students. Some students remain dependent on university resources such as electricity, reliable Wi-Fi and a conducive environment to study in. However, online learning that has to be done at home deprives these students of such resources. This deprivation makes clear the digital divide and inequality that affect disadvantaged members of many communities in developing countries.

Computer literacy is needed as a foundation for digital literacy. The digital revolution remains the main trend in education, especially during the times of global pandemics such as COVID-19 and other crises, leading students requiring acquisition of new competencies as well as the need for reorganisation of the educational landscape.

Possibilities of Digitalisation of Higher Education

Digitalisation can positively change the face of the earth. Glushkova et al. (2019) contend that internet technology has significantly changed the economies of developing countries. The same holds true for the education sector. Students and academics in higher education need to regularly use technology to develop confidence and acquire necessary skills to use technology tools which help facilitate collaborative learning. The use of technology brings students together virtually while physically apart. Online teaching and learning enhance learner-facilitator, as well as learner-learner interaction. This results in increased learner persistence and improved academic performance. Online learning facilitates social presence, which provides virtual but immediate learning space necessary for effective distance education. Collaborative learning further facilitates social presence in a virtual classroom. This collaboration and presence in a virtual classroom has to be a result of a great innovation in the design and development of content. As such, academia needs to come on board and embrace online teaching and learning for the processes to be successful.

Digitalisation of education allows for collaboration, and its good effects make a positive contribution to online resource knowledge. It helps promote collaboration between universities in the use of digital technologies. Digital space further opens up new opportunities for education that never existed before. With the digital revolution, students are able to develop the much-needed competencies for the twenty-first century. Learning also becomes more effective and exciting when supported by technology. Digital teaching and learning has made the processes more inclusive than before. People living with disabilities are also taken on board as a result of innovation that comes with online learning. They are thus able to interact with their peers, knowing that they are never alone.

Rossikhina, Rossikhin and Kaganovska (2019, p. 741) highlighted that 'the world is digital today. In order to have the necessary competencies of the twenty-first century, children should receive them at school'. Digital technology provides opportunities to access various sources of information. It further facilitates increased efficiency and chances for creativity. This, therefore, dictates that no educational institution can afford to keep away from the digital revolution. Research has shown satisfying internet experiences such as students being able to search for and find materials. Students are able to scan files to upload and use as necessary. Generally, it has become clear that with the introduction of online learning, innovations that would have normally taken years to implement are now being

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prioritised and introduced urgently. Online learning has, over time, been able to increase participation in higher education which some years ago 'was limited to a precious few' (Kaplan and Haenlein, 2016, p. 442).

Challenges of Digitalisation of Higher Education

Further research has shown that there is unequal access to technology necessary for online teaching and learning. This unequal access impacts negatively on effective online delivery. Most institutions implement online delivery during crises situations. Online learning platforms are usually non-existent in most conventional universities even though governments insist on online delivery. Institutions would then rush to implement online delivery only in response to a crisis situation such as what is currently prevailing. Availability of gadgets to facilitate online learning is also not easy. Private institutions of higher learning in developing countries such as Botswana can afford to provide their staff and students with laptops, but access to devices in most public institutions remains a challenge. Though learning devices can be availed by some institutions, internet connection remains a general problem due to power outages and low bandwidth. One can therefore safely argue that crisis situations such as COVID-19, wars, floods and others have a potential to highlight existence of digital inequality that has been in existence.

It is further evident that institutions, students and educators in most developing countries are not yet ready for the digital revolution. Many still have fear and reservations about online or digital learning, citing lack of access to internet facilities, lack of proper interaction and ineffective technology (Adnan and Anwar 2020).

Lack of technological skills and expertise contributes drastically to the digital divide, which ultimately leads to social exclusion for some people, especially students. Most students in developing countries have limited experience with online teaching and learning. This is because of the shortage of resources such as internet and devices that are necessary to facilitate and support teaching and learning. Resources are a serious barrier to access; internet signals are problematic, with already limited access. Internet is also unaffordable to many citizens of developing countries, with prohibitive costs for regular online connection and gadgets. Serafino (2019, p. 2) observes that 'this is leading to a digital divide between those who have access to information and communications technology and those who do not, giving rise to inequalities to access opportunities, knowledge, services and goods'.

Technologies for teaching have been around for a while but not used as a tool for teaching and learning by many institutions of higher learning in developing countries. The imbalance in accessing technology in most developing countries can possibly lead to a digital divide. Face-to-face methods of instruction have always been dominant, despite calls to integrate technology in teaching and learning. As such, when the COVID-19 pandemic that the world is currently facing gained momentum, most institutions of learning, across all levels, had to immediately switch to online learning. To stay afloat, higher education institutions had to immediately switch to online learning too. This sudden switch to online learning brought with it a number of challenges as discussed in the next section of the chapter.

Lack of Resources

Students from disadvantaged backgrounds do not own gadgets nor have the money to buy them. Others may have gadgets to access online learning but no data bundles to access materials. Most of them are faced with the challenge of having no internet connection at home, making it difficult to continue with their studies. Despite this challenge facing the disadvantaged section of the population, it is common for people with high income to have multiple gadgets, usually the best. It is common for lower income earners to share a gadget between members of a household, especially smartphones, which they use for learning. In some cases, there will be absence of online learning platforms. In some African countries, there is a great disparity in the availability and use of technology equipment and bandwidth across households, especially among the disadvantaged areas and members of the society. Some African countries continue to experience shortage of resources such as internet and devices needed to facilitate and support teaching and learning. For developing countries, there is evidence of limited access to fast, affordable and reliable internet connections due to lack of necessary infrastructure to support online teaching and learning. It is important to note that access to internet is about access to digital devices and services at a time and place convenient to whoever needs to use it.

Lack of Skills and Expertise

Lack of technological skills and expertise is yet another serious barrier that hinders digitalisation of higher education. It is important for students to possess the necessary internet skills to be able to learn through the digital platforms. Internet skills in this context refer to getting online and being

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able to navigate to what one wants. If one does not possess the necessary skills, they can lose digital access, and this will mean losing access to other pertinent activities such as doing their assessment. Some students may have access to devices but lack sufficient technology and digital skills to effectively study online. Serafino (2019, p. 2) contends that 'users of the internet can still be digitally excluded because they lack the skills to be able to confidently and safely navigate the digital world'. Other students fear technology as they have never experienced it before. They do have neither the knowledge nor skills to handle online applications and platforms. Some of the students may have no skills to use the gadgets for accessing the Internet. In some countries, students do not even have an email account. Some inexperienced staff can also resist new digital initiatives if the leadership has not encouraged them to embrace and trust the change to facilitate innovation. Indications are that both students and educators may not be ready for this sudden digital transformation if online methodologies are introduced without the necessary expertise and resources to achieve it. During the COVID-19 pandemic, it became apparent that online learning facilitated social communication and promoted physical distancing rather than social distancing. This is because digital learning is characterised by lack of campus interaction, which leads to lack of socialisation and delayed feedback from instructors, further frustrating the learners.

In developing countries, with the advent of digitalisation, virtual classes that characterise teaching and learning have become a turnoff to students who are used to face-to-face, classroom contact teaching. Digitalisation of higher education resulted in societal and educational inequalities between public and privately owned educational institutions becoming more predominant since others would be better equipped and more experienced than others.

Lack of Infrastructure and Support

Institutions of higher learning in developing countries still lack necessary infrastructure to support online teaching and learning. In most of these countries, there is still a shortage of the latest technology which impacts negatively on digital learning. Poor network connections lead to frustrations and anxiety among students who, for various reasons, fail to do their schoolwork. This is corroborated by Kaplan, when he made an observation in Chapter 1 of this book that online learning will never come cheap as more resources will be needed to ensure its success.

Conclusion

This chapter explored possibilities and challenges that students and educators face when doing online learning. The whole world has now moved on and is living in the digital age, and unfortunately, those not engaging effectively with the digital world are at the risk of being left behind for good. Students of lower socio-economic backgrounds who do not have access to digital technologies need to be supported and provided with gadgets such as tablets or laptops. They cannot be left behind since digital technologies are becoming enablers for change in higher education. Support from internet providers is key as it can help bridge the digital gap between the 'haves' and the 'have nots'.

There is a need for inclusion when thinking about teaching and learning in the digital era. For instance, inclusion is never easy for people with disabilities, which can therefore lead to both social exclusion and the widening of the digital divide. In African countries, there is a need to educate the population, across all generations. From the literature, it is clear that older parents do not have the same understanding regarding the importance of digitalisation. Research shows that some older people, especially in African countries, grew up without internet. As such there is often a clash between this older generation and the younger ones as older parents do not understand the need and role of internet in education. This being the case, it makes them think their children do not need it. Digitalisation of higher education is here to stay and continues to advance with time. The leadership of African countries need to provide the necessary support to educational institutions and the entire education sector to break the barriers that make it difficult for students to effectively use technology for learning. Students from poorer backgrounds need to be supported in their learning. They need to be provided with the necessary resources to enable them to continue with their studies even in the advent of online teaching and learning. Otherwise, they will remain sidelined, making access to education appear to be more of a privilege than a right to them.

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CHAPTER 5

Internationalisation of Higher Education
The Case for Virtual Collaboration

Jesús Pineda, Alexander Knoth and Dagmar Willems

Throughout the course of history, higher education has developed to be international due to its pursuit of universal knowledge and the intended exchange of ideas between often mobile students and scholars. In the last half a century, the discourse of internationalisation has gradually changed. There has been an observable shift from mere development cooperation to an exchange of students and teachers, collaborative curriculum development and even active transnational education (see De Wit 2013). Common practices within academia, which have progressively developed over centuries in search of a shared sense of culture and the rational development of modern civilization, have been shaped and standardised in recent years through policies and top-down decision-making processes. This is exemplified by the variety of funding schemes (e.g., Horizon 2020, Erasmus+) and internationally oriented institutions (e.g., European Association for International Education, Asia-Pacific Association for International Education, NAFSA Association of International Educators) which can be found around the globe. In this context, it can be argued that international exchange and scientific collaboration across borders have become an indicator of higher education systems' sustainability.

In the framework of its strategy, the German Academic Exchange Service (DAAD) devotes its efforts to enhancing international collaboration for the benefit of science, industry and society as well as to assuming global responsibility and contributing to development and peace (DAAD 2020a). In recent years, an important goal has been to answer the question of how international collaboration and student mobility can be enhanced through digitalisation. Many initiatives had been triggered due to innovation concerns, an increased awareness of the importance of digital skills for contemporary (work) life as well as climate policies.[1] In light of the

[1] For a more in-depth discussion of the climate dimension, see the impulse paper 'Sustainable Mobility – How Do We Organise Internationalisation of Higher Education and Science in a

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COVID-19 pandemic, however, further developments can be observed in the discourse on digitalisation of higher education in Germany and elsewhere. An unprecedented acceleration of the implementation of digital communication tools has been documented in everyday practice. Education systems and the labour market have faced a great deal of challenges in transforming established processes on short notice and across country borders through the use of digital alternatives (Byrnes et al. 2021; Matthiessen 2021; Seinsche et al. 2020). It is paramount to reflect comprehensively on these recent phenomena as well as their possible impact on the post–COVID-19 world of higher education. This chapter reflects on the complexity and opportunities of international collaboration in an increasingly virtualised world based on the recent work of the Digitalisation Section of the German Academic Exchange Service (DAAD). It provides an overview of current debates as well as critical considerations of future applications.

The International Collaboration Paradigm in Higher Education

For the purposes of this chapter, international collaboration is understood as the commitment to pursue shared interests with a common goal through the joint efforts of multiple countries' higher education systems. Collaboration and cooperation can often be understood as synonyms in the context of international higher education. A main distinction of both concepts is that collaboration goes one step further, from the individual resolution of a problem by many actors to the joint accomplishment of a common mission, as it will be argued throughout this contribution. This trend can be observed in different domains such as bilateral and multilateral agreements, sharing of infrastructure, development of joint projects, scientific and technological cooperation and student as well as staff exchange. Extensive research has been conducted on international collaboration in scientific research (Qinchang, Liu and Du 2019; Steel et al. 2019), teaching (Cronin, Cochrane and Gordon 2016; Stornaiuolo 2016), curriculum development (Walpole et al. 2017; Caniglia et al. 2018), institutional impacts (Badzińska and Timonen 2020; Kontinen and Nguyahambi 2020) and power dynamics between countries (Palacios-

Climate-Friendly Way in the Future?' (DAAD 2021). The publication outlines current challenges, conflicting goals and possible solutions on the way to a balance between necessary international scientific exchange and climate protection.

Callender and Roberts 2018; Meredith and Quiroz-Niño 2020) to name a few examples.

In Germany, international collaboration has become a fundamental component of higher education governance. One example to support this statement is the publication of the Strategy of the Federal Government on Internationalisation of Education, Science and Research (BMBF 2019), which seeks to shape the way into a sustainable and coherent international collaboration. The strategy highlights the importance of the European Research Area and points out the explicit goals of achieving synergies, increasing the coherence as well as the building of bridges. These principles should assure a strengthening of excellence through worldwide collaboration, the further development of Germany's innovation on the international stage, the growing collaboration with emerging and developing countries to shape the global knowledge-based society and overcoming global challenges together. According to the resolution 'Guidelines and Standards in International University Cooperation' published by the German Rectors' Conference (HRK 2020), the higher education of the future is considered to be transnational and must perceive itself as a formative part of the global university community. Therefore, the resolution addresses the implementation of these principles on different levels, such as strategy and governance, the pursuit of joint teaching and learning as well as joint research and the establishment of higher education institutions as transnational spaces.

The German Rectors' Conference's database (HRK 2021) lists collaboration activities currently being implemented at German higher education institutions and their international counterparts. The overview sheds some light on the different manifestations of the international collaboration paradigm for international mobility, international collaboration in teaching, international research collaboration and international collaboration in institutional development. According to the database, about 300 German higher education institutions maintain partnerships with over 5,400 institutions in more than 150 countries worldwide. Traditionally, many of these partnerships have translated into individual and group mobility in the form of international travel.

The German Academic Exchange Service is one of the world's largest funding organisations for the international exchange of academics. It supports the systematic establishment of international networks to support Germany in its involvement in global issues and discourses of internationalisation of higher education. According to its 2019 annual report (DAAD 2020b) 154,659 scholars (85,078 Germans and 60,581 foreign

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nationals) received funding for international activities in 2019. Furthermore, it documents the fact that over 30,000 students enrolled in German transnational education programs worldwide, over 46,000 students from Germany were granted funding for an Erasmus stay abroad and over 2 million visitors were reached at international education fairs.

As it will be shown in the next section, the year 2020 represents an important milestone in the discourse of international collaboration, given the crisis created by the COVID-19 pandemic. The recent global developments have forced higher education systems to find alternatives to operate and might have serious repercussions in both the short and the medium term when it comes to taken-for-granted practices of higher education internationalisation.

The Case for Virtual Collaboration: Reflections from Practical Experiences of the DAAD

At the time of writing, the world has reached the first anniversary of the global pandemic colloquially known as the Corona crisis. Since the beginning of 2020, a variety of precautionary measures have been implemented throughout the world to contain the further spread of the virus, including but not limited to temporary closure of educational institutions and international travel bans, both of which dramatically impacted the international higher education sector. Ever since the pandemic began to affect educational systems, numerous analyses have been published on the impact of the crisis on higher education (Crawford et al. 2020; EMN and OECD 2020; International Association of Universities 2020; Marinoni, Van't Land and Jensen 2020; Martel 2020).

Based on a survey of US universities on the effects of the COVID-19 pandemic on international student mobility in the United States, the DAAD conducted a survey among international offices of German higher education institutions between the end of April and mid-May 2020 (Kercher and Plasa 2020). The analysis clearly shows a dramatic and sudden interruption of most internationalisation activities. In terms of institutional response, however, it depicts the virtual replacement and implementation of hybrid models of most activities in record time. Despite many fatalistic predictions at the beginning of the pandemic, several analysts suggest that the reality in Germany has been more positive than expected in terms of the implementation of digital alternatives to teaching and learning (Deimann et al. 2020; Friedrich 2020; Stifterverband 2020; Weisflog and Böckel 2020). Indeed, a great deal of experimentation could be observed.

As awareness for such new, digitalised formats increased, institutions of higher education around the world began recognising their potential and to strategically integrate them into their processes. The focus of virtual collaboration is precisely the digitally supported dialogue and interaction between members of the higher education community. Academic communities can work together on topics and projects across great distances without physical presence as a prerequisite. In recent years, there has been an observable influx of literature concerning these developments (O'Dowd 2018; Bruhn 2020; Hacker et al. 2020; Kauppi et al. 2020; Ray and Srivastava 2020).

In the following, a selection of innovative instruments developed and implemented by the DAAD on a trial basis in the framework of the COVID-19 crisis will be presented.

Collaborative Action: Hackathons – Interdisciplinary Teams Working Virtually on Creative Solutions

As stated above, the summer semester of 2020 took place digitally in most higher education systems around the world. It was evident from the beginning of the crisis that many of them were not prepared to cope with the sudden digitalisation of analogue courses, the implementation of digital examinations or the replacement of international study stays. In May 2020, the first nationwide online hackathon on digital higher education was organised by the Thinktank Hochschulforum Digitalisierung (HFD), the project team of the learning platform AI Campus and the Digitalisation Section of the German Academic Exchange Service (DAAD). Around 1,000 participants were involved in this virtual collaboration format aiming to exchange ideas and develop solutions for the challenges of the digital 2020 summer semester over a period of thirty-six hours.[2] After the successful completion of the first hackathon in May 2020, the #SemesterHack 2.0[3] took place in November 2020. During both events, interdisciplinary teams of students as well as other members of higher education communities offered joint solutions to different challenges. Using an open source platform, participant teams virtually worked

[2] For further information on the solutions developed over the course of the event visit the following website: https://hochschulforumdigitalisierung.de/en/online-hackathon.

[3] For further information on the solutions developed over the course of the event visit the following website: https://hochschulforumdigitalisierung.de/de/semesterhack-2-0.

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collaboratively to create projects, tools, handouts and innovative solutions to be used in digital higher education.

Co-teaching and Co-creation: International Virtual Academic Collaboration (IVAC)

As pointed out above, there is also a need to closer examine new models of mobility. With the IVAC initiative (International Virtual Academic Collaboration), the DAAD provides practical support for teachers and universities in strategically shaping and expanding international university collaborations and global mobility under digital conditions with funding provided by the Federal Ministry of Education and Research (BMBF). The program promotes and supports the integration of collaborative digital formats in study programs with international teaching cooperation. Other key issues include the development of students' and teachers' digital competencies, cross-university digitalisation of study and teaching, blended mobility, expanded access to international higher education offerings for specific target groups (e.g., non-mobile students) as well as the formation of a community of practice.

In total, sixty-one projects at higher education institutions in fifty-six countries will be financially supported until the end of 2021.[4] The funding period began in September 2020 and will end in September 2021 at the latest. There will be a second project funding phase that will start after the first and run until the end of 2022. Based on the transformation potential and scalability of the developed concepts, participants may apply for additional funding over the duration of the funding scheme to expand digital cooperation formats, for example, certification programs, jointly offered micro degrees and structured international degree programs. Instructors and students of the foreign partner institutions are encouraged to share their academic, teaching and learning culture as well as practical experience with virtual teaching formats. One aim is to jointly develop new, collaborative and virtual formats.

With IVAC, the DAAD does not only ensure that universities provide online courses for international students but also implements courses together with their international partners. In addition, time is to be allotted for participating student groups to discuss their experiences among themselves. During joint work phases, participants can improve their language skills, expand their own subject knowledge and, most critically,

[4] The projects are carried out through blended, fully asynchronous as well as synchronous approaches. More than ten different platforms (e.g., ILIAS, Google Classroom, Linkr, etc.) are used and a variety of methods and videoconference as well as content creation tools are used to collaborate.

increase their proficiency in navigating digital environments. As an example, for the latter, on-boarding events for teachers and project leaders are conducted. Within the framework of those exchanges, participants also align on practical question such as: How do I organise an online collaboration? What are the hurdles? How much effort is required? Which tools do I use? What do I need to consider in terms of intercultural communication within the groups? In addition, best practice examples are analysed as a basis for teachers to build their own digital collaborations on and successively start small interactive events so that they can learn right away what it means to collaborate digitally.

Networking, Knowledge Production and Exchange: Virtual International Conference 'Moving Target Digitalisation: Re-thinking Global Exchange in Higher Education'

On 5–6 October 2020, the German Academic Exchange Service invited the international and German higher education community to the virtual conference 'Moving Target Digitalisation: Re-thinking Global Exchange in Higher Education'. The two-day event was carried out in the context of the German Presidency of the EU Council. It focused on opportunities that arise from the digital transformation and its effects on internationalisation in higher education. Central questions of the event included: what new goals can be set in the internationalisation of higher education? and what paths can be opened in the areas of collaboration, mobility, digital management and knowledge transfer thanks to digital formats?[5] Through a hybrid format, scholars from around the globe were able to participate in the event, which was conducted in German and English. In total, there were 1,384 registered participants on the conference platform, of which 193 were contributors (keynote speakers, panellists, workshop leaders, etc.).

Lessons Learned and Anticipated Future Directions

International collaboration has historically grown to be an important pillar of education and science. The current pandemic has again shown the

[5] Further information can be found on the following website: www.daad.de/en/the-daad/what-we-do/moving-target/. Events from other departments of the DAAD which were successfully transformed into virtual events include the Network Conference and the Annual Meeting of the Heads of the International Offices and the International Representatives of German Universities as well as the virtual trade fair 'Studieren Weltweit'. These initiatives represent large-scale events with networking purposes as well as the dissemination of information and knowledge.

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imperative to address global issues in a collaborative manner, prominently exemplified in the collaborative development of a SARS–Cov-19 vaccine (see Kinsella et al. 2020; Zhou 2020). Similarly, the field of higher education has increased its efforts to share knowledge and assets across borders, as discussed above.

Virtual collaboration offers a great deal of opportunities. Most notable examples include an expanded access to information, reduction of operative costs, inclusion of new target groups, new conceptions of academic collaboration, a climate friendly internationalisation, as well as the modernisation of existing infrastructures and processes. At the same time, it brings a variety of challenges of didactic nature (complexity of co-teaching, selection of materials, potential cultural misunderstandings, language skills, digital literacy), of technical nature (issues regarding security and data protection, provision of hardware and software for all parties involved, compatibility, time differences) and of social nature (the digital divide, shared ethical ideas, institutional practices and quality assurance).

It is not currently foreseeable which long-term effects on the internationalisation of higher education can be expected. The DAAD closely monitors this development and provides a comprehensive overview of the current state of debates.[6] In the last months, many analysts have speculated on what a post-COVID world could look like (Altbach and De Wit 2020; Buitendijk et al. 2020; d'Orville 2020; Oleksiyenko et al. 2020; Tesar 2020; Kaplan 2021).[7] Furthermore, a variety of institutions have positioned themselves to offer recommendations for action (UNESCO 2020; Wissenschaftsrat 2021). And finally, a variety of political developments are observable which will continue to push the digitalisation of higher education beyond pandemic-motivated measures (e.g., the new ERASMUS generation, the Groningen Declaration, the Digital Competence Framework 2.0., Online Access Act, Digital Education Action Plan and Digital Education Initiative).

At the time of writing, there are ambivalent hopes regarding the end of the pandemic. Even though a variety of vaccines are being administrated, continuously high infection rates as well as the discovery of new mutations do not allow for a clear prediction of the definite duration of the pandemic. As new travel restrictions are being announced, schools as well as higher

[6] See the DAAD Press Review International Higher Education – Corona Update, where an overview of analyses and forecasts on possible Corona effects in the higher education sector with a focus on internationalisation is regularly updated.

[7] See also popular blogs like Inside Higher ED or University World News for further analyses on the matter.

education institutions remain closed. As a result, the further development of virtual scenarios and digital solutions is essential to address the education sector's current needs. Only a few months ago, many of the initiatives discussed in this chapter would have seemed futuristic. Today, they have become the reality of educators and students around the world. Of course, while significantly accelerated by the pandemic, the movement toward a more internationally collaborative higher education had begun long before the first COVID-19 restrictions were implemented. These developments have not only shown higher education systems' tremendous flexibility in adapting to sudden change, they also provide data for the anticipation of post-COVID challenges and opportunities to be addressed by higher education systems around the world.

It is to be expected that after the COVID-19 sanitary crisis, many aspects of internationalisation and cross-border mobility will change. The same applies to fields such as globalisation studies (Enderwick and Buckley 2020; Frey, Westkämper and Beste 2020; Hofman 2020; Rüland 2020; Schwarzer 2020), tourism (Brouder et al. 2020; Nunes and Cooke 2020; Renaud 2020), public policy[8] (Budd and Ison 2020; Cresswell 2020; Siedentop and Zimmer-Hegmann 2020; Volkmer and Werner 2020), migration, as well as international economic development (Felbermayr and Görg 2020; Ratten 2020; Zukunftsinstitut 2020). Authors from those fields are currently discussing the potential consequences of the COVID pandemic with the aim of anticipating the likely duration of a recovery and/or the possibility of permanent changes in the future.

Naturally, alternative approaches to international collaboration and exchange have been developed in many domains of the public sphere. As the Science Council (Wissenschaftsrat 2021) recommends in its position paper, the goals, beneficiaries, extent and conditions of international mobility and cooperation must be re-examined on a case by case basis in the near future. However, Germany is likely to maintain its international attractiveness due to the health system's successful handling of the pandemic. Especially the strengths of its health care system, as well as the achievements of its science system will be assets for new models of international collaboration and exchange.

[8] This area covers studies about the potential future of cities with issues such as changes in people's behaviour, transformations of the workplaces due to home office as well as public transportation trends. Some of these developments are discussed in the framework of COVID-19.

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When it comes to student exchange, the experience abroad will continue to be of special value even under the so-called new normal. Very different combinations of international education delivery can be expected. Some options would be completely virtual study and research stays abroad from the participants' current country of residence as well as combined virtual/physical stays abroad[9] apart from traditional internationalisation measures. This will raise questions about topics such as fair and efficient recognition or credit transfer mechanisms to use the possibilities of digitalisation properly. Recent data from the DAAD and the Service Centre for International Student (Uni-Assist) suggests that the interest of international students in studying in Germany has remained high even during the Corona pandemic (DAAD and Uni-Assist 2020). As a matter of fact, after the coming semester's conclusion, a number of bachelor and master students will have already completed half of their studies virtually. In the long term, this can play a role in shaping new educational expectations and dispositions to go abroad in terms of physical mobility. Given the positive experiences in the past two digital semesters, a trend toward hybrid formats can be anticipated in the future. After some years of successful digital cross-border education, it might even become difficult to argue for 'physical only' interactions again. The importance of such questions will be further amplified by concerns of sustainability and environmental issues related to international travel.

Regardless of the direction in which digital higher education develops, there is a need for evaluations and follow-up research. It will be necessary to evaluate not only the technical feasibility but also the results in terms of satisfaction and quality of the replaced collaboration formats. Furthermore, it will be imperative to support institutions and individuals by offering guidance when it comes to recommendations for the proper use of virtual formats. The EVOLVE (Evidence-Validated Online Learning through Virtual Exchange) project can be mentioned as an outstanding example of these efforts (see EVOLVE Project Team 2020; Jager et al. 2021). We hope that this chapter will encourage a debate on what will be a likely change of the logics of internationalisation of higher education as we once knew it. Since, as pointed out in Chapter 1, nothing is constant except change.

[9] The DAAD carries out two projects to allow international students to spend the first part of the study preparation abroad through the creation of digital offers and courses (see projects Digital Campus and VORsprung).

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CHAPTER 6

Africa's University Landscape
Embracing Digital Transformation

Fred Moonga

Higher Education Institutions (HEIs) in Africa are going through transformations that reflect global trends. As Kaplan notes in Chapter 1, it might be risky not to embrace transformation even if it is potentially disruptive. One of the main aspects of these transformations is the adoption of Information and Communication Technologies (ICTs) in administration and management, marketing and teaching and learning. The transformations in HEIs in Africa are associated with opportunities and challenges which mirror national circumstances. The challenges include competition brought about by market liberalisation and consequently reduced public funding, the effect of ecological changes and the need to incorporate these in the curricula and the effects of pandemics on humanity, especially on teaching and learning and increasing enrolments, among others. Opportunities include flexibility, convenience, partnership (Gungu and Rickets 2007) and wider coverage, thereby economising on resources, among others. Challenges and opportunities are discussed in detail later in the chapter.

The global competitiveness and the need for effectiveness in teaching and learning and research among HEIs necessitate the adoption of ICTs (Adam 2003). Policies and practices that enhance change, dynamism and competitiveness are essential because revenue and survival of HEIs is at risk owing to reduced public funding. There is optimism and pessimism regarding the future of HEIs (Pucciarelli and Kaplan 2016). Optimism because there is a global, national and institutional drive to digitalise and pessimism because there could be some negative effects and uncertainty in doing so.

Most HEIs in Africa have embraced remote teaching or Technology Enhanced Learning (TEL) over the years due to some challenges and opportunities in the global environment. Although TEL has been going on in some HEIs over the years (Kaplan 2021), as described in Chapter 1 of this volume, it was further enhanced by the COVID-19 pandemic which requires reduced personal contacts as a preventive measure. Nonetheless, in resource-constrained countries, digital transformation through TEL has been low and slow for both learners and educators due to limited access to digital necessities. It has also been a challenge to some more experienced educators who spent most of their teaching careers using non-TEL teaching aids but were required to adopt them during COVID-19.

This chapter analyses digitalisation in HEIs in Africa. Although HEIs include all tertiary education institutions, that is, colleges and universities, it is used in this chapter to refer mostly to universities. It is argued herein that digitalisation in HEIs in Africa has challenges as well as opportunities that require careful context-specific harnessing and collaboration among these institutions and with other partners. The chapter concludes that HEIs in Africa have generally embraced TEL despite resource constraints, but infrastructure and end-user challenges remain unresolved. The chapter is divided into five sections. The next section provides an overview of higher education in Africa. It is followed by a brief discussion of distance education and then the emergence and development of digital education. Thereafter is a discussion of Artificial Intelligence (AI), after which challenges and opportunities of digitalising learning and teaching are discussed. The chapter ends with conclusions and suggestion for future research.

Overview of the Higher Education System in Africa

Most African countries inherited small education systems from colonisers whose goals, it has been argued, were short term (Osei-Hwedie and Bar-on 1999). Years following independence, massive investments were made to expand and sustain the education and other sectors to accommodate growing populations and economies. It can be argued that resources from minerals and other natural resources were available and invested for these purposes. Indeed, literature suggests that there were comparable progressive achievements especially in higher education (Atteh 1996; Samoff and Carrol 2004). In the 1980s and probably 1990s, these standards started declining (Atteh 1996).

The oil crisis of the early 1970s and, in the case of Zambia, falling copper prices (its main export earner) combined to negatively affect economies (Osei-Hwedie and Bar-on 1999) especially in those populations that were also growing, thereby creating pressure on resources. It was also a period of political upheavals characterised by military coups (Samoff and Caroll 2004) which also contributed to slowing economic and social

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development. Efforts to mitigate deteriorating economic situations through borrowing (Atteh 1996) resulted in unsustainable debts as economic deterioration continued. To alleviate the situation, the World Bank and International Monetary Fund (IMF) recommended structural adjustment measures.

The structural adjustment measures, however, worsened the situation. Structural adjustment measures required, among other things, privatisation and deregulation in developing countries (Grey and Ariong 2018). These measures had negative consequences, one of which was reducing the workforce which sent affected workers and their families into poverty. The measures also compounded neoliberal policies particularly as socialism was already losing ground (Grey and Ariong 2018). With rising poverty, foreign aid also increased alongside non-governmental organisations (NGOs) through which substantial aid was channelled. Increased borrowing enmeshed most African countries into debts which were only cancelled to facilitate the attainment of Millennium Development Goals (MDGs).

The structural adjustment period was characterised by cost-sharing in most social services, marked reduced public investment in higher education and other social sectors and diverting the investment to primary education (Varghese 2004), a strategy that can be said to have improved literacy, not education. It was motivated by the economics of education argument that there are higher returns on investment in primary than in higher education (World Bank 1986 cited in Varghese 2004). This argument does not hold true all the time and everywhere. For instance, in developed countries, returns from higher education were regarded higher than those from primary education (Carnoy 1999 cited in Varghese 2004).

As argued in the preceding section, investment and technological standards in HEIs are reflective of developments in their respective countries. Therefore, with declining economies worsened by structural adjustment measures, the standards in HEIs also deteriorated. For example, declining public expenditure on education, deteriorating infrastructure, brain drain, student unrest, increasing unemployment among graduates among other factors (Atteh 1996) and, to an important extent, the rise of private HEIs all happened during or after the structural adjustment era. Therefore, for digitalisation to take full effect in HEIs in Africa, national economies and other fundamentals need to be improved. Digitalisation is important for distance education and for all modern teaching and learning as well as administration and management activities such as marketing and recruitment. Nonetheless, distance education is at the centre of digitalisation in HEIs.

Distance Education in Africa

Open and flexible learning has existed for more than three centuries (Casey 2008) to enhance equity and access to education. Continuous professional development also benefits tremendously from this flexible mode of teaching and learning especially for busy executives (Kaplan and Haenlein 2016). However, the formalisation of distance education began with the invention of the printing press and enhanced by postal services (Anderson and Simpson 2012). In recent times, it has been further propelled and made easier by advances in ICTs. Scholars on distance education use a generational framework, first used by Nipper (1989), to analyse its evolution. They identify the first, second and third generations respectively as the stages of its progression from the rudimental print and posted material to audio broadcast and the current era of TEL. The latter era uses print, audio-visual and virtual modes of teaching and learning. However, there are diverse views regarding the third generation, particularly as regards its context, pedagogy and whether it is indeed the third and last. For instance, Taylor (2001) even adds the fourth and fifth generations, respectively (cited in Anderson and Simpson 2012). Arguably, there could be several subsequent generations. Nonetheless, it is the third generation which is the focus of this chapter because of its relationship to digitalisation. The generations are distinguished by modes of production, distribution and communication (Nipper 1989 cited in Sumner 2000) thus blending content, pedagogy and ICT. The University of South Africa (UNISA) is one of the oldest and biggest pioneer institutions of distance education in Africa, active since the 1940s, and has therefore experienced all the generations.

Initially popularly known as correspondence education, distance education has evolved from posted learning materials to broadcasting to asynchronous computer conferencing (Anderson and Simpson 2012). The latter has transformed distance learning tremendously by increasing interaction between teachers and learners and among learners. Distance education was meant for disadvantaged and busy learners. However, Sumner (2000) argues that it only serves the system. Indeed, its challenges continue to the present despite improvements in modes of delivery. Learners still have limited affordability and access to digital necessities for an interactive learning process. As Susman (1997) and Herbamas (1987) have argued, 'the measuring stick of communication technology is how it benefits ordinary people' (cited in Sumner 2000, p. 273). Both distance education and ICTs have not done so. Due to limited interactions or communicative action (Herbamas 1987 cited in Sumner 2000) among learners and

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teachers, distance education seems to individualise an activity that is supposed to be socially interactive and pedagogically dialogical and participatory. Nonetheless, it is flexible, self-directed and convenient. Arguably, limited access, coupled with demand for education have contributed in some way to innovations in TEL as discussed next.

The Evolution of Digital Education in Africa

Not long ago, digital resources were only accessible by a few elites, the financing of which was by northern NGOs (Limb 2005) and established HEIs through partnerships. Financing has an important bearing on usage, ownership and policy. As Samoff and Carrol (2004, p. 72), note, 'external support to higher education in Africa in general, and partnerships in particular, can and do play a prominent role in the perpetuation of dependence'. Funders influence policy and can partially or wholly own digital infrastructure, especially in a liberal global economy. Consequently, liberal ideologies in some African countries have a bearing on digitalisation especially as some infrastructure is externally sourced and profit rather than service seem to drive the process. Defined as 'the process of making information resources available online' (Limb 2007, p. 18), digitalisation did not constitute wider policy transformation agendas among HEIs in Africa until recent decades. Due to resources constraints, pedagogical and other reasons, many universities were hesitant to embark on digitalisation (see Chapter 1). As such, digitalisation was siloed in a few digitally oriented departments and individuals (Adam 2003) partly due to limited resources.

The resource-constraint discourse continues to the present, but it can also be regarded as a driver of digitalisation, in that using ICTs, access to education is enhanced. For example, instead of constructing lecture rooms which require huge costs in resources and time, teaching and learning can be done by thousands of students remotely. By and large, there has been enormous progress towards digitalisation in African HEIs (Limb 2005) congruent with their respective countries' advancement (Adam 2003). For example, most HEIs in Africa have access to Wi-Fi and digital libraries although the internet speed is still low. Resource-constrained countries such as Niger, Chad and Malawi, among others, made minimal progress in digitalisation due to the high costs involved, while resource-rich countries such as Egypt and South Africa made enormous progress (Adam 2003). The African Virtual University (AVU) established by the World Bank has contributed immensely to digitalisation in resource-constrained HEIs in Africa. The AVU has over fifty-seven learning centres in twenty-seven

African HEIs in Ethiopia, Ghana, Kenya, Namibia, Rwanda, South Africa and Tanzania among others, enhancing both internet connectivity and technical capacity (Gunga and Rickets 2007).

The rise in ICT usage necessitates new ways of knowledge production, management, distribution (Adam 2003) and utilisation. Over the years, there has been an increase in utilisation of social media tools such as Facebook, Twitter and Myspace among others for marketing (Paladan 2018). There has also been an increase in the utilisation of virtual learning and teaching platforms such as Moodle, Skype, Zoom, Google classroom, Teams and WhatsApp among others in HEIs in Africa and elsewhere. These platforms have enhanced the interactivity which has been limited in distance education over the years. In addition, digital platforms such as LinkedIn and Facebook are used by HEIs to recruit staff around the world. They have enhanced recruitment of internationally recognised staff capable of improving the image and ranking of a university due to their established teaching, research and scholarship. Such status in turn helps the university to attract funding and even more experienced staff.

The young generation is arguably the main target audience for digitalisation. It is more attuned to the digital environment. Thus, digitalisation has not only become important in reaching the clientele but also inevitable in the operations of HEIs in Africa. Nonetheless, Africa still lags in embracing ICTs in comparison with other regions of the world (Adam 2003). There are also inequalities in access and utilisation of ICTs which persist within and across countries (Limb 2005). Thus, despite the general increase in digitalising HEIs in Africa, only a few countries have achieved meaningful progress.

Utilisation of digital resources has been limited among some academic staff in HEIs in Africa due to availability of alternative non-digital teaching methods, an ICT challenge. For instance, Okello-Obura and Ssekitto (2015) found that while staff at Makerere University appreciated digitalisation, they rarely used digital resources in their teaching and research due to limited ICTs skills, electricity outages and cost of internet among other factors. In a way, non-use reduces demand and therefore acquisition of digital technology. Even worse is the limited or non-availability of digital resources in local languages which deepens user inequalities even further.

Artificial Intelligence in Africa

Artificial Intelligence (AI) has been around for a long time, but its utilisation and usefulness perhaps has only been realised in recent decades and

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even much later in Africa. It is defined as 'a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation' (Haenlein and Kaplan 2019, p. 5). It is the application of human intelligence on machines so they can perform human tasks or act like humans. Computers and robots are good examples of AI. It was introduced in some developed countries in the 1950s (Haenlein and Kaplan 2019). However, there are universities in some African countries where research on AI is being done. Some South African universities are engaged in specialised AI research activities. For example, the University of Pretoria has been advancing research in computational intelligence research (Ferrein and Meyer 2012). Nonetheless, overall, breakthroughs in AI research and innovation in Africa are still limited. The next section discusses challenges and opportunities in digitalisation.

Challenges

Although digitalisation in African HEIs has accelerated over the years, it is still far behind HEIs in the north. Among the reasons is the myth of creating *redundances* and *digital phobia*. While appreciating digital dynamism, there seem to be fear of technological gadgets replacing humans. But Kaplan and Haenlein (2016) remain optimistic that digitalisation would not kill the education sector but improve it. As they argue, 'sharing cookies online is just not the same as sharing cookies in real life' (p. 449). It may enhance most of the aspects of education but not replace the human side of it.

Digitalisation through e-learning is undoubtedly an ideal model of teaching and learning in infrastructure- and other resource-constrained HEIs in Africa. One can reach more students and other clientele with limited resources. It even becomes a model of choice in times of pandemics such as experienced in 2019, 2020 and 2021. Without doubt, before COVID-19, digitalisation in teaching and learning was optional, used only with specific groups and in specific circumstances. The pandemic seems to have reified this choice. Some of the challenges of digitalisation identified in this chapter are competition, the need for sustainability, poor connectivity, the home environment. There could be more.

Academic capitalism (Price-Williams, Nasser and Sasso 2020) has not only brought about *competitiveness* in HEIs but also slowed the digitalisation process and stifled equity of access. HEIs in Africa sometimes compete for students' enrolments, funding, ICT resources and excellence among other factors. While this competition presents several opportunities as discussed later, it also presents some challenges, not least the possible compromise on quality. Competition for students' enrolments, which contributes immensely to income through tuition fees, has the potential to recruit less academically able students with the ability to pay due to their socio-economic status while leaving out more academically able students who cannot afford to pay, especially in private HEIs. On the other hand, the high numbers of students enrolled to raise funds would also create pressure on learning and teaching facilities. Thus, in both cases, quality control is necessary.

The requirement for *sustainability* exerts pressure on the management, teaching staff and learners. As Shaduk and Taok (2020) point out, it has the unintended consequence of dehumanising and objectifying those involved. Thus, they risk being carried away by the profit motive at the expense of the primary objective of learning and knowledge production. On the other hand, it is undeniable that public funding has been reduced in most HEIs in Africa. Thus, the sustainability discourse is aimed at promoting their own resource mobilisation given reduced funding from the government. To be sustainable, most HEIs have embraced business models.

In most remote areas in Africa, internet *connectivity is poor* due to undeveloped or non-existent ICT infrastructure. This hinders digitalisation in HEIs in low-income countries. It limits the reach of an HEI to its remote clientele, thus creating a gap between those with easy access and those with difficulties. This creates an artificial difference in abilities of students. Students with limited internet access and poor or no ICT gadgets would appear to perform more poorly than their counterparts with easy access to internet and ICT gadgets. Moreover, the cost of ICT infrastructure and internet bundles are higher in low-income countries. Poor connectivity is exacerbated by erratic power supply which is blamed on rationing. Additionally, limited access by some end-users makes communication one-sided from the sender, with limited or no feedback from the recipient thus rendering it ineffective.

The other challenge is *monitoring and supervision of students* in field and practical-based learning programmes. Although laboratory practicals can be monitored remotely, there is limited if any opportunity to correct a student mistake immediately. Similarly, for field-based practicums such as those in agriculture, education and social work, although students can take photos and videos of what they do, it may become too late to make corrective interventions in their learning. Thus, although course work can easily be done online for such programmes, blended learning is

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required for fieldwork. Such programs were especially negatively affected by the lockdown occasioned by COVID-19. Given that efforts were being made to ensure interaction suggests that remote learning may not be better than on-campus learning in quality delivery and outputs. Some universities still recognise this difference and issue different certificates to the two categories of students. Others who believe that the gap has narrowed over time issue the same certificates to students taught under the two modes.

The *home environment* is rarely considered a constraint to digitalisation. Yet most homes were not planned for academic or office work or even for digital installations. Therefore, working from home presents a challenge especially to those with children and noisy neighbourhoods. Additionally, both leaners and teachers are still adapting to online learning and teaching. As Okello-Obura and Ssaekitto (2015, p. 2) observe, 'new learners want an education so focused that it is almost vocational'. Even when they can have unlimited access to the Internet and learning materials, the home environment does not seem to convince them that they are pursuing studies. It does not set them apart from others at home. They want to perform experiments, read and attend lectures (Grange 2011) and be seen to be doing so as evidence that they went to study and are specialists in the field. It therefore requires new designs for homes which would make it safer for digital use. For example, a need for an office-like space in the house to enhance learning, teaching and working from home. There is thus a need for adaptation of both the infrastructure and the mindset for learners and teachers. A blended model of both methods would thus be ideal.

Opportunities

Over the years, there has been growing concern among environmental experts and advocates that the environment is severely threatened by human activities. Although regarded by some as eco-mongering (Costello et al. 2011), human activities negatively affect humans (Costello et al. 2009) and wildlife. Digitalisation is *environmentally friendly*. It reduces paper and desks usage, both of which are by-products of deforestation – a hazard to the environment and natural habitat. It also eliminates the use of chalk and other environmentally unfriendly teaching aids thereby minimising pollution in the environment. Regarded as 'disruptive innovation' (Christensen and Eyring 2011), digitalisation in HEIs can mitigate against human threats to the biosphere. However, since it makes older learning materials such as newspapers, journals, textbooks and others obsolete, there is need to find environmentally safer means of disposing of these.

Digital communication, teaching and learning are *flexible and convenient*. They can be done at a convenient time and place provided there is internet connectivity. That makes them suitable for busy executives (Kaplan and Haenlein 2016). It is convenient both to the learner and teacher and fosters self-direction to the former under the tutelage of the latter. In addition, since recruitment of both staff and students is borderless, it enables institutions to reach many prospective students and staff in a shorter time through cheaper means. Moreover, like traditional teaching and learning, it also blends technology, pedagogy and content (Gunga and Rickets 2007) to the advantage of the learner.

Digitalisation *decentralises* education and *widens coverage* by taking it to the learner and enabling one teacher to reach many learners at the same time. It is therefore ideal for resource-constrained HEIs in Africa. It came at the right time when students' enrolments are increasing without corresponding expansion of infrastructure and increased public funding. It therefore has the 'potential to enable Africa achieve education for all' (Gunga and Rickets 2007, p. 896), promote equality of access and do more with less. HEIs no longer need to worry about staffing and infrastructure which have been widespread challenges, as few staff can reach more students at their convenient time as discussed earlier.

There is a huge opportunity in promoting *partnerships*, both local and international, among HEIs and with the private sector in digitalising learning and teaching. Importantly, this move would help achieve sustainable development goal number four (4), 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations 2019, p. 7). Thus, even with limited resources, HEIs in Africa have the potential to accelerate digitalisation through partnerships. For example, the African Virtual University (AVU) which is a partner to most African HEIs in virtual learning partnered with the Open University of UK to enhance teacher education and training in sub-Saharan Africa (Gunga and Ricketts 2007).

Through partnerships and collaborative activities, many HEIs in Africa have been able to build capacities for their technical and administrative staff required for digitalisation. There is also anecdotal evidence that the cost of internet bundles is becoming lower than when internet was first introduced on the continent. For example, Steiner, Tirivayi, Jensen and Gakio (2005), observe that 'the average African university has bandwidth capacity equivalent to a broadband residential connection available in Europe, pays 50 times more for their bandwidth than their educational counterparts in the rest of the world, and fails to monitor, let alone

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manage, the existing bandwidth . . .. As a result, the little bandwidth that is available becomes even less useful for research and education purposes' (cited in Gunga and Rickets 2007, p. 898).

Conclusion

African universities have generally embraced digitalisation despite some challenges. On one hand, they need to digitalise for efficiency reasons by doing more with less while indirectly saving the environment. On the other, they are required to be competitive and sustainable in the face of changing circumstances especially those of an economic and technological nature. Digitalisation challenges can be mitigated through enhanced partnerships among themselves, with the private sector and with HEIs in the developed world. 'Partnerships bring together innovative minds including experts from government, business, civil society, academia and the international organisations' (Gunga and Rickets 2007, p. 902). Some governments in Africa are already supporting digitalisation in teaching and learning through infrastructure, policy and legislation. Others also need to do more in supporting digitalisation.

Despite achievements in digitalisation, the end-user's challenges remain unresolved. Equity of access, which is among the foundations of distance learning, remains unresolved in resource constrained HEIs and among underprivileged students. Students struggling with school fees also struggle to access ICT facilities whose infrastructure is often limited in their residential areas. Thus, research, policy and practice would need to focus on ICT infrastructure and skills development. Without improvements in infrastructure, digitalisation in HEIs in African will remain low and slow and will not enhance teaching and learning and access to education and training as it has done in other parts of the world.

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PART II

Changes in Teaching Formats

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CHAPTER 7

Contemporary Changes in Teaching Formats
An Overview

Narasimha Murthy Kalanatha Bhatta and Ashwathanarayana Shastry

Teaching format is the mode through which knowledge is transmitted to the students and learning is facilitated. During the initial days, where textbooks and writing materials were not in vogue, teaching and learning were conducted orally, teachers used to have a complete repository of the subject within themselves. As they pronounced what they knew, students used to repeat several times to understand, assimilate and internalise the knowledge. Later, the chalk and talk method of teaching became prominent, where teachers took the help of writing on a board and students took notes and memorised and reproduced it during examinations. In both these traditional methods, it was mostly one-way transmission – students essentially only received information and their participation was limited to asking a few questions when things were not clear to them. These formats were traditionally known as authoritative formats, where no individual attention was given to each learner. These formats promoted rote learning and were not known to be very effective in internalising the knowledge.

As the generations changed, teaching formats changed to more of a delegator approach. Here teacher acted as a collaborator. Learning was through peer-to-peer interactions and the teacher acted as an active observer. In this format, the teacher's role was minimised and emphasis was placed more on the self-motivation of the students. While this format was effective in self-learning by students, it did not get much prominence, as the learning of the students was limited to the combined knowledge of the group and was severely restricted.

Further research in higher education led to facilitator teaching formats. In these formats, while students still resorted to peer-to-peer learning, teachers also played an active role as a facilitator, provoking and questioning the students. This accelerated and improved the quality of discussions, promoted problem-solving skills and increased internalisation of learning. However, this format was found to be difficult to practice in a large classroom setting and also called for a special setting of the classroom. In spite of these limitations,

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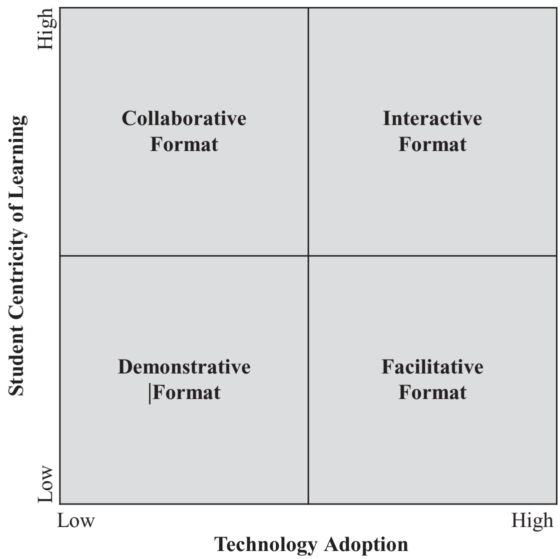

Figure 7.1 Teaching learning quadrant

facilitator teaching formats are still quite popular and widely practiced in the delivery of higher education (see Figure 7.1).

Other than the formats described above, a few other formats are also popularly adopted in higher education. The demonstrator format was popular in special areas like dance, art, music, physical education, medicine, science, etc., where instructors demonstrated a procedure by doing it himself and students learnt it through observation and internalised it through rigorous practice. Integrated or hybrid teaching formats found their place where students with different learning levels and needs are brought together in the same classroom. In this case, teaching format is tailored to the needs of each student (Middlebeck 2019).

Contemporary Changes in Teaching Formats

While several teaching formats are practiced in higher education, the key to choosing a format always depended upon the level of engagement expected, type of students and courses taught (skill-based or knowledge-based) and the learning level of the students. In general, in higher education, contemporary teaching formats encouraged more student-centric learning than adopting a teacher-centric approach. In student-centric learning, while the teacher maintained authority, equal participation and interaction were encouraged among the learners and between the learner and the teacher. This approach promoted more group work, communication and collaboration and the teacher generally assumed a supporting role acting as a guide or mentor.

As technology advanced, high-tech approaches found their way into the delivery of higher education (Bui 2020). The first among these were flipped classrooms, where the teaching content is pre-recorded either in a lecture form, for theoretical subjects, or demonstration form, for skill-based subjects. Learners were expected to watch videos as many times as necessary to get a hang of the subject and even attempt a few assignments before actual classroom interactions. In the classroom, students are encouraged to discuss the contents of the video and clarify any points which needed more elaboration; and application of the content is practiced through relevant case studies and practical or lab experiments.

Emerging Classrooms of the Current Decade

In this decade, 2020–2030, many new types of engaging classrooms are emerging:

- Flipped Classroom. In this format, students watch fifteen to twenty minutes of pre-recorded video on the subject which acts as a launching platform for the physical class.
- Hybrid Classroom. This is a combination of some learners participating physically and other learners simultaneously participating through electronic mode. This also called as Synchronous Classroom.
- Asynchronous Classroom. In this format, the instructor delivery will be pre-recorded and made available to learners to watch them at their own convenient time. This format comes in handy when learners are distributed across time zones. A separate interaction hour is provided for the learners to seek any clarifications.
- Virtual Classroom. These classrooms are facilitated by an augmented reality/virtual reality system. They will not have any physical teachers and are fully facilitated by technology.
- Intelligent Tutoring Systems. These are customised e-tutoring and learning platforms suited to individual learning preferences and styles of the students.

As mentioned by Andreas Kaplan in Chapter 1, personalised learning methods are quite popular in higher education particularly when learners

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were involved on a part-time basis. These methods were also popular for slow learners and those who had unstructured time for their learning. Here each student decided on his/her own pace of learning and progression depended upon competency attained at each stage. When a student masters a skill or an item of knowledge and clears an evaluation, he is allowed to progress to the next level of learning. Students' interaction with teachers in this case is need-based and customised. Teachers work more as guides or mentors. These days several universities run online programs which follow this teaching format.

Digital Transformation in Education

Digital Transformation is considered as a strategy to leverage technology to deliver knowledge to the students. The technology being talked about in this transformational sense includes cloud computing, the Internet of Things, data analytics, virtual and augmented reality and artificial intelligence. In the field of education, digital transformation is all about leveraging the technology to enhance the student learning process. The next-generation classroom is undergoing transformation in adopting technology to promote new teaching formats to engage students more effectively.

Cloud computing technology provides a platform for content developers to create a variety of education applications which can be accessed anytime, anywhere and using any device. The leading cloud computing service providers such as Amazon Web Services (AWS), Google Cloud Platform and Microsoft Azure have created platforms to host content at very affordable prices. Other software-as-a-service (SAAS) providers are creating learning applications where teachers can create their own content and blend it with video, audio, images and other digital content. Learning management systems such as Moodle provide hosting content on the cloud and allow students to access the same using any device. The assessment feature built into the system allows teachers to conduct quizzes and assignments online and auto-evaluate them. A live streaming software connected with a learning management system such as Moodle will allow teachers to run the classes in complete virtual mode or in blended mode.

Artificial Intelligence (AI)–powered examination software now allows teachers to conduct examinations online by remote proctoring of students. Attendance tracking is built into the live streaming software. Auto-grading of students based on their performance in various assessments is now enabled in the learning management systems.

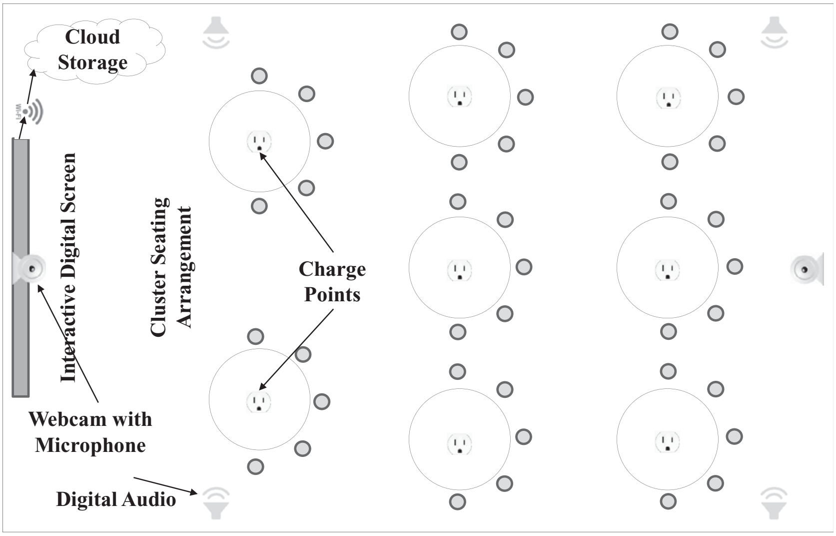

Figure 7.2 Next generation digital classroom

The Internet of Things (IoT) technology innovates the classroom teaching format in several ways. Smart boards (or interactive white boards) in the classroom allow teachers to access the same learning management system to conduct classes in a blended mode. These smart boards are next-generation computing devices equipped with a rich set of sensing devices including webcams, Wi-Fi, GPS, microphone, speakers, touch screen, graphic cards and a rich set of software applications which can overlap live content on a white board. Teachers can load live content on the whiteboard while teaching. Any update to content during class hours gets auto saved and becomes visible to students anytime on their smart devices such as laptops or smartphones. Other interactive learning tools such as gamification tools or simulation tools would also be available on the same smart board. In addition, IoT technology can condition the classroom in terms of air purity, temperature monitoring, light control, attendance tracking by sensing digital student ID cards and so on. Thus, IoT technology completely transforms a traditional classroom into a digital classroom (see Figure 7.2).

Creating a culture of 'big data' is nothing unusual in a classroom environment. Starting from the student admission information, emergency contacts, assignments, evaluations and grading – all these put together will create the sense of big data. Data analytics technology can act on this big

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data and hence bring transformation in classroom education. Data analytics helps teachers to keep track of student's historical data, comparing current performance with historical data and predicting student's future performance. This prediction of future performance will help teachers to adopt customised changes in teaching methods to enable students at all performance levels to perform better and hence can positively influence the improvement in overall performance of the students. This 'data driven decision-making' inside the classroom can significantly help in adaptive teaching styles to keep the higher levels of student performance.

Technologies Enabling Digital Classrooms

- Cloud Computing. Providing computing services, anytime, anywhere, on any device including a pay per use model to bring teacher and students together.
- Internet of Things. Sensors, devices and communication technology connecting teachers and students together on a common interaction platform.
- Data Analytics. Collection, cleansing, analysing, interpreting and predicting what can be achieved in learning.
- Artificial Intelligence (AI). Representing and leveraging knowledge models to predict future performance based on past and present data and adapt incremental learning methods to improve performance.
- Augmented Reality/Virtual Reality. Two promising technologies that would help in creating interactive content to aid student-centric learning.

The growth of AI as the general-purpose technology is transforming the way education is imparted on digital platforms (Agarwal 2020). Machine learning is the core of AI which can learn itself as it encounters every new data set it processes. AI tools can play a pivotal role in several ways to improve the teaching process.

With the globalisation of education using an online mode of learning, the need for personalised education is increasing. AI tools can provide support for personalised education by tailoring the study schedule according to student's specific capability and pace of learning. These AI tools are built using the knowledge space theory to define and represent knowledge gap.

AI tools can produce smart content dynamically based on each student's interest and learning pace (Dharmadhikari 2020). Smart content is a blend of an innovative learning interface with customisation options, contextual information, quickly accessible references and tailored assessment. Visualisation tools provide a variety of learning interfaces to make the content highly perceivable. The content is updated in real time and remains up to date.

Teacher's administrative activities such as paper setting, evaluation and grading can be completely automated with AI technology. Text analytics and natural language processing technology can even generate interactive insights in student's native language thereby providing real-time feedback on student's performance and scope for improvements.

AI-powered virtual agents or chatbots can interact with students in their native language and handle all their personal queries, which students otherwise might find embarrassing to ask. These virtual agents also keep a record of history of all previous responses for the query raised and can provide responses quickly.

Knowledge Space Theory

Suggested by Doignon and Falmagne in 1999, knowledge space theory[1] proposes a set and ordered framework to mathematically represent knowledge in terms or problem, cognition and action domain. This theory assumes that the problem is represented by several states of knowledge and are dependent on one another to recognise the patterns and hence represent solutions to the given problem. AI applications leverage this theory to process ambiguous data sets given to them and can identify patterns and provide automated solutions to solve the problems.

AI tools built with sensor technology also aid students with special needs. Students with vision challenges can leverage voice activated interactive tools to meet all their learning needs. Similarly, students with listening challenges can use leverage visualisation tools to meet all their learning needs. Students with Autism Spectrum Disorder (ASD) can now use special apps designed to run on iPhones and Android phones that will help the students to learn to overcome their neurological conditions. AI tools have also made it possible to convert sign language into text and vice versa to help students/teachers with speech/hearing challenges.

[1] For detailed information on Knowledge Space Theory, see https://cran.r-project.org/web/packages/kst/vignettes/kst.pdf.

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Benefits of AI Intervention to Students

- Students will have 24–7 access to personalised content.
- Smart content will keep them better engaged with the learning.
- Students can adjust their pace of learning and hence there is no pressure.
- AI can facilitate equal opportunity of learning for students with special needs.

All four digital technologies mentioned above – cloud computing, Internet of Things, data analytics and Artificial intelligence – are interconnected to one another and can drive significant innovation in teaching formats adopted by the instructors. There are three teaching formats that are worth considering – simulation, gamification and augmented/virtual reality. The role of simulation as a means of learning critical thinking and decision-making has emerged as a new learning paradigm especially in higher education. The simulation allows students to assume different roles and play the given business situations there by ensuring hands-on learning. Simulation and gaming are considered as the primary formats for experiential learning.

Next Generation Teaching Formats

Globalisation of business is forcing corporations to look for fresh talent with a skill composition to include sound theoretical knowledge blended with exposure to real-world challenges in terms of critical thinking and decision-making (Payton 2015). Teaching business case studies is a stepping-stone in this direction and became immensely popular among the business schools to change the face of learning. But any given business case study is static in nature and can only bring out a fixed perspective of a real-world challenge. While the live cases concept has helped in overcoming this challenge to some extent, the need for the students to learn about the multi-disciplinary challenges a business will face and be able to critically think and make optimal decisions about them is largely unfulfilled. This limitation of the business case study approach can be easily overcome using a simulation format. What simulation does to a student is to connect the conceptual learning to a real-time situation by allowing the student to take decisions and learn the impact of such decisions.

With recent innovations in technology, interactive learning has gained significant momentum in teaching formats. The instructors now like to engage students more actively to learn basic concepts using technology interventions rather than listening to traditional lectures. Interactive learning involves many strategies – instructors can use collaborative tools to engage students more effectively by introducing flipped classes where students learn pre-recorded content before coming to the class for a discussion, peer learning where students in smaller groups learn a given topic using rich content and present their view to rest of the class and team learning where students are engaged to take each topic for discussion and create a constructive viewpoint. Interactive learning enhances engagement, promotes collaboration and drives critical thinking among students.

Simulation as a Teaching Format

Simulation as a teaching format is not new to the teaching world. It has been in existence for the last forty years or so. The business schools in the United States and United Kingdom are well known for using simulation games in their management courses. However, developing countries were slow in adopting the same but are catching up now as the access to digital technology such as high bandwidth internet and online simulation tools becomes more widely available. The digital platform provides a better collaboration environment where students have the option to join online or offline, assume different business roles, make decisions and see the instant impact on business and study what-if scenarios. The historical data maintained in the computer and an analytics engine processing this data can direct students to progressively improve on their problem-solving and decision-making skills to produce positive business results.

Online digital simulation games enable groups of students to work together to make right decisions to promote and run a business enterprise. This approach fosters strategic thinking among them and walks them through a formal planning process, simulating marketing conditions, analysing alternate pricing approaches and achieving the best possible results (Panoutsopoulous 2011; Sampson 2011). There are many digital simulation games available in the market today. SimVenture, a UK-based firm, provides learning simulation solutions to foster entrepreneurial ideas. Many universities around the world use SimVenture to promote simulation-based learning in their course curriculum. Cesim is another business simulation tool that promotes experiential learning in an online format.

One need to be careful while selecting simulation as a teaching format in the learning process. The technology platform on which simulation

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games run is diverse in nature – computers, laptops, operating systems, mobile devices, internet speed, language preferences, availability, data accuracy, validity of results and 'realness' of simulated business scenarios. It is important that simulation-based learning provides realistic learning to students so that they are more industry ready.

Gamification as a Teaching Format

Introduced in 2002 by Nick Pelling, a British IT expert, the word 'gamification' refers to the process of leveraging a game approach and game elements to achieve better engagement than can be found in non-gaming activities. Gamification is expected to trigger four aspects of learning among students – activity, interaction, motivation and engagement. A game by nature has randomness and competitiveness built into it. To play a game requires a student to perform certain activities to convert randomness into a measurable result within a stipulated timeframe. Performing activities require interaction with other players, game tools, game rules and a game environment. The students are hence motivated and engage themselves throughout the duration of the game. The primary idea behind using gamification in education is to create a learning environment that condenses the time required to learn key ideas and allows students to explore either variations of a given idea or more ideas in their learning period in a more relaxed and fun-filled environment (Makri 2017; Vlachopoulos 2017).

Gamification involves two steps – game elements and game process. The game elements are the aspects that will drive motivation among the students to keep engaged in the process. There are seven distinct game elements (see Table 7.1):

Table 7.1. *Seven distinct game elements*

Game element	Role in enhancing learning effectiveness
Points	Instant feedback on individual performance
Leaderboards	Instant feedback on relative performance
Badges	Representation of instant progress
Performance graphs	Representation of continuous progress
Avatars	Representation of individual role
Teammates	Representation of multiple roles coming together
Meaningful stories	Representation of task achieved in the game

The game process involves introducing randomness in the learning process and challenging students to perform an activity to remove the randomness. This activity can be done by one individual or in a group. Each time randomness is removed, the participant will be rewarded with one or more of the game elements. This process will start conditioning the students in a learning environment and keep motivating them by awarding various game elements. The assessment is internally built into the gaming process and hence the student's performance automatically gets reported as soon as the activity is completed.

Gamification of learning became prominent where it was important to impart problem-solving skills to learners. Several games are specially designed with specific learning outcomes and objectives in mind. The advent of hi-tech animations and cloud computing helped learners to master complex skills on a trial-and-error basis using gamified teaching formats. Every failure in gamified learning acted as a reinforcement of learning. Internalisation of knowledge and skill was found to be maximum in a gamified learning format. These formats are quite popular in aviation training, medical education and several other skill-based learning systems.

Gamification Tools

There are many commercial and open license gamification tools available in the market today. For example, Gimkit is one tool that helps a teacher to blend a quiz question in between his content to check how well the students are following his teaching. Students can use their mobile devices to respond to the quiz question and will get rewarded every time they respond with a correct answer. Class Dojo is another tool which assigns an avatar to each student and allows that avatar to collect points as he/she engages in performing activities assigned by the teacher. Classcraft is another avatar-based gamification tool. Kahoot is a gamification tool that allows a teacher to blend a variety of content such as images, videos, audio and text in the form of questions and let students respond to the questions using their mobile devices. Kahoot is highly adaptive and can adjust pace to match the student learning speed.

Augmented/Virtual Reality as a Teaching Format

Two promising technologies to help interactive learning are the augmented reality (AR) and virtual reality (VR). Augmented reality as a technology lets content creators blend digital objects within the real physical world.

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With AR in action, students can now use their own favourite characters to navigate and interact in the real world, thereby learning the essence of the real world and its usage. AR promotes problem-solving, collaboration and creativity among students.

VR is paving the natural way for the next step in education. Two classical problems associated with the traditional methods of learning are fact retention and comprehending information. All traditional teaching methods provide lot of information that students should learn and remember. This leads to information overload. It is essential for students to understand what is being said in the information provided and how it would help them in the future. This is essential to learning. Unless teaching formats provide for comprehensive methods for students to interact with and digest the information provided, the learning will become rote. This is where virtual reality is coming in to provide alternate forms of content representation. The way it works is that the VR technology creates a virtual version of the real world with all the information contained in it and allows the students to interact with the real world virtually. This will allow students to 'immerse' themselves in the learning process and hence enhances engagement.

VR as a teaching format offers certain unique characteristics. First, it provides a real sense of place to the students and how information is contained in it. For example, it may not be possible for all students to visit an aeroplane to view different components of the cockpit. But VR content can provide a realistic view of the cockpit in different aeroplane models. It can also allow students to select a component in the cockpit and gives details of the purpose of that component in flying. Second, VR can scale learning experience among students. A student can take his/her own time to explore the cockpit using a VR device. Third, VR technology can allow students to learn by doing. A student can fly the aircraft virtually by operating different components in the cockpit. A guided interactive character can help the student to virtually fly the aircraft. Fourth, as students learn by doing, their emotions will be high and stimulating. Students flying the aircraft virtually will be excited and will attempt to venture into taking risks in the flying process. Finally, VR technology makes students more creative in the learning process and hence develops an attitude towards learning.

Developing AR– and VR technology–enabled education tools can be expensive. But with globalisation, access to these tools with multi-language support has made it affordable on pay per use model. The challenge for educational institutions is to scale their technical infrastructure quickly so that the faculty can adopt these formats of learning.

VR and AI have completely redefined higher education, particularly in business schools. These technologies are providing a useful platform for co-creation of knowledge and also promote extensive collaboration among teachers across the globe. With the global impact of COVID-19, e-learning has become the new normal, which completely erases geographic boundaries. While many conventional educationists still feel that digital education can never substitute real learning, the very fact that it was forced on both teachers and the learners without leaving a choice meant that it was accepted as a new normal and they found their own innovative methods which helped to derive higher quality of learning. E-learning facilitated learning from multiple platforms, creating knowledge repositories in the cloud, exploitation of mentor-mentee programs for upgradation or upscaling of knowledge. Both synchronous and asynchronous modes of e-learning are practiced depending on time zone differences across the globe and hybrid classrooms using what is popularly known as simulcasting is also becoming popular.

Several research studies were conducted on teaching formats and student styles and their interactive effects on learning. These studies generally concluded that peer-centred formats resulted in better learning than pure instructor-led formats where problem-solving and situational customisation was considered important. The demonstrator style helped increase learning in skill-based programs. Learning efficiency almost doubled where demonstrator-led teaching was reinforced with prior e-learning using VR and AI technologies.

Conclusion

This chapter highlights changes happening in the teaching formats for higher education in the last few years due to the ongoing digital transformation. Various emerging teaching formats enabled by modern technologies like AI, cloud computing, the Internet of Things, data analytics and VR/AR have been included. The chapter also introduces the readers to newer types of classrooms like the flipped classroom, synchronous and asynchronous classroom, hybrid classroom, etc. The impact of the use of simulation and gamification tools in the delivery of higher education has also been discussed in detail.

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CHAPTER 8

Digital Transformation in Teaching and Learning
A Multiple Case Study Approach

Luiz Carlos Di Serio, Enido Fabiano de Ramos and Kenyth Alves de Freitas

> In digital education, everything you do leaves traces. It's not only footprints. It goes deeper than that. There are marks all over the place .... So, the professor needs to prepare himself better. It's the fundamental characteristic that immediately differentiates digital teaching from conventional teaching. In face-to-face interaction, lecturers can give any class they want ... in the digital environment there's no such thing.
>
> University Respondent

As mentioned in Chapter 1 of this book, the mindsets of staff and faculty members have changed as a result of the coronavirus pandemic and have become much more open to online teaching methods. Digital transformation in higher education, however, is not a recent phenomenon. It has been continuously evolving in recent years through the application of new technologies. Education has reached new markets by way of media such as radio, television and the Internet, and it has been constantly improving in quality over time. It has been possible to break the traditional paradigm of education supported by the unidirectional, individualistic and fragmented teaching of knowledge. Digital education has enabled an innovative educational model to emerge that is supported by the principles of multidirectional, collective, transdisciplinary and collaborative learning.

Higher education institutions have built different digital models based on their own distinct strategies. Besides the obvious geographical separation of students, digital courses can offer what Kaplan (2016) called 'separation by time perspective' through asynchronous or synchronous learning. In the former, which is very common in massive open online courses (MOOCs), students can learn at their own pace. Synchronous learning, on the other hand, depends on simultaneous study and is found mainly in small private online courses (SPOCs) that usually require some form of formal enrolment.

Despite all its advantages, there are criticisms of the use of digital education, which can be grouped into technical and teaching difficulties

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(Kaplan 2018; Blasco, Kjærgaard and Thomsen 2021). Technical difficulties are related to understanding multimedia resources and the structure of the virtual space of the course. Teaching difficulties, in contrast, refer to the lack of follow-up in the learning process by trained professionals and the massification of teaching. Kaplan and Heinlein (2016) showed that most of these criticisms could be addressed if students were better targeted and teachers were better trained. With regard to students, the development of digital initiatives must awaken their intrinsic motivation, while with teachers' educational institutions must identify and train their members to build courses and content that are aligned with current and future market needs.

This chapter sets out some of the important findings of qualitative research that was carried out with eight Brazilian educational institutions that employ digital transformation but that are at differing levels of maturity. The important factors needed for developing an effective and successful digital course will then be presented, based on this research.

The Critical Factors of Digital Transformation in Higher Education

Critical factors are essential items for achieving an organiSation's executive, strategic or tactical goals. They guarantee its competitive performance, even if other factors are neglected (Seo 2018). Graham, Woodfield and Harrison (2013) and Sheehan and Morgan (2020) highlighted five critical factors for achieving success in the learning process. First, contextual and educational assumptions refer to how individuals absorb and fix knowledge in each discipline and on each course, including knowledge-transfer beliefs, based on computer-supported collaborative learning and research theories. The second factor is the application of the learning theory that is in evidence throughout the teaching-learning process, the conceptual models that describe how students absorb and internalise the experience they have in each knowledge-transfer activity, the application process and exercises, the assessment formats and maximum knowledge retention. It also considers the cognitive, emotional and environmental influences, the previously acquired or changed experience and the retained knowledge and skills.

Third, student motivation explores the implications of new technology for student commitment and promotes creative ways for improving the attention and interest that students show in the teaching process. Fourth, the role of the teacher refers to the discussion about the approaches adopted by teachers and their limits in digital education. Some authors are radical concerning the non-permanence of this agent, others recommend a profound resignification of the role to that of mediator, while others mention that the role only becomes stronger with this approach, since new ways of evaluating and preparing 'classes' require better-prepared teachers. Lastly, collaborative learning refers to the way knowledge is presented and is a social construction. There are several possibilities for collaboration: in pairs or in small or large groups, with mediated challenges, major dilemmas or simple tasks. In the digital context, these dynamics are essential when considering the epistemological process and quality.

The Maturity of Digital Transformation in Higher Education

By evaluating strategies, structures and support, the framework shown in Table 8.1 enables the maturity level of higher education institutions involved in digital transformation to be assessed. Its objective is to support educational institutions that are looking to evolve, and it supplies coherent and effective information to enable this process.

The Multiple Case Approach

This study adopted a qualitative approach using the multiple case study technique. According to Myers (2013), qualitative approaches allow for analysis of the motivations behind the actions and decisions taken by managers and offer more extensive results of this analysis. We sought to understand the factors that are critical for implementing digital transformation in education in eight higher education institutions and to establish the maturity level of this service in the institutions we analysed.

A multiple case study should analyse between four and ten cases to be considered effective (Eisenhardt 1989). It was decided, therefore, to select higher education institutions that offer courses at the technological, undergraduate or postgraduate levels. We selected eight private higher education institutions for our research that offer courses in business (four institutions), engineering and social sciences (two each).

Data were collected by way of in-depth interviews based on a semi-structured questionnaire. In choosing the cases for this research, we undertook an extensive search for institutions that offer digital education at some level of higher education. This resulted in eight institutions being selected.

At least four managers from each institution were interviewed, for a total of thirty-six interviews; twenty-eight of these took place using conference software, while only eight were in person. We recorded and transcribed the interviews, the only modifications being to conceal the names of the person or institution.

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Table 8.1. *Digital transformation's maturity in higher education*

Category	STAGE 1 Consciousness/ exploration	STAGE 2 Adoption/ preliminary implementation	STAGE 3 Growth/ mature implementation	STAGE 4 Application of good practice	STAGE 5 Best practice market reference
Technological	Focus on technological support for the traditional classroom	Focus on technologies for partial face-to-face teaching	Technological support well-established and compatible with the needs of stakeholders	Digital recognition of the student's digital security	Teachers make the most of technological resources, using AI and blockchain
Pedagogic	No development process	Experimentation and construction of a formal development process	Established and robust process, systematically improved	Problem-based learning/effective assessment models	Active methodologies, world-class didactic design
Purpose	No goals defined	Objectives being explored through training and course development	Well-established goals and systematic course improvements	Guarantee of recorded technical and behavioural training capabilities	Student-centric planning, including UX and engaged teachers
Results	**Online Curiosity**	**Face-to-face moved to online**	**High level approaches**	**Quality deliveries**	**State-of-the-art digital education**

Source: adapted from Graham, Woodfield and Harrison (2013) and Sheehan and Morgan (2020)

The interviews were then coded and analysed according to open coding using the content analysis technique. The inductive method was adopted for: (1) detailed transcription of the interviews, (2) coding the concepts, (3) tabulating and analysing the data and (4) interpreting the results.

Digital Teaching: What This Research Revealed

> There is a focus on the essential and results-oriented. There is no time for fake solutions. It is quality digitalisation or . . . we are dead!
>
> HU3 University Respondent

Our findings reveal that theses institutions applied several teaching techniques to develop their courses, including active education, a just-in-time vs. if-in-case approach, problem-based learning, project-based learning, flipped learning, neuroeducation, storytelling, the science of forgetting, game-based learning and experimental learning/escape room. No one technique is considered better than another, but combining them is a key factor in digital teaching.

One of the great challenges in digital courses is keeping students highly engaged. Courses that employed a humanised narrative were the most successful, with low dropout rates. The high impact of the educational elements and in-depth content of these courses, the teaching strategies of which are anchored in the neuroscience of education, were formatted to enable students to experience and handle sub-themes, concepts and practice. These courses were also intended to connect the subjects being taught/learned to the students' tacit knowledge to allow emotional associations to be established and to promote a better understanding of the subject matter. Ultimately, self-assessment with immediate feedback improves the overall learning experience. On this particular point, Kaplan and Heinlein (2016) provide us with insights, a framework for motivating students and tips on how institutions can identify and train those faculty members who are suited for digital education.

The Success Factors When Developing Digital Courses

> Look at the case of Harvard, which in its 377 years of existence reached one million students, and then in just one year had the same number of students enrolled on its MOOCs. Here in our institution, for every student who enrols for a classroom-based course, we have another 100 students online.
>
> HU5 University Respondent

A concern of researchers when conducting a case study is to ensure the veracity of the information collected. According to Yin (2014), this process

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begins before the researcher goes into the field, in the construction of the research protocol and in case selection. Thus, these factors help to ensure the reliability of the study results and allow the replicability of the findings.

Our research shows that the success of digital education is based on factors that must be considered when developing the course or discipline. Eisenhardt (1989) propose that a multiple case study must analyse between four and ten cases to be considered effective.

These *success factors* are guidelines and were collected and highlighted in the interviews with thirty-five administrative and faculty members who have direct responsibility for the digital initiatives in the eight institutions. They recommend the following.

Factor # 1: Planning Teaching

Digital education requires an in-depth assessment of the entire curricular matrix, a clear definition of the competences required and a detailed review of the content that exist in the face-to-face model.

> Nothing is done without planning. No investment is made without there being an objective, without having a destination for this teaching and digital learning: What's your plan?
>
> PM1 University Respondent

> The first thing you need to think about is what my educational project is. Who am I creating this project for?? Who's my audience?
>
> HU4 University Respondent

> When we reviewed the entire educational project, we reflected on the profile of the professional we wanted to deliver for society. As a result, we included management disciplines in medicine. In fact, 'we don't just want good specialists. We want leaders who know how to work in groups'.
>
> HU1 University Respondent

Factor # 2: Workload Optimisation

Most of the time, there is a lower workload in digital education than there is with the same face-to-face discipline. This does not mean a lack of the necessary content, or a lack of quality, but it is an important adaptation of the current learning process.

> The current generation of young people is used to 'Twitter's standard 140 characters'. They're more digital and well-informed. They can't absorb a lot of content, or concentrate if the same logic of traditional classes is reproduced.
>
> HU3 University Respondent

> We've defined a new model for the course workload. We rethought the current way we measure course performance. Now it's by the results the students get, rather than by workload. The time spent on the virtual course is relative, and depends directly on the performance of each student
>
> EU1 University Respondent

Factor # 3: Right Content

Develop high-quality content that has the right depth and is aligned with the current and future challenges of the profession, embedded in practical coherence.

> Particularly in this complex and uncertain digital age that's full of vulnerabilities and ambiguities, students connect to narratives that are based on facts described using the storytelling method.
>
> EU2 University Respondent

> With regard to content, the focus is on teaching subjects that are useful for practising the profession. For example, in the beginning students generally learn some 60 ways for anatomically fixing the femur. But in the day-to-day profession, when it comes to treating patients, only 10% of them are going to be useful. 'Online undergraduate courses always focus on this most important part of the discipline.'
>
> HU1 University Respondent

Factor # 4: Lecturer Training

Empower all faculty members because the role of teachers has changed and been reframed.

> With continuous updates, the lecturer is only the moderator of a discussion. There are some lectures, but they're a minority. . . we've moved to this model that's about empowering and raising awareness. It's a new way of doing things that's imposed by [today's] reality.
>
> HU5 University Respondent

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> We train lecturers and assistant lecturers to become learning community managers
>
> HU1 University Respondent

> Assistant lecturers with three years' service were trained in how to gather and arrange content for their own departments' lessons, and taught how to write better in order to make course content more dynamic.
>
> EU1 University Respondent

Factor # 5: Language and Teaching Format

Digital education requires self-study techniques, so all of the content must be vectorised and transcribed using heutagogy approaches: instructional design and online graphic design.

> In project-based learning, each student's creativity may be different from the others, and you can't let it die.
>
> HU2 University Respondent

> There are two production stages. We design all the content in a language that's appropriate to our target audience, and that's closer to the student, and in order to encourage reading. Then we produce videos and provide recorded lessons, animated films, games. . .
>
> EU2 University Respondent

> Learning at the right time, and access where and when it's needed. It's brief content that's straight to the point, and we quickly develop it and make it available.
>
> HU4 University Respondent

Factor # 6: Changes in the Assessment Process

Unlike traditional models, the assessment process is continuous and involves class attendance, the time spent in activities, the quality of the texts produced, interpretation of the academic challenges, interaction with peers, the level of questioning in tutorials, as well as the classic multiple-choice tests, case construction, problem-based learning, etc.

> The teacher accesses the student's screen (with their permission) and assesses the code and programming.
>
> HU2 University Respondent

> Students are assessed every week, by way of continuous tests. It is almost obsessive.
>
> HU1 University Respondent

> We have a form of assessment that the class itself carries out. Each student has to judge the performance of their teammates – and they can't give everyone 'Excellent'. At least one colleague has to be 'Poor'. It's an assessment that has a quota of marks that have to be divided up between the group; it's the famous 'forced ranking'.
>
> HU4 University Respondent

Factor # 7: Student Centricity

There is a change in the paradigm of the role of the teacher being at the heart of the learning process: the focus of attention in digital education is on the student learning process.

> Online classes follow the 'team-based learning' method – the virtual room comprises all the students, or it's subdivided into teams of students. They receive texts and e-books and discuss the topics and agendas in groups.
>
> HU4 University Respondent

> Each student's interaction is built for them to be the protagonist in the process of autonomous learning. It's assumed that the student is the centre of the process. In fact, in our institution, we call it learning, not teaching as we used to do with face-to-face classes.
>
> HU5 University Respondent

Factor # 8: Technology

This is the means in the process, the tool that enables the teaching and learning process. It avoids the same mistakes made by many institutions that chose the platform and the technology first.

> The first mistake on this digital journey is to make technology the driver of the project.
>
> PM1 University Respondent

> When I came here (five years ago), I had to convince a lot of people that the platform is a mere messenger; if the message is bad, the excuse can never be the technology.
>
> HU3 University Respondent

Factor # 9: Teacher Compensation

Evaluate disruptive remuneration formats and seek the right incentives for migrating to digital models. Variable remuneration is linked to the success

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rates of the disciplines and online courses. There are formats for encouraging the production of content and clear criteria on copyright issues, the use of the image and the preparation of digital classes.

> In the beginning, some of the teachers didn't feel comfortable, especially because they were afraid of being replaced . . . it happened with about 85 per cent of them (HR climate survey). We set up groups of teachers to develop the online disciplines and complete courses, and they were paid a fee that was based on various indicators.
>
> HU5 University Respondent

> We hired a specialist company to create content, an EdTech, but our teachers receive royalties for the courses they've created. We have a lifetime contract with some of them.
>
> HU3 University Respondent

Factor # 10: Provide a Pleasant Experience

Ensure that the learning process will be positive and pleasant for the students. This does not mean being superficial and evasive or dull or overly-rigorous. The concept of 'edutainment' is becoming more powerful, and gamification and other techniques increase student motivation and make for a better overall experience.

> To be recognised as top quality, learning challenges don't have to be boring or serious, or too difficult.
>
> EU2 University Respondent

> Everybody agreed that student engagement and motivation indicators improved when we redesigned the course, involved scriptwriters, and had actors perfoming in course videos. We were inspired to upgrade our digital content format by some of the principles that are used by Disney.
>
> EU1 University Respondent

> Games are an evolution that enabled us to acquire skills and knowledge in a fun, but at the same time serious way. It's great, because in a game we can make mistakes in a risk-free environment, and we learn and actively practice the right way to do things by experimenting.
>
> PM1 University Respondent

Factor # 11: Social Learning

Share content in forums, chats and social networks. Use social networks because this facilitates the creation and the exchange of user-generated content.

> In an activity in Module 1 of the course, we ask each student to establish their own timeline for all students to see, and to include what they expect to get from the course.
>
> HU2 University Respondent

> Collaboration is the basis of creativity and innovation.
>
> HU5 University Respondent

> Social learning (students are the protagonists of their life knowledge, which fosters digital collaboration).
>
> HU1 University Respondent

Factor # 12: Active Methodology

Make the students the protagonists in the learning process and highlight individual skills and competences that, in a traditional class-based model, remained dormant. Some of the techniques available were mentioned in the Section 'Digital Teaching: What This Research Revealed'.

> Problem situations that need to be solved with the final delivery of expert apps and software
>
> HU2 University Respondent

> One of the great changes we made was that we adopted active methodologies. They became a very important teaching resource for us.
>
> EU2 University Respondent

Although the COVID-19 pandemic was a catalyst in the digital transformation of the sector, the twelve factors based on these eight cases can be used like a compass to upgrade the maturity of digital transformation in any higher educational institution.

Conclusion

Digital transformation in higher education through the use of online courses and digital tools is a point of no return. Both students and faculty members need to embrace change and understand that the future of learning and teaching involves the use of digital methodologies. Educational institutions must recognise that the students of today must be understood in their essence as must their current and future needs. Faculty members must also be trained to enhance their digital teaching capabilities, over and above what they know and do in face-to-face interactions.

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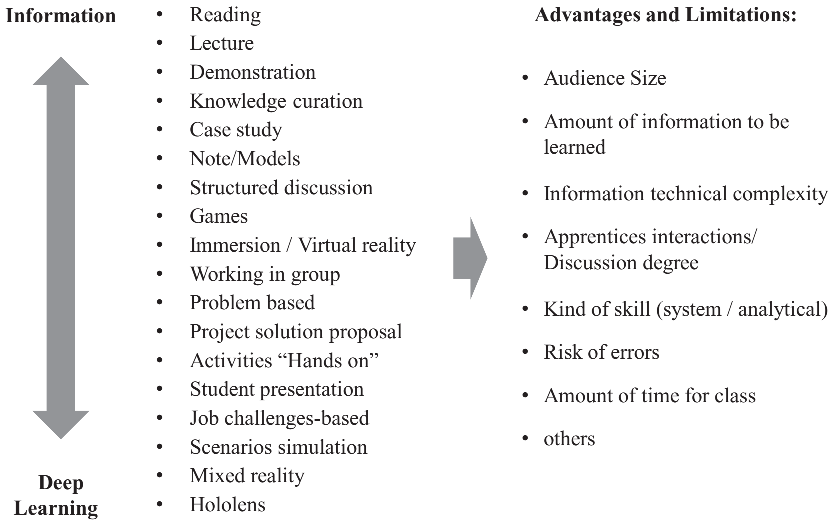

Figure 8.1 Higher education digital learning elements

When structuring the course, all available learning elements (Figure 8.1) must be considered and based on the objectives, profile and needs of the students.

In this sense, the *success factors* that are listed in this chapter provide a good pathway in how to think about and build digital learning activities and courses. The fact that these factors were taken from interactions with educational institutions, plus the experience of the authors, strengthens their use in real life.

In summary, we can design the development of digital learning strategies in three stages: before, during and after the course. Before the course, be clear and specific about the development of the courses and how they will be given. During the course, ensure that content is developed according to the target audience in order to stimulate interest and encourage reading. Humanise execution and use as many different tools as possible, such as videos, animated films and games, always bearing in mind that educational needs must be met. Lastly, after the course, use student assessments as a process for reflecting on the learning journey. We also suggest the use of infographics for presenting the most relevant points discussed during the discipline or study period.

Digital initiatives in higher education are growing, but there is still much to be explored, discovered and developed in this journey of genuine transformation. Welcome to the new world of learning where digital innovation is key, keep going and always put the planning teaching first.

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CHAPTER 9

Blending Emerging Technologies for Student-Centred Teaching
A Critical Analysis

Sameera Mubarak, Santoso Wibowo, Mubarak Rahamathulla, Rongbin Yang and Silke Schönert

Student-centred learning is different from traditional teacher-centred or institution-centred learning, where the power balance leans more towards teachers and institutions. They set the learning outcomes while students remain passive listeners. In institution-centred learning, schools, colleges and universities design learning in a way that advances their own financial, administrative or logistical benefits; student learning becomes a secondary aim (Wibowo et al. 2016; Kaplan 2021). However, in recent times, these traditional teaching approaches have been replaced by a movement that places students at the centre. The ideology of student-centred learning proposes a paradigm shift that makes student participation a crucial part of teaching. Some of the key principles of student-centred teaching are the following:

- The curriculum, content and pedagogy are designed to build on what the students have already learnt to relate to what they would like to learn further.
- Student-centred learning assists students to independently acquire knowledge via active participation in the teaching process.
- Student-centred classrooms are characterised by students provided with specific, skill-based learning outcomes to motivate them to fully engage with the teaching process.
- Students are provided with opportunities to actively interact with the class and share their views and knowledge openly.
- Student feedback is emphasised to ensure that the teaching is student-centred, and the teacher is aware of what the students would like to learn.

Implementing these student-centred learning principles involves radical changes in the way teaching and educational institutions worldwide rely on e-learning platforms to implement student-centred teaching and learning. The present chapter will critically analyse the ways in which five leading e-learning platforms – learning management systems (LMS), virtual reality (VR), internet of things (IoT), Massive Open Online Courses (MOOCs) and social media – offer their support in implementing principles of student-centred learning.

Learning Management Systems

Learning management systems facilitate student-centred learning through synchronous or asynchronous communications between the students and teachers to simulate a face-to-face learning environment while the students are away from the classroom. The asynchronous aspects of LMSs present creative opportunities for students to learn at their own pace. LMSs are well known for facilitating student-centred learning (Mtebe 2015) and have the technological capability of integrating multiple media to actively engage with students. There are numerous LMS versions with many interesting learning features (Christino de Oliveira et al. 2016) that open up endless opportunities for educational institutions to invest in student-centred learning. Moreover, LMSs present learning resources in an organised and student-friendly manner, thereby promoting student-centred learning (Tella 2012).

Designing Pedagogy Based on What Students Already Know and What They Would Like to Learn Further

Curriculum design is a dynamic process that evolves as the teacher interacts with the students to understand what they have already learnt and what they would like to learn further. The demand for continual professional development, combined with the availability of technologically supported flexible learning opportunities, have increased the opportunities for students with advanced pre-existing learning who are looking for further opportunities to enhance their professional skills. This means that the curriculum design has to be dynamic and flexible to suit the needs of students who come from a wide range of backgrounds. In fact, technological platforms such as LMS have the potential to design curricula based on the students' existing knowledge and further learning interests; for example, the teacher can organise virtual discussion groups using LMS. This prevents repetition and helps sustain student motivation. LMSs have other helpful options – online quizzes, polling and live feedback facilities can be

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used to understand existing student knowledge while the class is in progress and can instantly elevate the classroom discussion to build on what the students already know.

Assisting Students to Acquire Their Own Knowledge by Active Participation

Empowering students to acquire their own knowledge necessitates the curriculum to provide a foundational knowledge for students to commence their learning and motivate and challenge them to enhance their learning to a level that each student prefers. LMS offer students the flexibility to access foundational knowledge when and where they want it in order to reflect and acquire their own knowledge. For example, the teacher can nominate specific readings that students must read, reflect on and summarise to post online for the class to read. This process ensures that students acquire knowledge independently and share it with the class. To involve all the students in the acquisition of their own knowledge, the teacher can request them to read every student's comments and reflect on what they have learnt from the whole process.

Assistance in Creating Skill-Based Learning Outcomes to Sustain Student Motivation

Skill-based learning not only facilitates the transfer of skills but also increases student motivation and involvement in the learning process. LMSs have the capability of integrating multiple media such as YouTube to demonstrate professional skills. In addition, some of the recently developed LMSs have the technological capability of combining virtual reality and augmented reality files to improve the real-life demonstration of professional skills. Another possibility is to form discussion groups using the LMS to work on case studies and professional skills relevant to the scenario. Importantly, the skill-based curriculum creates an evidence base for teachers and students to evaluate its learning outcomes.

Creation of Opportunities for Students to Actively Interact and Share Views with the Class

LMSs have the technological capability of creating life-like virtual classrooms that facilitate open communication like face-to-face classrooms. For example, there are live chat facilities for students to ask questions or share their reflections while the class is in progress. This platform also offers live video relaying of lectures and students can live-stream to have a face-to-face interaction with the teacher. LMSs have numerous other facilities that can increase student interaction in the class. In addition, the teacher can create time-restricted discussions with the groups finishing at specific times so that students have to move from one group to another to interact with all the students in the class.

Learning via Student Feedback to Ensure the Teacher Is Aware of What the Students Would Like to Learn

Learning based on student feedback is a concept that is central to the philosophy of student-centred learning. LMSs offer numerous facilities for students to provide feedback (Almrashdeh et al. 2011) anonymously, thus facilitating free and frank communication. The teacher can also create numerous opportunities for the students to provide feedback on specific matters. This means that the teacher need not wait for the term to finish to receive student feedback; consequently, students can benefit from their own feedback. Moreover, LMSs have the technological capability of integrating with multiple media to engage with the students; they allow students to communicate through hand-held devices such as tablet computers and mobile phones while the class is in progress. This creates an excellent opportunity for the teacher to receive live student feedback and improve the teaching content to confirm that the students learn what they want to their satisfaction.

Critical Analysis

There is a presumption that LMSs can solve all the problems associated with the lack of face-to-face interaction in e-learning. However, it is important to note that this platform cannot totally replace the aspects of face-to-face teaching.

Virtual Reality

Virtual reality (VR) is the application of three-dimensional (3D) computer graphics in combination with interface devices to create an interactive, immersive environment (Mihelj et al., 2014). VR technology facilitates learning through engagement, immersion and interactivity.

Designing Pedagogy Based on What Students Already Know and What They Would Like to Learn Further

Radianti et al. (2020) point out that teachers can adopt VR technology to conduct various activities virtually, including field trips, laboratory and

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science sessions, safety training and medical training, as part of the classroom experience. VR technology is an effective tool for engaging students in a deeply immersive sense of place and time and has the capability to improve learning based on student feedback. This is because VR visors have eye-tracking mechanisms that provide ongoing improvements to the software.

Assisting Students to Form Their Own Knowledge by Active Participation

VR technology offers the possibility of imitating complex real-life processes and systems (Chang and Lai 2020), which are difficult to replicate with traditional educational material such as lectures or case studies. VR technology provides students with a deep learning experience via three basic features: (a) immersion, (b) imagination and (c) interaction (Banerjee 2021). Several studies have identified the positive impacts of VR technology through immersive learning experiences and further found that engagement, presence, experienced realism and elicitation of emotions can facilitate learning (Chang and Lai 2020) as better elicitation of emotions increase engagement in participants (Buttussi and Chittaro 2017). Being immersed in what you are learning motivates you to fully understand it. It will also require lesser cognitive load to process the information. Moreover, VR technology enables students to make learning experiences social by allowing them to communicate with each other. Using avatars and mapped facial expressions, people can come together to discuss, synthesise and learn from one another. For example, Liaw et al. (2000) discuss the use of VR technology in teaching healthcare students. The social interactions among the students in their study were supported further by application of an experiential learning approach that underpinned learning activities such as role-play and debriefing in VR simulations.

Assistance in Creating Skill-Based Learning Outcomes to Sustain Student Motivation

VR technology proposes a different way of learning: It assists teachers in creating real-life scenarios and skill-based learning outcomes for motivating students to engage closely with the teaching process. VR technology also enables practice-oriented learning content rather than content that needs memorising. It can provide learning experiences at a level of immersion that other technologies cannot offer.

Creating Opportunities for Students to Actively Interact and Share Views with Others

VR technology creates several opportunities for students to actively interact with the class and openly share their views and knowledge. In order to achieve this, many universities around the world have built online versions of their campus within Second Life environments. Second Life is a virtual world where users interact in simulated 3D spaces (Virtual Reality Society 2020). In Second Life, students are able to exchange messages in real time and see their classmates' animated images. The University of Glasgow uses Second Life to create a space where students can interact with each other and their teachers in an environment that enhances student experience and promotes a feeling of 'being part of' the university (University of Glasgow 2020).

Learning via Student Feedback to Ensure the Teacher Is Aware of What the Students Would Like to Learn

VR technology enables teaching to be student-centred as students are inspired to discover new information and knowledge independently. This provides an opportunity for students to learn by doing rather than passively reading. In addition, VR technology provides a more customised learning experience wherein students can provide feedback directly to the teacher, and their learning progress can be assessed and monitored by the teachers through the capability and transparency.

Critical Analysis

The cost of using VR technology can be very high; therefore, it is recommended to start with a realistically small scope, tailoring the application case to what seems feasible and achievable over time. However, the development of VR applications is quite complex, so teachers and students might need more VR experience to apply them.

Internet of Things

According to the International Telecommunication Union, the internet of things (IoT) is a dynamic global network infrastructure with billions of physical devices connected to the Internet, all collecting and sharing data

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(Zuerner 2014). IoT replaces the 'information age' with the concept of 'the connected age'. The application and incorporation of IoT technology brings significant benefits to many sectors including education, enabling the uninterrupted learning of any content at any given time (Şad and Ebner 2017).

Designing Pedagogy Based on What Students Already Know and What They Would Like to Learn Further

Sensor technology is part of the IoT and has advanced features to collect information from varied people for different purposes. In fact, sensor technology has vast potential in generating a valuable evidence base for student learning. Based on what students have already learnt, IoT technology can be useful to develop curriculum content within adaptive learning environments. Further, the big data about learners collected through sensors have a huge benefit in improving adaptive learning systems during the stage of curriculum development.

Assisting Students to Acquire Their Own Knowledge through Active Participation

An experimental study by Stojanović et al. (2020) shows that the use of IoT and mobile technologies has increased the level of students' knowledge and active participation in learning compared to the control group that used the traditional learning method. The IoT also offers many opportunities for students to acquire their own knowledge through active participation since a smart classroom enables real-time learning experiences that are much more effective.

Assistance in Creating Skill-Based Learning Outcomes to Sustain Student Motivation

The usage of Twine products on university campuses allows users to link almost all physical object to a local area network, thereby facilitating easy setup and quick data transfer. The accurate demonstration of professional skills in a classroom has always been a challenge for teachers. Thanks to the IoT, digital devices can be used to demonstrate real-life scenarios in a classroom and generate debate and discussion regarding professional skills.

Creating Opportunities for Students to Actively Interact and Openly Share Views with the Class

A huge benefit of the IoT is that it enables seamless uninterrupted learning at any given time by making every aspect of the learning environment digital, intelligent and connected (Şad and Edner 2017). Unsurprisingly, IoT applications have changed the education sector drastically. The usage of mobile devices maintains continuity in the learning environment by moving the classroom environment anywhere and to anytime, ensuring student engagement throughout. The Horizon Report 2015 acknowledges the use of the IoT in the higher education sector (Johnson et al. 2015). Embedded technologies such as sensors, RFID and cloud computing support seamless learning that can easily be accessed via mobile devices. With the help of mobile devices, students can actively exchange information, interact with the class and learn from each other at a flexible time and environment.

Learning via Student Feedback to Ensure That the Teacher Is Aware of What the Students Would Like to Learn

An important application of the IoT in learning is its capability of bringing a wide range of interacting devices to facilitate feedback from teachers to students and vice versa. Never before have the students had so many open channels for them to directly communicate their needs and provide feedback to teachers. Thus, IoT technologies have created a revolution in the implementation of student-centred learning.

Critical Analysis

The IoT is a group of technologies and not a single platform; hence, their usage in education requires a lot of preparation. Moreover, the huge investment on new technologies to adapt and maintain users' security and privacy poses challenges for educational institutions.

Massive Open Online Courses

As indicated by Kaplan in Chapter 1, Massive Open Online Courses have been the subject of technology-enhanced learning research for many years

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(Ebner et al. 2020) and are a 'big deal' in open education and distance learning (Kaplan and Haenlein 2016). MOOCs are online courses for a large number of participants that anyone can access from anywhere as long as they have an internet connection; they are open to anyone and offer a full online course experience for free (Mulder and Jansen 2015). In addition to typical course materials, MOOCs often offer interactive user forums that help build a community for students and teachers. Although MOOCs do not always offer academic credits, they provide training that can enable certification and qualification for employment or further study. There are mainly two types of MOOCs: xMOOCs and cMOOCs. The distinguishing feature of the two is the use of software platforms, video lectures, online assessment, support materials and opportunities to comment and discuss. xMOOCs are suitable for transmitting information to a wider audience. In contrast, cMOOCs are based on network learning where learning evolves through interactions and discussions between participants over social media. There are a few other forms of MOOCs that are more aligned to the concept of a flipped classroom (Ebner et al. 2020).

Designing Pedagogy Based on What Students Already Know and What They Would Like to Learn Further

Autonomy is one of the main features of MOOCs. When students enrol in the MOOCs, they choose online courses according to their interest, which is in contrast to the limits of a traditional curriculum schedule. In the learning process, students are not restricted by time and place, thus ensuring sufficient learning time, on the one hand, and improving learning efficiency, on the other. In fact, universities in some countries have even set up a credit transferring system (Li 2019).

Since the beginning, major MOOC providers required all learning materials to be presented in ways that are accessible to a diverse population of learners. As a result, MOOCs have the potential to meet the needs of diverse learners in various ways and aim for further learning based on what they already know (Barman et al. 2019).

There is considerable empirical evidence that suggests that MOOCs mostly benefit those who are already well-educated, whereas the disadvantaged and underprivileged do not benefit from MOOCs (Emanuel 2013). The prior educational standards of MOOC students across the world far exceeds that of the general population in their own countries. In some countries, almost 80 per cent of MOOC students come from the wealthiest and most well educated 6 per cent of the population (Barman et al. 2019).

Assisting Students to Acquire Their Own Knowledge by Active Participation

Traditional MOOCs show a lack of interaction. In contrast, MOOCs that are aligned to the flipped classroom concept allow teachers and students to make the most of classroom time through blended classes. Students receive assignments to listen to or watch a recorded lecture in advance and return to the classroom for a more valuable discussion time or interactive learning. This process encourages students to develop independent learning skills to acquire their knowledge by active participation in the learning process.

Assistance in Creating Skill-Based Learning Outcomes to Sustain Student Motivation

The learning experience in MOOCs remains more knowledge-based than skill-based due to the less-pronounced opportunities to convert theoretical knowledge into practice. However, MOOCs offer the opportunity for students to reflect on the skill aspects through self-paced courses.

Creating Opportunities for Students to Actively Interact and Share Views with the Class

MOOCs allow extensive participation by learners, thus offering the opportunity of exchange between people from all over the world. MOOC forums can have different functions: learners can socialise with their peers and ask questions about the course content. Moreover, forums take on the traditional classroom role of offering assistance to a classmate to clarify a challenging subject (Diver and Martinez 2015). Concerning the completion rates of MOOCs, research suggests that online forums offered as part of MOOCs play a significant role in increasing successful completion of MOOCs (Bonafini 2017). Furthermore, active engagement of participants on online forums predicted their greater commitment to the course materials (Ferguson and Clow 2015). However, it is important to mention that discussions on online forums might be problematic in MOOCs due to the massive number of participants (Cagiltay et al. 2020).

Learning Facilitated via Student Feedback to Ensure That the Teacher Is Aware of What the Students Would Like to Learn

MOOC platforms offer limited student feedback due to the high student volume. The learners' behaviour, instructional design, assessment processes and interactions among learners and teachers in MOOCs are significantly

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different from traditional educational platforms. For instance, MOOC learners were rarely able to obtain direct and timely feedback from teachers. This was due to the shift to MOOCs based on flipped classrooms (Cagiltay et al. 2020).

Critical Analysis

The role of MOOCs is more as a supplement rather than a full-fledged replacement of classroom learning. The courses register a huge number of dropouts as students lack motivation to finish these courses since they do not provide official credit points; probably, the students themselves not being ready for a self-guided study process serves as evidence for this (Birzina and Cedere 2020). Moreover, there are concerns raised about the pedagogical quality of MOOCs. The quality assurance from institutions offering MOOCs is another area of debate (Barman et al. 2019).

Social Media

Social media are forms of electronic communication (such as websites) through which people create online communities to share information, ideas, personal messages, etc. (Merriam-Webster 2020). Students can use such platforms via their smartphones, tablets or computers. There are different types of social media used for creating and sharing information (see Table 9.1).

Designing Pedagogy Based on What Students Already Know and What They Would Like to Learn Further

Social media facilitate creativity in curriculum design as instructors can develop new forms of assessment activities by combining social media and learning. For example, students writing essays as blog posts can improve their writing and critical thinking skills. This also allows students to respond to weekly prompts by making them informal and loosely structured. Additionally, students may adopt social media, such as Instagram and YouTube, to present a series of videos and pictures to accomplish their learning tasks, such as observation assignments. This can also improve the students' critical thinking skills by actively evaluating and commenting on their peers' works (Davies et al. 2019).

Assisting Students to Acquire Their Own Knowledge by Active Participation

Skill-based learning has seen a significant improvement due to the capability of social media to transfer audio and video files, thereby

Table 9.1. *Social media types for information creation and sharing*

Types	Purposes	Examples
Social networks	To connect with other people	Facebook, Twitter, LinkedIn
Media sharing networks	To find and share photos, video, live video and other media online.	Instagram, Snapchat, YouTube
Discussion forums	To find, discuss and share news, information and opinions.	Reddit, Quora, Digg
Bookmarking and content curation networks	To discover, save, share and discuss new and trending content and media.	Pinterest, Flipboard
Review networks	To find, review and share information about brands, products and services, as well as restaurants, travel destinations and more.	Yelp, Zomato, TripAdvisor
Blogging and publishing networks	To publish, discover and comment on content online.	WordPress, Tumblr
Shopping networks	To spot trends, follow brands, share great finds and make purchases.	Polyvore, Etsy, Fancy
Interest-based networks	To connect with others around a shared interest or hobby.	Goodreads, Houzz, Last.fm
Sharing-Economy networks	To advertise, find, share, buy, sell and trade products and services between peers.	Airbnb, Uber, Taskrabbit
Education networks	To enhance collaboration between the teacher and the student or student to student	Google Classroom

demonstrating key professional and social skills. Educators are able to use online messages, comments, news and articles from blogging and publishing sites (e.g., WordPress), online discussion forums (e.g., Quora) and bookmarking and content curation networks (Pinterest) to transfer key professional skills and keep the students actively involved in the learning process. These platforms often contain content based on students' individual interests, presented with eye-catching photos and other media. This also promotes critical thinking while engaging in social media and online communities to evaluate, use and share information (Al-Aufi et al. 2017).

Assistance in the Creation of Skill-Based Learning Outcomes to Sustain Student Motivation

Social media optimise institutions' career assistance for their students as they use social media to connect students with career services and

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employers. For example, students and employers can have informational question-and-answer sessions and make connections through professional networking sites such as LinkedIn. Educational institutions can also host live events and webinars via social media platforms, including Zoom and Facebook, in which employers communicate with students about their organisations and career opportunities. Social media allow institutions' career services to achieve a more dynamic presence and develop creative content, which supports career assistance teachers and workers to become opinion leaders in campus communities and professional networks. This can facilitate an engaging culture where students regularly share positive experiences and promote career services' perceived values by referring peers (Dey and Cruzvergara 2014; Conroy et al. 2020).

Creating Opportunities for Students to Actively Interact and Openly Share Views with the Class

Social media have revolutionised the way in which students actively interact with their peers. They are especially useful for disadvantaged students who are unlikely to communicate with other students for a range of social, emotional and equity-related reasons. In fact, social media–supported educational programs are also acknowledged as more flexible and engaging learning methods for both on-campus and blended-learning students. For example, educators are able to create online groups for each of their classes through social media networks. Students are also able to connect with their peers and teachers via instant messaging applications to exchange questions and make phone calls or video calls. Some educational networks, such as Google Classroom and wikis, allow students platforms to undertake group work. These platforms also scaffold learning through the real-time posting of assignments, tracking work-in-progress, discussing and debating (Chu et al. 2017).

Learning via Student Feedback to Ensure That the Teacher Is Aware of What the Students Would Like to Learn

Social media platforms allow educators to engage with their students by responding to enquiries, posting discussion activities, assigning homework and announcing updates either during or outside school hours (Dutta 2020). Social media also enhance parental involvement in children's education. For example, educators can update parents on school-related news via Twitter or Facebook. Some cloud-based platforms (Microsoft

Table 9.2. *Social media usefulness for student feedback facilitation*

Social media platforms	Focuses	Benefits	Examples	References
Skype, Zoom, Facebook, Microsoft Teams	Distance learning	It provides students with more flexible learning methods, especially for the disadvantaged students who are not able to acquire formal education by attending regular classes on campus	University students in India during COVID-19	Dutta (2020)
Wikis, Google Classroom	Collaboration and cooperation	Students see it as a novel and effective method of quantifying levels of collaborative group learning, which facilitates better group learning outputs	Collaborative writing group of secondary school students in Hong Kong	Chu et al. (2017)
WordPress, Tumblr	Literacy and reading skills	Students are motivated to devote their time and put some extra efforts into their learning. It also promotes their critical thinking skills	Undergraduate students in Sultan	Al-Auf et al. (2017)
Instagram, Pinterest	Curriculum design	Students are able to participate in new forms of assessments, such as photo assignments and blog post essays. It promotes students' learning engagement.	Geography field courses in Germany	Davies et al. (2019)

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Table 9.2. (*cont.*)

Social media platforms	Focuses	Benefits	Examples	References
Facebook, Whatsapp, Wechat	Parental involvement	It enhances students' performance with the better informed academic support offered by their parents at home	Wechat groups of secondary school students' parents in China	Huang and Lin (2019)
LinkedIn, Facebook, Twitter	Career Assistance	Students are able to identify more job opportunities via direct communications with employers. Social media platforms also promote students' engagement with career services provided by schools and universities.	Undergraduate psychology programs In the United States	Conroy et al. 2020

Teams, Zoom, Skype) share students' real-time progress between schoolteachers and parents. This enhances parents' communication with the school. It also improves students' performance as their parents can offer better-informed academic support at home (Huang and Lin 2019). Table 9.2 provides a literature review on the usefulness of social media in facilitating student feedback to ensure the teaching is student-centred.

Critical Analysis

While social media can enhance the quality of the student-centred approach of educational institutions, their usage has risks of psychological or behavioural issues such as internet and smartphone addiction among young users. Therefore, educational institutions should educate their students about the moderate use of social media.

Conclusion

Emerging technologies have transformed the ways in which students learn, and educational institutions have gone through major reforms in their approaches to teaching and learning processes. Students, as consumers, have gained a lot through this process. Never before has learning gone through such major reform. Educational institutions could not have made such a major transformation without the support of emerging technological tools. These technological tools for learning are still evolving and will continue to play a crucial role in making student-centred learning a permanent reality. However, it is important that these technological tools are used cautiously based on a critical analysis of their strengths and weaknesses. Practicing caution will ensure that the optimal use of these digital and technological tools remains viable to communities around the world.

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CHAPTER 10

Artificial Intelligence
An Adaptive Learning Methodology

Francesca Pucciarelli and José Cobo-Benita

As every teacher knows, no one student is equivalent to another. Each of them has their own characteristics, peculiarities, abilities and weaknesses, and broad-based learning approaches may be ineffective in embracing this complexity over the long term. This is where adaptive learning (AL) comes in. This method delivers customised solutions to meet the specific learning needs of individuals. AL is an educational system based on technology and data analysis, allowing teachers to track students' performance and adjust methods and programs to each student's needs.

Nowadays, students have a diverse learning and knowledge background when they attend class. It is therefore natural to argue that a drive towards progression in Higher Education (HE) institutions should not only consider scholars' age and time spent in class; it should also be more focused on proficiency. This student-centric approach supports students in their efforts to master concepts, rather than accepting failure based on other students' performances and on time limits. In addition to giving students the right amount of time to maximise their efficiency and engagement, there are other significant implications of putting AL into practice. Think about how useful it would be for teachers to get real-time analytics about their class' performance, emerging difficulties and successful activities (Xie et al. 2019). Thanks to automated data analysis, they could intervene promptly on critical issues and adjust their methods to solve them. As a consequence, those in charge of producing content for HE institutions will also benefit from the increasingly wide use of AL, as they will receive more objective and detailed feedback about the efficiency of their work and emerging areas to be covered by educational programs.

AL is not new (see, for example, Paramythis and Loidl-Reisinger 2003), and some of the benefits of adopting this pedagogical mechanism are well proven. Think, for example, of the possibility for professors to update their teaching style as the curriculum moves forward based on technology-assisted insights and analytics (Kaplan and Haenlein 2016;

Midgley et al. 2000,) or even of the positive impact on learner performances and engagement of the one-to-one personalised experience.[1] What is unprecedented in our times is that artificial intelligence (AI) is enabling AL to reach a completely new level. In fact, AL powered by AI has made it possible to use this educational approach on a large scale and in combination with other educational innovations to provide real-time mass-customised learning experiences, which improve with use and time (Kaplan and Haenlein 2019). As a result, it is not surprising that AL is once again attracting the interest of HE decision-makers, scholars and many practitioners from publishing houses to EdTech start-ups.

How Artificial Intelligence Is Transforming the Learning Experience: Opportunities and Challenges

Many of the products and services we use every day are already leveraging AI to improve the user experience. Learning styles influence the development of learning solutions. A person's learning style can be influenced by age, ethnicity, cultural background and other factors that must be considered in the development process. Current HE students rate training and personal development as the number one job benefit (Afini Normandi et al. 2019). HE institutions and organisations must be prepared to begin implementing AI to empower students and employees by optimising content to suit users' preferred learning style. This will not only make the learning experience more enjoyable for them, but it will also help with knowledge retention and on-the-job performance.

An AI-powered training program allows that program to be adaptable, whereby modules are modified to suit the needs of each student (Hung and Wu 2016). The learning management system can offer video tutorials for certain students, but it will automatically transcribe the videos into text-based articles for other classmates. You can create images based on written content and suggest that an employee takes a day of in-person training on the sections of the course that they are struggling with. Learning insights also help develop a broader understanding of student behaviour, generating predictive capabilities (Kautzman and Jaques 2019). Using these insights, HE institutions can create smarter content that is adaptive, intuitive and responsive to a learner's personal journey.

[1] This is well-illustrated by Bloom in 1984 with the concept of the '2 Sigma Problem'. See Bloom, B. S. (1984) The 2-Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring. *Educational Researcher*, 13(6), 4–16.

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AI through adaptive learning can drastically shorten the learning process by suggesting only specific modules that the student needs to improve their skills for the future job they are applying for (Capuano and Caballé 2019). Having learned the strengths, weaknesses and learning preferences of the user, the system can suggest suitable training courses and modules for the student. AI can enhance the training experience for students and provide personalised feedback on areas for improvement (Kaplan and Haenlein 2016). For example, using tools such as speech-to-text that rely heavily on AI and machine learning, users can receive feedback on the performance of your presentation in areas such as voice rhythm, number of hesitation words used and whether certain keywords were mentioned, among others (Truong 2016).

In corporate training, performance data can be collected when employees perform their jobs in the workplace and also during training courses. Once this data is collected, AI can analyse it and apply it to obtain certain insights (Mavroudi et al. 2017). When workplace data is analysed, learning and development professionals gain insights into which training programs should be assigned to specific employees to improve their effectiveness at work (Manyika et al. 2017). The data analysis should highlight the areas in which employees need to improve, and the AI system can recommend suitable courses to fill these knowledge or practice gaps. An analysis of training data reveals what types of training material should be assigned to employees based on their learning styles (Truong 2016). It can also help to compare employees to each other with assessments and provide an appropriate level of difficulty in training materials to challenge the learner (Xie et al. 2019). Any gaps discovered in training can be assessed and training programs can be redesigned. The collection and analysis of employee data needs to be continuous, so that systems stay up to date with current trends and AI models are trained using the latest data.

Whether we realise it or not, we can be prejudiced against certain parts of the learning process. This can range from creating a new course with just a few evaluations because we do not particularly like them, to rating students differently based on their backgrounds, to accepting new hires based on how we feel about them (Nabizadeh et al. 2019). AI enables the learning process to be unbiased and objective, with processes, learning paths and new courses based on data and results. However, it is important to note that bias can still appear when training AI and machine learning models, as humans still choose the predefined variables and data sets. To remain accurate and relevant, the adaptive learning system must be continuously trained to account for changes in the market and to eliminate any biases that occur through new data sets.

On the side of HE institutions, using AI through adaptive learning presents a number of opportunities. First, the use of AI identifies proficiency gaps: across disciplines, identifying proficiency gaps is crucial. However, in many cases, students are not aware of the gaps in their understanding (Chen et al. 2020). AL uses a question-based approach (or situational questions, depending on the competency to be assessed) to understand what students know and where the gaps are. Second, it offers tailor-made training by providing focused attention to every individual student. It also offers personalised feedback to students, which enables them to understand concepts better (Cobo-Benita 2020). AL leverages the algorithms and data it receives from the student in the form of assignments and responses and adapts the content accordingly. Third, an AL system accommodates different learning styles: unlike one-size-fits-all courses that might intimidate some groups of students, AL is suitable for all types of students, regardless of whether they are at the beginning, intermediate or advanced level of knowledge of concepts. A well-designed AL system learns how students learn and focuses on delivering learning materials that are tailored to their learning styles. Lastly, an AL system is updated when information changes – one of the crucial challenges in designing learning content is providing the most up-to-date material. The AL system keeps track of what a student has learned. When a teacher introduces changes to the course, the system can differentiate between material that a student has already covered and new areas to master (Mirata et al. 2020). This helps students get up to speed without having to quickly recheck all content.

But of course, AL brings its own set of challenges. First, convincing teachers of the enormous time investment required to rethink their learning content and teaching style to adapt it to AL. Second, a trained team is required to implement AL systems: developing this pedagogical solution is not only a matter of cost but also one of skills (Mavroudi et al. 2017; Mirata et al. 2020). HE institutions need to find the right team of managers, teachers and developers who can handle these projects efficiently. And third, it is important to clearly design the data analysis process, graphs, patterns and information available to teachers (Afini Normandi et al. 2019; Nabizadeh et al. 2020) so that they can design the right content depending on current trends and on each student's performance.

In our rapidly changing world, HE institutions and organisation development teams have to be proactive and strive for real pedagogical

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innovation, as analysed in Chapter 1. They have to ensure that the most relevant training tools and knowledge resources are available to their employees when they are available to learn. The learning technology landscape is changing extremely fast. HE institutions and organisations must keep abreast of the latest trends, whether in AI, virtual reality or blockchain, to remain relevant. A key part of upskilling and re-skilling is through the use of AI and machine learning to provide students and employees with the most relevant content when they need it. AI will transform how learning content is delivered, leading to greater alignment with business values.

Adaptive Learning and Higher Education

Technological advances are fundamentally changing the nature of the university system: challenging fundamental aspects of education, changing the way we learn, teach, assess (Bergamin and Hirt 2018; Kaplan 2021) and research (Gorska et al. 2020) and overcoming many of the common barriers of higher education. Think, for example, about the issue of access inequalities, both geographically and financially, and how online learning and massive open online courses (MOOCs) have extended reach potentially across the whole globe and made tuition fees much more affordable, at the single-module, certificate and full programme level (Bailey et al. 2018). Another example could be the enormous amount of information educational institutions hold on their students – from attendance, to progress, from favourite subjects, to test scores and grades – all of which are data-points that can assist both the institutions and the students themselves in understanding their strengths and weaknesses (Kaplan and Haenlein 2016). Moreover, many universities are increasingly using online education and technology in classrooms – and will continue to do so – to augment students' learning experience, creating even more data-points (Pucciarelli and Kaplan 2016).

Thus, it is not surprising that AI is now expected to make education smarter than ever before in a number of dimensions. In teaching, learning and assessment, for example, AI and digital technologies can offer innovative, purposeful and effective ways of engaging both teachers and students. Adaptive learning acts like a GPS (Dziuban et al. 2018). AL helps students to focus on what they need to learn and teachers to better allocate their time to value-added activities; the adaptive learning software dynamically adjusts the lesson (e.g., the next learning activity) based on student performance to create a personalised learning experience, personalised feedback, content recommendations and real-time progress dashboards that both students and instructors may review.

Adaptive learning is seen by many as the future of HE. Yet a limited number of documented cases of successful adaptive learning implementations are presented by the extant literature (Imhof, Bergamin and McGarrity 2020), even though adaptive learning has been around for quite a while.

Back in 2013, The Bill and Melinda Gates Foundation initiated the Adaptive Learning Market Acceleration Program (ALMAP) in support of an evidence-based understanding of how adaptive learning technologies could improve college completion (for disadvantaged adults). The project involved fourteen higher education institutions, both public and private online universities (for the full list of educational institutions involved, see Yarnall, Means and Wetzel 2016, pp. 30–31), which incorporated nice adaptive learning products into twenty-three courses, run multiple times over three years (from summer 2013 to winter 2015) to measure, in comparison with the comparison group, the effects of AL on students' outcomes, cost and savings impacts and students' and teachers' satisfaction. The effects on student learning and course completion were somewhat limited, probably because of the limited maturity of adaptive learning itself. Stronger outcomes were produced with adaptivity at a micro level (individual lesson or learning object), which also explains the initial rise in the cost of implementation of adaptive learning, as the format change requires instructor labour. Costs were lowered in the following implementations of adaptive courseware and were lower than traditional learning formats. Moreover, most instructors were satisfied with adaptive learning, pinpointing the real-time progress dashboard as useful for informing their teaching; and students reported higher rates of engagement and learning gains (60 per cent and 95 per cent, respectively, versus 25 per cent and 35 per cent of the comparison group).

Among the early adopters of adaptive learning, previous scholarly works cite Colorado Technical University (CTU) and its commitment to provide industry-relevant higher education to a highly diverse student population (i.e., online open enrolment student population), making teaching and adaptive learning a crucial part of its strategy, at both pedagogical and institutional level (Kaplan 2017; Bailey et al. 2018; Dziuban et al. 2018). Another interesting example is the University of Central Florida (UCF), a public research institution strategically using digital learning. UCF offered its first online course in 1996, offering a variety of course modalities with online and blended learning counting for the majority of enrolment

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growth and piloting adaptive learning in 2014 as an instructional technology for faculty use (choosing Realizeit as a provider, as was the case of Colorado Technical University). Dziuban et al. (2018) investigate the impact of adaptive learning in the two above-mentioned universities (CTU and UCF) and prove that adaptive modality stabilises learning organisation in multiple disciplines (e.g., math and nursing), whilst positively impacting students' engagement and growth.

Moving to Europe, a few and more recent cases of adaptive learning technology can be found, mostly in management education institutions piloting this new learning model primarily in MBA and Executive MBA programs. The Politecnico di Milano Graduate School of Business (MIP) launched FLEXA in 2018, an innovative, personalised continuous-learning platform and a digital mentor for students, powered by Microsoft AI. The platform is currently available to MIP Politecnico di Milano alumni and students, as well as to all interested professionals in the business world, with a strong focus on mentorship, career service and networking, furthering continuous and customised learning (see www.som.polimi.it/en/flexa/). Similarly, the ESSEC Business School Talent Center Project is providing personalised recommendations based on predictive analysis, among other functionalities. As part of a bigger digital transformation plan, the ESCP Business School has launched a project of adaptive learning in Executive Education for the Global Digital EMBA, in partnership with several EdTech start-ups, to design customised learning experiences and confirm the impact of adaptive learning.

Furthermore, using adaptive learning in corporate training is a powerful approach for achieving highly effective, personalised training and better performance outcomes. A number of corporate academies are in fact using adaptive learning to upskill and reskill their employees. Renault Group 'Primo Manager' is an AL-blended module aiming at producing a diagnostic of the management skills of its current and aspirant managers across eleven main target skills and designing individualised training paths. The AG2R La Mondiale (French Insurance company) sales academy is tailoring learning plans adapted to the challenges of the specific Business Unit, as well as employees' profiles and needs, skills proficiency and learning history. SNCF Réseau (French National Railway Company) provides newly recruited employees with AL training during their first months in the field, to reinforce technical skills and eventually hire them (if they fail the final exam, they will not be entitled to join the company).

In sum, even though the promise of a more personalised and engaging experience through adaptive learning is generating a lot of enthusiasm and attention, the adoption of this important and influential development is still at an early stage. At first glance, AL may sound complicated to implement; but actually, switching a class to AL can be a gradual process rather than one involving abrupt, unmanageable changes. Additionally, HE institutions can create and deliver new learning experiences adapted to each student's learning needs, thus putting them on track towards excellent academic outcomes, oriented to match their professional expectations. Many HE institutions (Universities and Business Schools) are increasingly adopting AL to ensure that everyone learns the same skills at their own pace and according to their level of understanding, whilst adding a further marketing weapon in their bid to establish themselves as cutting-edge and innovative players (Pucciarelli and Kaplan 2016, 2019).

Conclusion

When a HE institution or a corporate university is strategically and organisationally prepared to adopt artificial intelligence, adaptive systems have the potential to improve the way teachers instruct and enhance student learning and can help higher education institutions and policymakers to better understand how to improve the learning experience. At minimum, these systems allow for proper calibration of the curriculum, initial assessment, customisation of the learning process, ongoing monitoring and finally, validation of acquired knowledge and skills. However, these systems require a rethink of the roles and dynamics between students and trainers.

The latest technological trends and current learning dynamics confirm that we can no longer just rely on traditional ways of teaching and learning. It is increasingly likely that in the future of learning, technology can diversify the means to support students. As shown, adaptive systems could be an opportunity to support self-directed learning, as well as other forms of learning, making it more accessible, impactful and engaging. However, given the complexity of adopting and deploying adaptive learning systems, HE institutions and corporate universities have to address significant technological and organisational change management challenges.

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CHAPTER 11

Quality Assurance and Enhancement
An Application of Digitalised Data

Julia Chen, Linda Lin, Dennis Foung and Caroline Nixon

The last decade has witnessed a heightened need for quality assurance (QA) in higher education. This need derives from 'a growing demand for accountability and transparency' (Smidt 2015, p. 626) from stakeholders such as students, faculty and government funding bodies (Leiber et al. 2015). The rise of online teaching and blended learning has also expanded the range of QA measures (Martin et al. 2017). Together with the rising demand for QA are challenges in the implementation of QA measures, two of which are most evident in the literature. One is staff resistance: their unwillingness to participate in QA exercises (Jingura and Kamusoko 2019). The main reason of resistance is that most QA measures are imposed by different levels of administration. Such measures place students, faculty and even institutions in a position of compliance with external standards, and their voices are rarely heard in the process (Leiber et al. 2015). These 'reward-or-sanction-led' measures have resulted in some institutions adopting a 'reactive quality culture' (Harvey 2008, p. 85). As a result, some faculty consider QA exercises a 'beast that need[s] to be fed' (Newton 2000, p. 31).

The other main challenge, according to Mishra (2019), is that the data generated in the QA process is not fully used for academic activities. In other words, the continuous improvement in teaching, research and public services, which are regarded as the three missions of higher education Kaplan (2021), has not yet been fully achieved via these exercises. To address this issue, Harvey (2008) introduced a regenerative quality culture, a QA culture that aims to achieve continued internal development. It places an emphasis on internal developments although with some awareness of external requirements. Despite a growing literature on the importance of a regenerative quality culture and how it should be developed (e.g., Harvey 2008; Kohoutek 2016; Tavares et al. 2016), little is known about how to implement measures needed to engender the culture. This chapter aims to bridge this gap by reporting on a case study of an internal quality review with the integration of learning analytics (LA) into the review process. LA is 'the measurement, collection, analysis and reporting of data about learners and their contexts, for the purposes of understanding and optimising learning and the environments in which it occurs'(Long and Siemens 2011, p. 34). These big data analytics affordances have greatly extended the suite of approaches in the review. This review proved itself to be a successful application of digitalisation in higher education 'beyond simply transferring offline courses into the online world', as described in Chapter 1.

The study, which was conducted in a university in Hong Kong, describes an internal curriculum review of an academic English programme led by the faculty in the English Language Centre. The review was in addition to the routine QA procedures implemented for academic English courses in the centre. The courses under review were designed to form a pathway of academic English learning for students who had newly entered the university. Three levels of academic English courses were offered according to students' English scores from the Hong Kong public university entrance exam. Each student in the university was required to take two language e-courses. Those with low scores are required to take Course A and Course B; those with average scores and take Course B and Course C; and those with high scores take Course C and an elective English course. Course A focuses on skills to prepare students for studying academic English, Course B focuses on basic academic English and Course C focuses on advanced academic English. These three courses were designed to enable students to experience a progression of their acquisition of academic English skills.

Curriculum Review in 2016

Four years after the commencement of the three-level course programme, the language centre undertook a comprehensive review of the programme (Chen 2018). The design of the review was based on O'Leary (2010), who asserts that effective quality assurance should explore views from all members of the stakeholder group, namely, the providers, the recipients and the wider community. Following this framework, the review collected views from subject leaders (the providers), faculty and students (the recipients) and local as well as overseas external examiners (the wider community). Multiple measures were adopted to examine objective artifacts in the programme, such as course and assessment materials, existing QA-loop documents (student and teacher feedback), as well as data from the

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university's learning management system (LMS) on student assessment and student and teacher engagement.

What We Did in 2016

Three review teams were formed for each of the reviewed courses. To explore various aspects of the subject materials and the course management, a wide range of methods were deployed. These included but were not limited to:

- Reviewing authentic data from the university's LMS including student assessment engagement data, students' interactions with course materials, student engagement/results in online summative assessments and teachers' engagement.
- A comprehensive review of the existing course documents: in-house teaching materials (students' and teachers' notes, assessments, QA-loop documents).
- Interviews: focus-group interviews with students who had taken the courses and semi-structured interviews with teachers who had taught the courses. Three types of teachers in the team were interviewed: experienced teachers who had taught the reviewed course for three to four years, new teachers who had taught the reviewed course for less than a year and teachers who had formally informed the timetable officer that they wished to stop teaching the course under review. Each interview was conducted by two teachers on the review team. No subject leaders participated in the interviews with teachers so that the latter could freely express their views without having to worry about any consequences their comments might incur.

All the information gathered from the review was triangulated to identify and merge common patterns that appeared in the documents.

What We Found in 2016

According to the review reports, Course A was 'hard to sell' to both students and teachers due to its perceived lack of challenge, so major revisions were required for both the course materials and the assessments. For example, teachers and students reported a lack of connection between Course A and Course B. To confirm this with the digital data, a multiple linear regression equation was established to explore the relationship between the overall grade for Course B Assessment One (BA1-Grade; an

Table 11.1. *Independent variables for course A progression in 2016*

Course A in 2016	Unstandardised coefficients	*t
Assessment – Assessment components	Beta	
(Constant)	1.10	7.58
Grammar test	0.17	5.43
Prose writing – organisation	0.10	2.09
Prose writing – grammar	0.13	2.38
Digital story – content	0.08	2.06
Digital story – conventions	0.12	2.14

*Only independent variables that were statistically significant were reported.

in-class problem-solution essay writing assessment) and all the component grades of Course A. While the overall model was statistically significant ($R^2 = 0.10$, $p < 0.01$), it could only explain 10 per cent of the variance. The variance explained (R2) just met the threshold for 'small' based on a review by Plonsky and Ghanbar (2018) on L2 studies. Only five out of ten predictors were statistically significant (Table 11.1). It is important to note that the strongest predictor in the model was the grade for a Grammar Test (i.e., the first assessment for Course A in 2016; $b=0.17$, $p < 0.001$). This seemed to confirm that there was a lack of connection between Course A and CBA1 (assessment one of Course B).

The review reports on Course B concluded that it had 'all the right ingredients' that made it a success and thus only fine-tuning of the course materials was required. LA was conducted to further explore the strength of the e-learning component of the course. LA provides further empirical evidence to support whether there was an acceptable alignment between the course learning outcomes and the e-learning components (Foung and Chen 2019a). Student log data also revealed that students continued working on the e-learning activities even after meeting the course completion requirements of 60 per cent; and many continued with activities with the aim of obtaining as high a grade as possible. Visualisations of student log events showed that students engaged in goal-oriented behaviours (Chen and Foung 2020). This means that students set a goal for completing activities and made plans for meeting these goals. Digital data provided avenues for the curriculum team to understand the strengths of the course and this shed light on how materials could be tweaked.

The review reports also found that Course C was well-received by students, but some teachers held very different views, and revisions were

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needed for some parts of the course and assessment materials. First, students believed that some tasks for the e-learning component were too demanding (e.g., three 170-word reflections) while some other tasks were not helping them to learn. Learning analytics was conducted on the digital data to explore the correlation between the completion of the e-learning component and the assessment component grades. Using Pearson's correlation, the average of all correlation coefficients was 0.08 with the highest being 0.14. This suggests that there was no correlation between the e-learning components and assessment results. In other words, there was almost no relationship between e-learning components and assessed tasks. With both self-reported and digital data suggesting problems with the e-learning components, it was recommended that the e-component of the course be re-designed.

The 2016 curriculum review recommended that the e-learning components for Course C be redesigned to better align with the course outcomes, and the assessments of Course A be revised so as to better align with the first assessment of Course B. However, further analytics needed to be conducted to understand the impact of these enhancements.

What We Decided to Do Next

Three years after the programme review described above, a new team was formed to evaluate the effectiveness of the changes made as a result of the first review. This study included (1) revisiting the revised course and assessment materials, (2) interviewing teachers and (3) employing e-analytic data analysis to compare student performance before and after the review of the three courses.

Methodology

Research Design

The main study described in this chapter was primarily an impact study. It was designed to address practical needs and to understand how the curriculum was enhanced. A mix-methods approach was used to allow the curriculum team to understand the general impact through data analytics, whilst qualitative interviews captured how individual teachers interpreted the impact. In the current study, data analytics and interviews were first conducted independently with a general aim to understand the impact. After the data from both sources were analysed, more questions emerged, and further data analytics were conducted for a clearer understanding of the impact.

The retrieval of data for analytics was approved under the university's data governance framework and proper ethical clearance for the project was obtained from the university's ethics committee.

Data Analytics

Data analytics was conducted after retrieving all the data logs from the university LMS. The data analytics arrangements and procedures were informed by the practices used in the original review in 2016 to maximise comparability between data. Only Course A and C requires substantial review so the impact study will focus on only Courses A and C. The objectives are summarised as follows:

- A1. Course A: To investigate the association between Course A assessments and BA1-Grade (Course B Assessment 1 Overall Grade)
- A2. Course A: To compare the language performance in Course B assessments between students taking the course before and after the enhancements
- C1. Course C: To explore the correlation between scores in e-learning components and non-e-learning assessments
- C2. Course C: To compare the language performance in the final essay assessment between students who completed the e-learning language component satisfactorily and those who did not

Participants

The data log retrieved included data logs from 2,545 students. As they were retrieved directly from the LMS that included all students in the cohort, typical sampling principles did not apply. All three courses were taken by undergraduates at the research site in Hong Kong across disciplines, including engineering, applied science, business, health and social sciences, design and hotel and tourism. Students taking Course A obtained Level 3 in the Hong Kong Diploma of Secondary Education (HKDSE) English exam (equivalent to IELTS 5.45–5.65). Based on the university's ability-grouping policy, these students were assigned to take Course A, followed by Course B, to fulfil the language and communication requirement of their undergraduate studies. Students taking Course C obtained Level 5 or above in the HKDSE English exam (equivalent to IELTS 6.81+). Students taking this course in Semester 2 had completed Course

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B and needed to complete Course C to fulfil the same language requirement for their studies.

Data Processing, Screening and Cleansing

After retrieving the data, student results were tabulated. Students who did not complete the course, that is, those who had failed to complete one or more assessments, were removed from the data set. Course A's data set included all assessment component grades for Course A and students' corresponding BA1-Grade. Course C's data set included the overall completion rate for the e-learning component and all assessment component grades. All grading variables were put on a rating scale from 0–4.5 with all e-learning component scores ranging from 0–100 per cent.

To understand the language performance of students in Course C, a new grouping variable was created. Based on the assessment of the subject leader, only students who completed 75 per cent of all language components were considered to have completed the said components satisfactorily. Therefore, students who completed 75 per cent of all four language-related e-learning components were placed into one group and all the other students were in another group. This grouping variable was used for the two-sample independent t-tests for Course C.

Data Analysis

The quantitative data analysis strategies were derived based on strategies used in the review to maximise comparability. All statistical analyses were conducted using R (4.0.3). Normality was assessed with a visual inspection of a histogram. Alpha was set at 0.05.

Course A: To explore the association between Course A assessments and BA1-Grade, a regression line was established using all Course A assessment components as independent variables and BA1-Grade as the dependent variable. Multiple linear regression can help identify the association between variables (Frey 2018) and allow comparisons across models with the adjusted R2. To further explore the difference in language performance, independent t-tests were conducted with the language component scores of the two cohorts of students. Two sample independent t-tests were used to answer this question (Frey 2018).

Course C: To investigate the correlation between the e-learning components and the course assessments, all course assessment component scores and the e-learning overall score were subject to rounds of Pearson correlation tests. To determine whether students who completed the language e-learning component satisfactorily would perform better in their language assessment component, a two-sample t-test was conducted with the newly created grouping variable.

Teacher Interviews

Participants

Teachers who had taught any of the three courses in the 2015/16 academic year and again in the 2018/19 academic year were approached to voluntarily give feedback about how they felt the changes impacted the three courses. Three teachers were recruited for each course from the small pool of staff who had taught the course in both years.

Procedures

Nine teachers (T1–T9) were interviewed once each in English over a two-month period during the second semester of the 2018/19 academic year. A standardised open-ended format with minimal interviewer interaction was adopted to minimise undue influence (Martella et al. 2015).

Content Focus

Questions focused on teachers' experiences teaching one of the courses to better understand the effectiveness of the enhancements made as a result of the LCR review. Two to three questions each on specific enhancements were followed by an open-ended question inviting respondents to comment generally on the changes. Each teacher was given access to the set questions in advance of the interview.

Data Analysis

The interviews were audio-recorded, transcribed and analysed thematically by the interviewer using an inductive approach (Thomas 2006).

Results

Course A

After re-designing Course A, a stronger connection between its assessments and BA1-Grade (Course B's Assessment 1 Overall Grade) was expected. Both data analytics and interviews were conducted to explore the connection. Since the interview responses suggested that there was a potential impact on the language proficiency of students, supplementary analytics were conducted to understand the change of the students' language performance.

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Course A: Interviews

One key theme identified was how the enhancements affected the ability to cater to students' language proficiency needs. Two of the teachers interviewed about Course A (T1 and T2) felt that the shift in focus from language proficiency to process writing and speaking meant that the course neglected students' specific language learning needs. They felt that students doing Course A needed help with a wider range of language proficiency issues than those supported in the newer version of the course. T3 felt that whilst the amount, scope and pace of activities made the course 'too ambitious' for students with lower proficiency levels and included elements that may have been unnecessary for some, moving away from a grammar-focused approach was 'necessary' to help prepare students for academic writing at university. This need was echoed by T2. T1 added that the change from language skills to process writing 'lost the ... essential thing that their language proficiency needs at this level'.

Course A: Data Analytics

To understand the connection between Course A and Course B, a linear regression equation was established. Similar to the analytics conducted in 2016, all assessment component grades in Course A were the independent variables and BA1-Grade was the dependent variable. Table 11.2 presents the model statistics and the estimates for predictors. While the model was considered adequate (R^2 = 0.17, p <0.01) and it explained 17 per cent of the variance, only two predictors were statistically significant. In other words, after enhancements were implemented, the new model could explain only another 7 per cent. Even though there was a 7 per cent increase, the total variance explained is still considered 'small' based on Plonsky and Ghanbar (2018) (while a variance that explained 18 per cent would be considered 'medium'). It is interesting to note that the significant predictor was the grammar score of the new assessment; however, the beta value was smaller than the grammar test in the previous regression equation.

Because the teachers described a potential change in language ability, a further investigation was conducted to explore how language competence may have been affected. As Course A was revamped and it was not possible to compare the language scores between the two cohorts of students in Course A, a comparison was made between the two cohorts of students who progressed to Course B. Two two-sample t-tests were conducted on the language scores of the Course B written assessments, the 'In-class Problem Solution Essay' and the 'take-home Discursive Essay', among

Table 11.2. *Predictors for course A progression in 2018*

Course A in 2018	Unstandardised coefficients	t[a]
Assessment – Assessment components	Beta	
(Constant)	1.32	6.23
Paragraph writing – grammar	0.14	1.97
Digital story – conventions	0.06	2.72

[a]Only independent variables that were statistically significant were reported.

the two cohorts of students, and these revealed a statistically significant increase for both the in-class problem-solution essay (by 0.13; t [1138.8] = 4.73; $p < 0.01$) and the take-home discursive essay (by 0.21; t [1085.8] = 7.04; $p < 0.01$) where a grade change of 0.5 denotes one grade change after the changes were made. This seems to refute the concerns teachers raised over the decreased focus on language proficiency in the revised version of Course A.

Course C

The review in 2016 showed that it was necessary to redesign the e-learning component of Course C to help develop students' language skills. Thus, an e-learning package with ten videos and online quizzes was designed and implemented. These quizzes and videos focused on four language-related components (hedging, complex noun phrases, sentence structure and academic style) and other learning goals of the course.

Course C: Data Analytics

One round of Pearson correlation analysis was conducted on all assessment component grades and the total scores in the e-learning component in order to explore the relationships between the variables. The average of all correlation coefficients was 0.21 with the strongest one being 0.38. The average of the correlation coefficients was considered weak with the highest coefficient being considered only moderate (Courtney 2018). While there was no strong relationship between the e-learning components and assessment scores, the relationships between them were stronger than those in the earlier review. This suggests that students in the current cohort may have found the e-learning components more relevant than their counterparts who had taken the course before the enhancements.

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To further explore the impact of the new e-learning components in language (ELL), comparisons were made between those who did well in the ELL and those who did not. Students who took Course C were divided into two groups: those who achieved 75 per cent in each ELL and those who did not. A round of independent sample t-tests was conducted on the language scores in the final essay assessment between these two groups showing that there was a statistically significant difference (0.19 out of 4.5; $t(74.33) = 2.63$, $p < 0.05$) between the two groups of students. This suggest that students who were more engaged in the ELL performed better in the language assessment components.

Course C: Interviews

Generally positive feedback was received regarding the changes to the e-learning component of Course C. One key theme emerging from the interviews was the increased value and relevance of the e-learning materials for students. All three interviewees (T7–T9) welcomed how the new e-learning topics were more closely related to the course content. T7 remarked that the change from a previous, relatively ineffective reflective task that students tended to complete 'mechanically', to language tasks more closely related to the assessment, was advantageous. T7 felt that the new language-focused e-learning quizzes would help students develop their advanced academic English skills. Another benefit mentioned by T7 was the students' familiarity with the format of e-learning quizzes, as students had completed similar activities for the e-learning component of Course B and therefore did not need to 'readapt' to a new learning mode.

T9 remarked that the e-learning activities 'consolidate students learning throughout the entire course and help guide students to . . . achieve the course learning objectives and outcomes'. Conversely, whilst T8 noted that the new e-learning activities were more relevant to the course content than the previous reflective tasks, the teacher was unsure of their impact, given that they had observed students often leaving language-related tasks until just before the end-of-semester deadline. This suggests that the impact of the changes to the e-learning component of Course C may depend on student engagement.

Summary of Findings

To summarise the results, the improved Course A shows there was an empirically stronger relationship with Course B after the curriculum enhancements. Despite the teachers' concerns about the lack of language proficiency development in Course A, the analytics revealed that students in fact performed better in language assessment in the enhanced version. Analytics also showed the effectiveness of the newly implemented e-learning component in Course C, and this was echoed in the views of the interviewed teachers. Analytics did not rely solely on the results of e-learning component completion but included a range of components within Course C, such as language assessment performance and the actual scores in individual language tasks in the e-learning component.

Discussion

The findings presented above show how digitalised data was used in two important stages of the review – first, as one of the measures adopted in a comprehensive review of a new curriculum and, second, as part of an evaluation conducted three years later to explore the effectiveness of the changes made after the comprehensive review. In both reviews, digitalised data was shown to be of immense value in at least three ways.

First, the learning analytics of digitalised data in the comprehensive curriculum review provided inter- and intra-course information that could not have been obtained from other means of quality assurance, such as student and teacher surveys. From the inter-course investigation, LA indicated a lack of connection between two consecutive courses, the first of which was a pre-requisite that should have prepared the students for the second. From the intra-course investigation, LA showed good alignment between the e-learning components and students' achievement of learning outcomes in Course B and a lack of such alignment in Course A. These insights brought by LA can increase subject leaders' confidence and determination to make changes to their course materials and e-learning components after a curriculum review.

In the second stage of this study, LA showed a statistically significant increase in students' language grades after they took the revised pre-requisite course and also revealed a stronger connection between the same two consecutive courses that had shown a lack of connection in the first review. LA also demonstrated that there were significant differences in the assessment grades between students who completed 75 per cent of the revised e-learning components in Course C and those who did not. These findings reveal that the changes made to the courses according to the findings of the previous comprehensive curriculum review led to improvement in students' assessment grades and a more noticeable progression from one course to the next.

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A further advantage of using digitalised data lies in its effectiveness in confirming or refuting stakeholders' perceptions and concerns. Our interviews with teachers revealed their concerns about some of the changes to Course A, chiefly that the changes might have weakened students' language abilities. LA, however, showed the contrary, that students' language scores significantly increased, which should allay teachers' concerns. Teachers of Course C expressed a different feeling about their course from those who taught Course A, in that they felt the changes made to the e-learning component of Course C were appropriate and welcome. In this case, LA results supported these teachers' perceptions by showing a positive relationship between student engagement in the e-learning activities and students' course assessment grades.

Conclusion

The rapid rise in the availability of digitalised data in the age of e-learning allows the leveraging of such data to make evidence-based pedagogic decisions for timely improvements to learning and teaching. This study, which encompassed a comprehensive curriculum review and subsequent changes made to three language courses and their e-learning components, reveals the value of using LA to advise on course revisions. Through generating actionable insights, LA provides teachers with the confidence to prioritise change in their courses. When compared with teacher intuition and surveys, which rely on perceptions and memory, LA produces convincing evidence about the aspects of teaching or materials that work well and those that need revising. It also offers tools to evaluate the impact of those revisions. The use of digitalised data can be viewed as a significant addition to regular educational QA measures that gauges stakeholders' perceptions. Future studies may move from exploring digitalised data-supported processes to digitalised data-led initiatives.

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PART III

Changes in Teaching Content

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CHAPTER 12

Building Human Capital for the Twenty-First Century

Natalia Timuş and Zakaria Babutsidze

Disruptive innovation and digitalisation challenge the traditional role of universities as primary knowledge producers. In order to prepare competent students who will be the game-changers of tomorrow, universities are expected to join forces with government agencies and private enterprises to comprise the 'triple helix' of knowledge production and innovation (Etzkowitz 2000).

The academic and business worlds agree that beyond the professional, or hard skills, the core graduate attributes rely on soft or employability skills, such as analytical thinking, collaboration, communication, creativity and problem solving (Sarfraz et al. 2018). Studies highlight the increased importance of technology skills, such as skills related to the use of information and communication technologies (ICT), as one of the most required components of human capital for the twenty-first century (Sarfraz et al. 2018).

Regional and international actors, such as the European Union (EU), the Organisation for Economic Co-operation and Development (OECD) and the United Nations (UN), have established various educational policies and frameworks for promoting twenty-first-century skills and competences. ICT skills and, more broadly, digital competence, have been particularly salient. However, a key challenge is integrating these skills into Higher Education (hereafter HE) curricula and course design, as well as finding the right blend of knowledge and skills transfer to address economic and societal transformation as a result of digitalisation (Kaplan 2018). Following the Bologna Process, a competence-based approach has been gaining ground as a viable tool to tackle this challenge throughout European universities. The alignment of HE curricula and course content with disciplinary and transversal competences and skills is perceived to be a driver of HE reforms worldwide and in Europe in particular.

However, the practical implementation of reforms, accompanied by the adherence to innovative teaching and learning approaches (Timus et al.

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2016), faces various challenges. There is a broad variety of factors that challenge these HE reforms, from reluctance at national and institutional levels – especially in countries with a strong tradition of academic freedom – to a lack of digital skills among HE teachers. The latter is especially important in the current COVID-19 context, as universities are facing an urgent need to harness digitalisation and the advances of artificial intelligence (hereafter AI). As stated by Kaplan in Chapter 1 of the current volume, real pedagogical innovation is needed to actually benefit from HE digitalisation, avoiding merely transferring offline teaching and learning into the online world.

In this chapter, we discuss how HE can harness digitalisation to provide human capital for the twenty-first century. We start with a critical assessment of the existing HE policies and practices within the EU on human capital that address digitalisation and disruptive innovation. Particular attention is paid to the current HE transformations that are focused on technology-enhanced learning. The assessment is complemented by a study of existing practices of incorporating new labour market demands into the HE curriculum. We focus on practices of incorporating AI-related skills into the curricula of French Business Schools in the European context (Kaplan 2021). The chapter concludes by providing some recommendations for universities and decision-makers at national and international levels.

Higher Education Policies and Practices on 'Human Capital' for the Twenty-First Century

Curriculum represents a tool to react to and tackle societal changes, as well as to define and build the human capital for the future (Chankseliani and McCowan 2021). Apart from subject-specific objectives, there is a pressing need for inter-, cross- and transdisciplinary goals and learning processes. This is vital for ensuring that students gain expertise to integrate into the job market of the future. Future workforce requirements, such as skill development, entrepreneurship and life-long learning, need to be articulated in the study offers.[1]

The EU has been a leading regional and international actor, articulating twenty-first-century goals and needs throughout the European Higher Education Area. The EU approach to teaching and learning twenty-first-century skills involves working jointly with education and employment

[1] What Students Learn Matters: Towards a 21st Century Curriculum. OECD (2020).

authorities, as well as companies, to streamline and implement development of these skills. Several competence frameworks have been developed since 2016 to guide various stakeholders. Two of these relate to HE: the European Framework for Digitally Competent Educational Organisations and the Digital Competence Framework for Educators. The first provides a comprehensive reflection on the integration of digital learning and innovative strategies within HE institutions. The second framework targets digital skills development for teachers in order to assist students, in their turn, to become digitally competent.

Digital competence, understood as a soft, or transversal competence, is defined as follows: 'Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), and problem solving' (European Commission).[2]

Digital competence is acknowledged to be as important in the educational sector as literacy and numeracy. Moreover, the European Commission highlights the need for digitally competent graduates 'who are not only able to use but also to innovate and lead in using these technologies'.[3]

Digitalisation and the advances of AI represent both a challenge and an advantage for long-lasting HE reforms to engage with societal demands through strategic and curricular provisions. Universities are expected to adapt and diversify both their curricular content and their delivery methods (e.g., micro- or even nano-degrees, executive programmes). The new reality, shaped also by the COVID-19 context, forces HE institutions and staff to revise course design and content to survive and stay relevant in the digital age.[4] The global pandemic has accelerated the paradigm shift and HE digitalisation has become a new reality, as universities are forced to move online and revise their modus operandi.

A recent European University survey report on digitally enhanced learning and teaching reveals that 81 per cent of European universities consider widening access and lifelong learning through digitalisation as a strategic development priority. But respondents mention a lack of digital skills as the main obstacle to student success in digitally enhanced learning and

[2] Save the Date: EU Code Week 2018. DG CONNECT. European Commission (2018).

[3] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Digital Education Action Plan. European Commission (2018).

[4] The Role of Universities in Regional Innovation Ecosystems. European Union Association (2020).

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teaching. The survey report reveals that the large majority of universities offer training for generic and sector-specific digital skills, ethical and data literacy, as well as safety skills. But digital skills fail to be embedded in a systemic way at the course level and across study programmes, often only being included in some specific programmes or offered on a voluntary basis (Gaebel et al. 2021).

The pressure for HE change also comes also from the industrial sector. Companies, such as Google, embark upon professional certificate training programmes that aim to replace traditional undergraduate and graduate degrees. Currently, Google offers a six-month programme[5] to acquire job-ready skills that would allow participants to start or boost a career in high-demand fields and connect to leading employers who are hiring.

The current digital disruption is highly affected by the take-off of AI technologies that are radically transforming society and leading the digital economy (Righi et al. 2020). The global job market generates a growing demand for a digitally competent workforce. In fact, this demand is twofold. First, digital competence is key for the production of AI technologies and related services that can solve core societal and economic challenges. Second, AI threatens to replace the human workforce in a variety of fields, having a significant impact on the job market (Riemer and Peter 2020). Within the 'triple helix' model (Etzkowitz 2000), universities are key actors for preparing digitally competent employees and disseminating AI expertise through a joint cooperation with government and business (Furnell and Scott 2015). Disruptive transformation and technological innovation require not only hard skills and subject-related knowledge but primarily soft skills that facilitate life-long learning and adaptability to new societal challenges (Greenwood et al. 2015).

In this context, HE institutions are expected to develop relevant curricula and courses that help their graduates to acquire soft skills to robot-proof their careers and increase their employability (Seth and Seth 2013). Critical thinking, problem solving, collaboration and creativity are harder to automate (Kosslyn 2019) and essential to respond to AI advances (Saunders and Zuzel 2010).

Integrating Artificial Intelligence in French Business School Curricula

The European Commission has put forward A Europe Fit for the Digital Age as a key priority over the 2019–2024 period. This initiative includes several actions, ranging from creating infrastructure for high-performance

[5] Google Career Certificates https://grow.google/certificates/.Grow with Google (2020).

computing to developing a comprehensive European data strategy. Under the action for developing digital skills, a special Digital Europe Programme aims at spending nearly ten billion euros on building digital skills in the current and future EU population. One of its objectives is to develop 160 new master's programmes in cutting-edge digital technologies (e.g., AI, cybersecurity) to train up to 80,000 digital specialists.

Parallel with these efforts, public and private players in the education sector in European countries have also started investing in building new programmes delivering relevant skills and competences. Significant efforts have gone into developing competences within the accreditation bodies that are required to certify these new programmes.

AI plays a leading role in the disruptive transition and radical innovation of the twenty-first century and its impact on future society is far from obvious (Risse 2019). It represents a complex phenomenon and a transversal technology that requires deep understanding and advanced digital competence and soft skills. From the technical standpoint, these include coding and data science. However, given its high potential to transform tomorrow's economy and society, arming students with AI-relevant skills also entails equipping them with tools to comprehend the technology's economic and ethical consequences. Hence, developing such skills and competences within HE curricula demands cross-sector and interdisciplinary collaboration, an example being collaborations between engineering and social science departments. Similar programmes, albeit on a smaller scale, have been developed in universities around the world with respect to AI precursor skills. These include data analytics and big data analysis. Their curricula are currently being revised to incorporate additional components necessary to acquire full-fledged AI skills and build human capital for the twenty-first century.

These private and public efforts have resulted in an extensive range of courses offering AI-related subjects. A recent EU technical report (Righi et al. 2020) has identified 5,297 English-language AI courses across the United States, Australia, Canada, Switzerland, the United Kingdom and the twenty-seven EU countries. According to the report, the EU is the second-largest supplier of English-language graduate programmes related to AI skills (after the United States). EU27 also occupies third place in English-language undergraduate programmes in AI-related subjects (after the United States and the United Kingdom). Most of these concentrate on the fields of ICT, engineering, manufacturing and construction. However, it is noteworthy that AI-related education in the EU has a remarkable association with the field of business (and law) education. Furthermore, while generalist AI courses are evenly distributed across the twenty-seven

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EU states, France offers the highest number of specialised masters. In fact, over half of all AI-related programmes in France are graduate degrees specialising in various aspects of AI technology.

In order to provide a narrative of recent developments in education curricula, we concentrate here on master's degrees (MSc) because, as noted above, they represent one of the EU policy priorities. Given the specificities of AI education in Europe, we use the French Business School (Grandes Écoles de Commerce) environment as an example. Business schools see a particularly acute challenge and an important business opportunity in the digital transformation of the economy. In parallel, they need to respond to modern ethical movements that challenge their legitimacy (Pettigrew and Starkey 2016; Tourish 2020). Given that (in France) business schools operate largely independently from the public sector, there is also more flexibility in moving into new educational areas. At the same time, existing business school personnel do not possess the technical competences required by this novel technology. This constitutes a particular challenge which pushes schools either to alter their hiring policies or to forge links with other higher education actors with complementary skills.

As of early 2021, eighteen different programmes in the areas of artificial intelligence, big data analysis and business analytics are available in France in this vibrant environment. These eighteen degrees are delivered by fourteen different schools (See Table 12.1). Out of eighteen programmes, fourteen have already been accredited by Conference des Grandes Écoles (CGE), the designated national accreditation body. Four non-accredited programmes either come from established schools (e.g., HEC, ESSEC) that command a premium over the average market player and can afford to deliver non-CGE-accredited degrees or are relatively new and in the process of accreditation.

These efforts have been taking shape over the last seven to eight years and include building significant collaboration with engineering schools. A third of them actually deliver a joint degree with an engineering school. Others programmes also collaborate with engineering schools and/or companies to source technical skills necessary for this complex competence. Some of these graduate courses train students for general AI-related jobs. Others train them for more specific roles within organisations. In total, these 18 programmes train about 500 specialists each year. This is a small portion of the market demand, which seems to be increasing at a stellar speed.[6]

A recent LinkedIn report[7] has documented that about 24 per cent of European AI talent is still concentrated in the education industry.

[6] France 2020: Les métiers les plus recherchés. Emerging Jobs Report. LinkedIn (2020).
[7] AI Talent in the European Labour Market. Economic Graph Report. LinkedIn (2019).

Table 12.1. *AI-related MSc programs in French business schools*

Programme	Business school	Engineering school involved	CGE accredited
Artificial Intelligence and Business Analytics	Toulouse Business School		Yes
Artificial Intelligence for Business Transformation	SKEMA Business School	ESEIA	Yes
Artificial Intelligence for Marketing Strategy	EM Normandie	EPITA	Yes
Big Data Analytics for business	IESEG		Yes
Big Data and Business Analytics	ESCP Business School		Yes
Big Data, Marketing and Management	Toulouse Business School		Yes
Business Intelligence and Analytics	ESC Clermont		Yes
Data Analytics and Artificial Intelligence	EDHEC		No
Data Management	Paris Business School	EFREI	Yes
Data Science for Business Polytechnique	HEC No	Ecole	
Data Sciences & Business Analytics	ESSEC	CentraleSupélec	No
Digital and Big data for Value	ESSCA School of Management		Yes
Digital Business and Artificial Intelligence	SKEMA Business School		Yes
Digital Marketing and Data Science	EMLyon Business School		Yes
Finance and Big Data	NEOMA		Yes
Health Management and Data Intelligence	EMLyon Business School	Mines Saint Etienne	Yes
International Human Resource Management in the Digital Age	Grenoble Ecole de Management		No
Marketing Strategy and Data Analytics	Paris Business School		Yes

The only industry with a larger concentration (42 per cent) is software and IT Services. Europe leads the United States in this indicator, which points to the potentially high impact the European education sector could have on the development of European society. Educational institutions represent hubs not only for developing new knowledge but also for disseminating these advances. As a result, once the diffusion of AI skills is streamlined

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by continued building of specialised programmes, the AI aspect of twenty-first-century human capital could develop relatively quickly.

Among the key challenges to harness AI for human capital is the alignment of academic curricula with industry standards, a goal towards which many current higher education players are actively working. This is usually achieved by involving large (potential) employers in governing boards of their master's programmes. One particularly acute challenge is the gender gap that persists in most of the AI-related programmes. Except for marketing and human resource management programmes, which organically attract a more female student body, the programmes in Table 12.1 have a male to female ratio greater than two. This needs to change rapidly to ensure a balanced development of the field of education.

Recommendations and Scenarios for Harnessing Digitalisation and AI for Human Capital for the Twenty-First Century

Human capital for the twenty-first century requires HE courses that provide a balance between subject-specific (hard) skills and the appropriate employability skills. In the current context of digitalisation and advances in AI, we propose several recommendations for HE institutions when contemplating scenarios of curricular development.

The paradigm shift in teaching and learning at all levels requires education providers to identify ways to reduce the amount of knowledge while focusing on the depth of learning and transferable knowledge and skills. The competency-based approach offers a viable solution to the deepening of the learning process by concentrating on discipline-related competences and soft skills.

The curriculum design must provide higher value to procedural knowledge – knowledge that graduates can transfer across different professional and societal contexts to understand and solve complex problems. HE institutions are expected to promote curriculum integration through transdisciplinarity, organising teaching and learning around the construction of meaning in the context of real-world challenges. This will provide the opportunity to acquire transversal knowledge and skills in multiple contexts, while simultaneously tackling the curriculum overload (Voogt et al. 2016).

The cross-fertilisation of various technological domains is welcome for ensuring more flexible and advanced digital skills. In the case of business schools, the overlap between data science and AI management is especially welcome to promote advanced digital competence and boost the employability skills, broadening graduates' job opportunities in various economic sectors. Apart from developing human capital for the twenty-first century, this measure would facilitate exchange between various technological domains and foster (digital) innovation.

In order to promote a better alignment of academic curricula with industry standards, specialised AI programmes, as well as short courses, need to find ways to integrate cybersecurity and the understanding of machine learning in their study offers. These two competences are key for addressing societal challenges, such as cyber threats or the misuse of digital resources, that the private and public sectors, as well as democratic governments, are currently facing (Righi et al. 2020). This is especially salient for the incorporation of master's students in the job market.

In addition, curricular reforms must not underestimate the importance of developing more basic digital skills for HE graduates. The 2021 European University Association survey reveals that although the majority of students use various technologies in their daily lives, training is required for discipline-related technological skills. In the current radical transition to digital education, HE curricula need to consider learning outcomes that target the study of ethics and safety of data use and communication, along with other outcomes that aim to foster digitally enhanced learning and teaching.

Last, but equally important, at the institutional level, universities need to move beyond competition and collaborate in order to prepare digitally competent graduates. The European Higher Education Area policies and initiatives provide valuable opportunities for promoting the alignment of HE policies and institutional practices with new realities and to ensure the exchange and success of technology-enhanced education through the development of digital skills and competence. The European University Initiative is a good example of an EU scheme for deepening collaboration through joint degrees beyond national borders and benefiting from joint expertise for developing human capital for the twenty-first century.

Conclusion

The radical transformation of universities, particularly in the context of the global pandemic, provides an opportunity for harnessing digitalisation and innovation for curricular reforms and structural changes. In order to tackle the current economic and societal challenges, the HE curricula must balance hard (discipline-related) and soft skills and align learning outcomes with industry standards.

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Digital skills and competence represent key components of human capital for the twenty-first century. The advances of AI require graduates that are technology savvy and digitally competent to produce and the manage AI technologies and services. Concomitantly, there is a need for developing soft skills, such as critical thinking, problem solving, collaboration or creativity, to robot-proof graduates' careers and increase their employability.

The EU is the second-largest supplier worldwide of AI-related English-language master's programmes, largely offered within the fields of business and law education. The empirical analysis of French business schools reveals that this represents a vibrant environment for AI-specialised master's degrees. A third of currently operational AI-related master's degrees in French business schools involve collaboration with engineering schools. Joining forces to source necessary technical and management skills is indispensable for the complex and uncertain future promised by modern times.

This study advances several recommendations for adapting HE curricula to the development of human capital for the twenty-first century. Firstly, universities are expected to promote curriculum integration through trans-disciplinarity and cross-fertilisation of various technological domains. A blend of data science and AI management is especially valuable for business schools to develop advanced digital competence and boost employability skills. To address the key challenge of aligning HE curricula with industry standards, cybersecurity and basic machine learning skills must be widely integrated in relevant programmes. University curricula need to consider incorporating learning outcomes on discipline-related technological skills, along with other digital skills for enhancing the success of digital learning. Finally, HE institutions across the EU may benefit from inter-university collaboration (exchange of expertise and joint degrees) and existing EU policies and initiatives (e.g., Digital Europe Programme or European University Initiative) in order to (re)design curricula that prepare digitally competent graduates.

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CHAPTER 13

Combining Work Experience with Digital Learning

Valerie Mc Taggart

Digital transformation, which has accelerated following the outbreak of the COVID-19 pandemic (Iivari, Sharma and Ventä-Olkkonen 2020), has been widely discussed in the popular press and scholarly literature over the last number of years (Vial 2019). Although organisations need to undergo several transformative activities to digitally transform, including culture and business model transformation, organisations must consider two key drivers when capitalising on digital technology's potential. These are a willingness to improve the customer experience and operational (business process) excellence, the latter of which is a mandatory factor for introducing new technologies (Martinez 2019). As Hammer famously stated, 'It is time to stop paving the cowpaths; instead of embedding outdated processes in silicon and software, we should obliterate them and start over. We should "re-engineer" our businesses; use the power of modern information technology to radically redesign our business processes to achieve dramatic improvements in their performance' (1990, p. 104).

Kettinger and Grover define a business process as 'a set of logically related tasks that use an organisation's resources to achieve a defined business outcome' (1995, p. 11). In a digital transformation, changes to business processes will not only accelerate the delivery of the transformation (Sebastian et al. 2017) it will also bolster the capabilities of the existing Information System (IS) platforms (El Sawy et al. 2016). Therefore, it is unsurprising that there is a growing demand for business graduates to understand cross-functional business processes.

However, previous research into teaching business process re-engineering (BPR) has highlighted that it can be challenging for instructors to engage students in understanding the concepts associated with BPR. The reason put forward is that previous research into teaching BPR identified that delivery is usually based on studying case studies rather than real life. This is considered artificial by some because case studies rarely allow students to experience all the challenges of changing a process

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and do not allow students to interact with real employees and face managers' real-life concerns (Pellerin and Hadaya 2008).

Profile of the Programme

The cohort of students, who form the basis of this discussion, were final year students of the BA Honours Degree in Insurance Practice. The programme commenced in 2016, with the first group of students graduating in 2019. The proposal for this industry-led practitioner programme was initially submitted to Ireland's apprenticeship council by a leading insurance provider who had identified an emerging skills gap in the sector. Although the initial concept was endorsed by the council, it recommended that there should be a broader industry representation and that this apprenticeship programme should be available to a broader range of employers. This was not just a matter of transferring an offline course into the virtual world (Kaplan 2009; Kaplan and Haenlein 2010); rather, this was a bespoke programme that the Insurance Institute of Ireland developed on behalf of the insurance industry to address this emerging skills gap. Subsequently, the Insurance Institute of Ireland approached the Institute of Technology Sligo to assist in the design, validation and delivery of the programme.

The Institute of Technology Sligo, which has won numerous awards for its innovative approach to digital learning, including the Digital Media Award for Remote Labs and the Taoiseach's[1] Award for public service innovation, is a third-level college located in the northwest of Ireland and is recognised as the national leader in online programme delivery. The college has a traditional third-level college campus with over 7,000 students. It also has a thriving online student cohort with over 30,000 students graduating globally at the undergraduate and postgraduate levels since the first programme was delivered. The college embraced the concept of online learning many years before other third-level providers, bringing its first online programme, a BSc Honours in Quality, to the market in 2002 to widen access to education. They did not believe that a physical college building was a thing of the past; instead, they believed that access to education was paramount regardless of the student's geographical location. Since then, the college has continuously invested in improving its online offering by adding more programmes at both the undergraduate and

[1] The Irish word 'Taoiseach' means chief or leader, and it was adopted in the 1937 Constitution of Ireland as the title the 'head of the Government or Prime Minister'.

postgraduate levels. They have invested in the technology infrastructure, provided the necessary training to employees and ensured that they have the proper supports available to students whose learning is conducted through a virtual environment. Therefore, when the pandemic necessitated that all students go online, this transition was a smooth one.

As in traditional apprenticeship programmes, the students of this degree programme spend four days each week working with their sponsor organisation – with one day each week allocated for online classes. The programme is structured to ensure that students learn academic business modules and complete their compulsory industry-regulated professional qualifications. Upon successfully completing the first year, the students are awarded the status of Accredited Product Adviser (APA). In the second year, following all modules' successful completion, the students will be awarded certification as a Certified Insurance Practitioner (CIP). In the third year, following its successful completion, the students will obtain their BA Honours Degree in Insurance Practice. Although it is not mandatory, most of the students to date have remained with their sponsor organisation after graduation.

A Full Irish Breakfast

The module under discussion is a Module on Innovation, Creativity and Critical thinking, which are recognised as key competencies for the future digital workforce (Sousa and Wilks 2018). The semester course work was set to challenge students to think innovatively, creatively and critically by reflecting on the business processes they carry out daily and identify where they could be improved. To do this, the students were tasked to select a process within their own work team and using the technology that the organisation already had in existence, the students were required to explore ways of improving this process. For the semester, the students took up the role of 'project manager' to implement the new, improved process where possible.

In comparison to on-the-job training that one might undertake to learn how to re-engineer a business process, demonstrating this in a digital learning environment required a clearly thought out and focused strategy for class delivery. Adopting a constructivist instruction approach to ensure that students were engaged in the content rather than passive recipients, we began by making a virtual 'Full Irish Breakfast'. Breakfast was chosen for several reasons. It is a meal that most students would be familiar with, either having eaten, watched others prepare or indeed prepared it

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themselves. Several ingredients are involved, so the complexity of mapping out this process correctly is challenging for the novice. Furthermore, as these students are geographically dispersed, and there are 'local' differences in what constitutes a 'Full Irish Breakfast', reaching a consensus would require students to engage and collaborate with their class peers.

The students were asked to bring a packet of 'post-it notes' with them to class. After explaining the concept of BPR, the students were divided into four groups of ten, and each group was assigned to a breakout room in their digital learning platform. Each group was asked to nominate a project leader, and, once nominated, the student groups were advised to work together and map out step-by-step the process of making a Full Irish Breakfast using the post-it notes. After twenty minutes of process-mapping, the students returned to their class, and the project leaders shared the groups' process map' with their peers.

Each group then took a moment to review the process map their peers had developed. Lively debates ensued amongst the students about, among other things, whether eggs should be kept in the fridge or out and the merits of full fat versus skimmed milk. I mapped out the process that the groups had identified using my own set of 'post-it notes'. While doing so, I removed the duplication and put these process steps in a sequence, where possible. This was labelled the 'AS IS' process for making breakfast.

Almost immediately, the students noticed that key activities were missing, which would derail the entire project. For example, while some students had made a note that they had switched the kettle to 'on', they had neglected to mention that they had put water in the kettle, assuming everyone would know that water was required. The students also remarked that not clarifying key factors, such as 'how you want your eggs cooked?', resulted in disagreements between team members and a delay in reaching a consensus about cooking the eggs. By overlooking these key activities, the students acknowledged that this resulted in a fragmented process map that missed crucial details.

During the next session, we went back to the 'AS IS' process map, and the students were asked to identify any way by which they could make the process of making breakfast more efficient. Once the students had an opportunity to discuss and collaborate with their peers, they suggested that several items could be cooked together rather than cooking each food item separately, which meant merging 'like with like activities'. According to the class, adopting this approach would ultimately save money in terms of electricity. Also, by merging the like with like activities, students realised that it would save them time, ultimately leading to a better customer experience.

The following week's session involved demonstrating to students how a project implementation plan can be drafted using MS Excel. We went back to making breakfast and, using the newly identified 'TO BE' process transferred this into a timeline of thirteen weeks onto the project implementation plan. As students drafted their fictitious implementation plans, they allocated tasks to team members working out a realistic timeframe to complete each activity. This was followed by a short demonstration on developing a professional process map from the post-it notes using MS Visio. The students were comfortable with technology as it was part of their digital learning; therefore, this session lasted half an hour and did not present any difficulty.

The purpose of these two sessions, beyond learning the concept of BPR, was to demonstrate to students how individuals and groups perceive and undertake a business process differently, even when the task is familiar. The students discovered that attention to detail when mapping out a process is crucial; otherwise, key activities are overlooked; therefore, it is important to avoid the 'assume' trap. The students also learnt that even when something appears obvious, such as putting water in the kettle, it still needs to be part of the existing process, 'AS IS', otherwise a key activity will be overlooked; in this case, there would be no tea produced. Also, the students recognised that there is always an opportunity to improve a process and kill complexity which will ultimately improve the service to the end-user. However, the most important learning for students was that collaboration is essential and that one can only map out a process successfully and succinctly by engaging and listening to others.

The Round Trip to the Printer

During the first lesson, when students were asked if they could identify any process in their current working environment that needed to be re-engineered, every student of a class of forty-six said yes. I will briefly mention one of these projects to demonstrate the value of linking real-life work experience with digital learning.

During the first session, Ann spoke about the round trips to the printer that occurred daily in her office. She felt the process needed to be improved significantly and was perplexed at why no one had thought about it before. Ann worked in a shared office space of seventeen people and remarked that people were 'toing and froing from the printer printing pages upon pages' each day'. Not only was it disruptive to Ann, as her desk was positioned beside the busy printer, but she also felt that there 'were a

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lot of trees dying as a result of this nonstop printing and photocopying!' Ann decided this was the process she would investigate. The following day, she spoke to her manager about what we were doing in the class and requested permission to review this activity for her college work. The manager was happy to support the student and felt that this needed to be examined, but no one had time available.

Once the approval was granted by the management team, Ann, adopting the role of a project manager, sent an email to her colleagues in the office advising what she was doing and asking for volunteers to participate in a focus group. Six colleagues volunteered.

Ann began her 'deep dive' in preparation for the focus group, noting how often people walked to and from the printer and the average time this journey took them. Over a period of three days, she made a note of the traffic to the printer, and she identified that, on average, it took her colleagues thirty seconds to walk from their workstation to the printer, which resulted in a round trip taking one minute. However, this did not account for the possible queue at the printer, which was particularly busy at certain times each day, which resulted in people queuing up to use the printer. She averaged this 'wait time' to four minutes. Therefore, each time someone went to the printer, this round trip cost the organisation five minutes per person.

Ann then examined how often individuals visited the printer, which equated to an average of eight visits per day, resulting in each person spending forty minutes each day collecting documents from the printer. She then simply multiplied this by the number of people who were making this round trip. She found that this activity cost the organisation 680 minutes or 11.3 hours every day. Per week this equated to 56.66 hours, which was equivalent to 1.5 of a full-time employees time used to collect documents from a printer. When I checked in with Ann to see how she was progressing, she stated, 'this makes no sense', to which I silently agreed. However, sometimes it takes a moment to take a step back and review a process objectively; only then will one see the obvious.

Armed with the 'evidence', Ann hosted her first focus group, and the fallacy of what they were doing was obvious. With input from colleagues, the student began to map out the existing 'AS IS' process with post-it notes as had been demonstrated in class. Then the group began to discuss how they could improve this process. The solution was simply to move a printer located at the bottom of the office that no one visited as it was too far to walk and move it closer to the workstations. The group felt that this would immediately reduce the queuing time. This was the new 'TO BE' process which the student also mapped out using her post-it notes.

The first focus group concluded, and the student transferred her 'TO BE' process into Microsoft Visio. She then completed a BPR report and circulated it to the focus group. The group and the manager signed off on the new 'TO BE' process, and very quickly, the idle printer was tested and moved closer to team members. As the project manager, Ann issued a communication to department members outlining the new business process for printing documents. She explained the rationale behind moving the printer and assigned each individual to a particular printer. Over the following days, Ann re-timed the new 'TO BE' business process. She calculated that it was now taking approximately three minutes to make the round trip, saving the organisation two minutes per person, reducing the daily printer commute time from 11.3 to 6.8 hours per day. Not only that, but colleagues immediately bought into the new process as they could see the benefit.

Several weeks later, the focus group reconvened to discuss the learning from their experience. Quickly, the members began to question why they were printing so many documents in this 'digital age'. This evolved into a discussion as to how they should review the existing printing process in its entirety which had been in place for several years. Taking up the role of a project leader once again, Ann called for volunteers to participate in another focus group following the meeting. Three of the previous focus group members and three new volunteers put their names forward. During their first focus group meeting, whilst mapping out the 'AS IS' process, the team discovered that the regulation that had required printing all documentation had been changed, but the printing process had continued as it always had. Ann, taking the lead, asked each focus group member to engage with colleagues to establish their printing habits. Upon investigation, they identified that while they could not email all documents that were currently being printed because of the continuing regulatory requirements, they discovered that 40 per cent of what was being printed could be emailed to customers with little difficulty, using the technology the team already had. Over the next few weeks, the focus group worked with team members and began to identify an entirely new process that involved emailing documents. While this was a much bigger project, Ann's colleagues embraced the change as it would save them time and ultimately provide a better service to customers.

The students who participated in this module learned several important lessons that will benefit them in their future careers. First, as students took up a project leader's role, they discovered that communication and collaboration are essential when leading any change. According to the

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students' feedback, getting people involved in the initiative from the start, whether directly or indirectly, significantly improved their project's chances of success. They also remarked that starting small sowed the seeds of further improvements and a cultural shift in how people perceived change, not as something to be feared but rather as something to be embraced.

A final point. Twelve months later, I had the opportunity to speak to one of my previous students who had undertaken this module. He was now in a junior management position in the same organisation. I asked him what he had taken away from the class: He said, 'I always remember you saying three things, "challenge the status quo", "think outside of the box" and "out of small acorns grow mighty oaks" and I constantly remind myself to follow this advice.'

Conclusion

As academics, we can sometimes get caught up in discussions about theory and pedagogy, paradigms and methodologies, citations and journal rankings; however, for organisations to survive and thrive in the post-pandemic world, these have little relevance. As higher education providers, the question being asked is how we can better manage the shift towards newer opportunities presented by the emergence of digital technologies (Jackson and Edgar 2019). Simultaneously, the higher education sector continues to face increasing demands for business graduates to transition more effectively from education to work (Herbert et al. 2020). However, many programmes do not effectively incorporate these into their existing curriculums (Crowne et al. 2020).

As technology advances and routine work is automated, skilled employees become more important (Brynjolfsson and Hitt 2000). It is acknowledged that the competencies that are needed in the future workplace include innovation, problem-solving, creativity (Pittaway and Montazemi 2020), social skills (Muethel and Hoegl 2010) and fast decision-making (Schwarzmüller et al. 2018). Future leaders will also need to tolerate ambiguity, embrace diversity and inspire others (Cascio and Montealegre 2016). Tasking students to re-engineer a business process in a real-life setting is an ideal opportunity to acquire these skills. For students who do not have the opportunity to apply their in-class learning in a real-life setting and instead learn from a case study, the practical challenges of leading and managing change is not as obvious, and we will have missed a golden opportunity to prepare our graduates for the future.

Kaplan opens this volume (Chapter 1) by remarking, 'Nothing is Constant except Change'. This statement has never been more relevant. Many graduates of the future will work remotely or operate under a hybrid model. They will not have the opportunity to 'learn on the job' where many of us honed our skills. Consequently, as education providers, we will need to reflect on designing and delivering our teaching content. We also need to think innovatively and creatively about how we deliver this content to ensure that future graduates are prepared for this rapidly changing world. We need to encourage and embrace new programme design and delivery and new forms of digital learning. But more importantly, we need to reimagine what it is to be a graduate of the twenty-first century. The world is changing, and we need to change with it.

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CHAPTER 14

Integrating Digital Competencies into Non-STEM Subjects

Kamaran Fathulla and Chavan Sharma Kissoon

This chapter sets out a heuristic model for the embedding of Industry Digitalisation (I4.0) competencies into the UK higher education curriculum in disciplines that are not computationally oriented, sometimes labelled as non-STEM, such as humanities, law, social sciences and business. Numerous challenges stand in the way for such disciplines to underpin their curriculum around I4.0 skills. Chapter 1 of this volume quite appropriately highlights the multidimensional challenges the sudden move towards digitalisation by universities in response to COVID-19 brings.

Most research into I4.0 content within the curriculum is focused on technological subject areas (Xu et al. 2018). Very little research is available on how such skills can be embedded in the curriculum for disciplines that are not traditionally or inherently computationally orientated. With the universal impact of data on all sciences and disciplines, this chapter advocates datafication as an effective means of bringing I4.0 skills into the curriculum of non-STEM subjects.

The impetus for this chapter comes from the Office for Students-funded (OfS) 'Industrial Digitalisation for the 21st Century' project at the University of Lincoln (UoL) (University of Lincoln 2019). The project pump-primed the co-creation of a suite of modules and curricula in order to meet the digitalisation challenges that UoL's industrial partners face now and in the future. Towards this goal, academics in non-STEM–oriented disciplines are faced with the primary challenge of the lack of relevant and fundamental digital skills for meaningfully embedding these in their curriculum (Lieu et al. 2018; Coşkun et al. 2019). Furthermore, there is no clear direction for where to start the process of curriculum innovation.

A key ingredient of I4.0 is data. This is our starting point. Data is seen as a universal language and we argue it should be taught to students across all disciplines. The art of generating and utilising data is known as datafication. This concept lends itself to being the key entry-level step to innovating non-STEM curricula with I4.0 skills. A model for adopting

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datafication in curriculum design is presented below. Example datafication skills could include data source identification, creation, manipulation and prediction. These skills can then be mapped onto a range of existing and new in-class activities to equip students. Through educators adopting the concept of datafication, it becomes possible to launch wider digital competencies into a diverse range of subjects. However, Carnaz and Nogueira (2019) argue that a change in 'mind-set' is needed to make data-intensive training effective. As such, a university-wide rethink must occur collaboratively among management, academics and students in order to shape the capabilities of the future workforce across disciplines.

This chapter is structured in two sections. The first sections details the background, rationale and sets out the problem. The second section lays out a simple solution with the power to transform practice, content and student learning.

Despite the prominence of the employability agenda in UK higher education, rapid industrial digitalisation–driven changes in the jobs market mean that university students constantly need better preparation for thriving in the workplaces of the future and universities tend to be one or more steps behind. McKinsey (2017) foresees a massive change in the nature of the job market primarily through automation and a range of other I4.0 technological enablers. McKinsey's (2017) report 'Jobs lost, jobs gained: Workforce transitions in a time of automation' modelled that 60 per cent of current occupations comprise at least 30 per cent work tasks that could be automated in the future and that 50 per cent of all work activities globally have the potential to be automated with up to one-third of work activities displaced by 2030. Furthermore, by 2030, up to 375 million workers globally may need to switch occupational categories and work in new occupations working alongside robots (McKinsey 2017). The nature of work may change too with existing occupations focusing more on hard to automate capabilities such as social, emotional and creative skills (McKinsey 2017). In essence, by 2030 'some occupations will grow, others will decline, and new ones we cannot envision will be created' (McKinsey 2017, p. 2).

The eventual impact of I4.0 on employment, education and society is anticipated to be profound, with advanced and digitally defined technologies changing subtly and overtly how societies function. As such, there is a need for the education sector to rethink traditional approaches and content. Astute adjustments to the curriculum are critical to enable universities to offer their graduates the best and most appropriate sets of skills needed to compete and succeed in a job market increasingly defined by digitalisation. Within higher education, Harth and Dellman

(2017, p. 492) contend that 'due to the influence of digitalisation and networking, skills profiles are undergoing such fundamental transformations that curriculum development should react more quickly'. Within UK education, the talk is of Education 4.0. Jisc (2020, p. 1) argues that the 'key difference with this revolution is the impact it will have on intellectually intensive jobs rather than the manual activities that were affected in the past – 95% of accounting tasks, 94% of paralegal jobs, for example, are predicted to be impacted by technology'. Digitalisation is said to be changing students' academic profiles from needing specific to needing generalist competencies. Harth and Dellmann (2017, p. 490) cite the example of architects:

> In the field of building technology … the ability to precisely calculate heating requirements or correctly calculate radiator dimensions will be less important, as computer programmes will soon be able to calculate these figures quickly, precisely and easily by entering known parameters. Instead, prospective architects must demonstrate themselves to be generalists, with an overarching understanding of energy concepts. In order to work professionally as an architect, the ability to bring together numerous influencing factors (such as light, air and warmth) to create an integrated energy analysis is increasingly important. Digital tools such as databases or computer simulations can again prove helpful in developing this generalist skills profile.

From a graduate skills perspective, technological skills such as artificial intelligence, cloud computing, robotics and Internet of Things are often cited as the new essential skills in this new age of digitalisation (Mckinsey 2017). These sit alongside a range of other hard and often computationally defined skills that employers are keen to find in a recruited graduate's portfolio of skills such as modelling and simulation, programming, big data analytics, operating intelligent machines, cyber-physical system security and 3D Printing. While acknowledging both the impossibility of predicting what the future of work *will* look like and that, with the current speed of change, making assumptions can lead down unproductive costly trajectories, there are nonetheless some universal guiding questions and ideas which can serve as an innovative-but-conservative foundation on which the future of UK higher education can be thought about.

What Is Datafication?

Datafication as a phenomenon is brought about by recent technological developments and, due to technological advances and lowering of

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production costs, is becoming routine. An example of such everyday datafication is how fitness trackers such as Fitbit capture users' physical data such as steps walked and sleep duration and then converts this into practical user-friendly data such as calories burnt. In essence, it datafies physical activities to generate actionable information and presents its users with a new lens with which to see themselves and the world. Datafication is already making a profound impact on many disciplines. In archaeology, it is challenging the foundations of established methods of measurement (Creswell 2014), while health subjects and anthropological ethnography are also using datafication in ways that disrupt the status quo (Ruckenstein and Schüll 2017; Pink and Lanzeni 2018). Given that data, specifically big data, is core to how digitalisation and I4.0 work, one can see a mirroring effect between datafication and digitalisation. Social media platforms continuously collect and monitor data information to inform how they market products and services to the public, and they use surveillance experiments to manipulate behaviour. Adverts that users see on social media are often the result of monitored and mined data. Large companies can identify customer buying patterns from mobile phone location data, tracked social media activities, external weather and previous order details. This data can then be analysed to find correlations of significance and to inform personally tailored offers to bring in additional sales. In the cases of companies like Walmart, Facebook and Instagram, captured user data is used and operationalised to redefine what content is created, presented and promoted to the public.

The Heuristic Model

To get educators started on the path to embedding digitalisation, this chapter sets out a heuristic model for easy ways to begin embedding I4.0 competencies into the non-STEM curriculum. Getting started is the goal, with, hopefully, greater ambition and sophistication developing with time. Our three step heuristic model prompts course leaders to identify how, when and why digitalisation competencies are relevant for graduates in their discipline and how to most powerfully turn this into high-value learning activities for current students.

Step 1: Identify the I4.0 Skills Necessary for Your Students to Learn

The first step is for course leaders – be it at programme or module level – to consider three things. Firstly, in what ways is I4.0 changing their

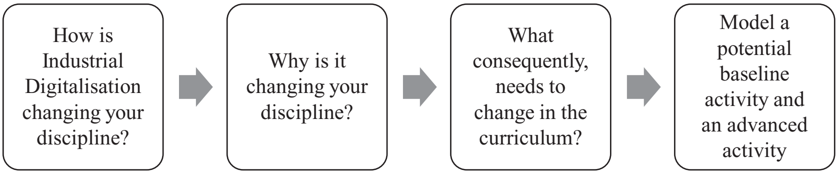

Figure 14.1 Identification and scope of change

discipline? Secondly, why is it changing their discipline in term of what are the causes and drivers of this? Thirdly, what needs to change in the curriculum? Building on that foundation, educators then move to modelling a simple baseline activity and an advanced activity. This can be seen in the process model found in Figure 14.1.

To work through several examples, digitalisation technologies are widely recognised as changing how work is conducted in multiple sectors (Xu et al. 2018). In health and social care environments, the Internet of Things (IoT) is becoming increasingly common. IoT refers 'to the networked interconnection of everyday objects . . . IoT increases the ubiquity of the Internet by integrating every object for interaction via embedded systems, which leads to a highly distributed network of devices communicating with human beings as well as other devices' (Xia et al. 2012, p. 1101). IoT is gaining importance in healthcare through applications that enable previously difficult to execute processes such as remote health monitoring, new fitness programs, mobile medical applications or wearable devices that allow patients to capture their health data and permanent geolocation auditing of medical devices (Carnaz and Nogueira 2019). For graduates seeking work in the healthcare sector, key baseline knowledge could comprise simply understanding how these devices work and being able to evaluate their affordances, limitations and controversies (e.g., data privacy matters, private sector involvement in public health). Moving beyond the baseline, graduates could significantly benefit from being able to conceptualise, create or design such applications. With the mainstreaming of low code and increasing employer expectations of coding ability among their university graduate staff, health and social care students could be taught to build using low-code platforms or to create a wireframe for an application.

Robotics, meanwhile, is gaining ground in hospitality environments (Murphy et al. 2017). It is being embraced for automating manual tasks such as processing cash payments, greeting tourists and sorting laundry (Ivanov and Webster 2020). Tourism, events and hospitality students

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could benefit from understanding the direction tourism workplaces are heading and how they can best deploy their skillset to add value and progress their career. For management students, knowing what to consider when managing AI projects could be key. The UK government-produced toolkit on *Managing Your Artificial Intelligence Project* (see UK Government Digital Service and Office for Artificial Intelligence 2019) holds great potential for business school curricular activities such as a business simulation exercise or exercises around setting governance, managing risk as well as discussions on ethics (see Kaplan 2020 for details on AI ethics), safety and data protection. Within law work environments, Artificial Intelligence (AI) is being increasingly used to perform automatable tasks that previously were done by lawyers (Miller 2018, p. 1):

> AI brings the ability to search for concepts (e.g. contract review and analysis for due diligence), to identify changes in tone of email communications (including looking for code words used to otherwise try to disguise the true nature of the conversation), and even to draft where the computer understands what needs to be drafted and prepares the document.

For law graduates, baseline knowledge could, for example, comprise gaining understanding of what it is like to work in such environments and how the human intellectual worker needs to adjust to add value, find meaning and build a successful career. Moving beyond the baseline could involve students attempting to replicate creation of one of these tools using an open source. As detailed above, there is a real need for educators to recognise how and in what ways I4.0 is changing their particular discipline, why is it changing the discipline and to decide how it ought to (or not) impact on what students learn.

Examples of open-source tools that could help educators and students across these disciplines with their datafication journey are listed in Table 14.1. These tools can generally be used with a minimum level of technical skill.

Step 2: Locate and Leverage the Necessary I4.0 Expertise to Co-deliver the Content with You

Once the relevant I4.0 skills have been identified, the next question is whether staff can deliver the curricula activity themselves or whether expertise needs to be sourced from inside or outside the institution or the academic's circle of contacts. Although many ID4.0 innovations originate from academia (Kaplan and Haenlein 2019), in general, the

Table 14.1. *Open-source data analytics tools*

Data analytic tool	Usage
Chartio	https://chartio.com/ Chartio uses its own visual query language to create powerful dashboards with just a few clicks without having to know SQL or other modelling languages.
Datacleaner	https://datacleaner.github.io/ DataCleaner transforms semi-structured data sets into clean, readable data sets that data visualisation tools can read.
Datawrangler	http://vis.stanford.edu/wrangler/ Highly recommended by top analysts, visualisers and data scientists, DataWrangler is an interactive tool for data cleaning. It takes messy, real-world data and transforms it into data tables. Then you can export to Excel, Tableau, R, etc. The goal: spend less time manually formatting and more time analysing your data.
Google BigQuery	https://cloud.google.com/bigquery/docs/ Structured Query Language, or SQL, is the programming language used with databases, and it is an important skill for any data scientist.
Gephi	https://gephi.org/ Gephi is a popular network visualisation package and is used widely within scholarly research. As open source software, it is easy to access at no cost. A dynamic developer community contributes to the software with new features, updates and bug fixing.
IBM Watson Analytics	www.ibm.com/watson-analytics Offers a wide range of data analytic tools, free, and no coding is required.
OpenRefine	http://openrefine.org/ OpenRefine is an easy-to-use open source tool for cleaning up messy data by removing duplicates, empty fields and other errors. It's open source but has a sizable community around it who will help.
Splunk	www.splunk.com/en_us Splunk Enterprise provides a broad-based platform that can be used for searching, monitoring and analysing data. The software can import data from a variety of sources, from logs to Big Data sources.

kinds of hard I4.0 skills needed are commonly concentrated among academics in specific areas: computer science, engineering and other computationally defined disciplines. Indeed, most research into digitalisation content in curriculum is focused on these technological subject areas. Little research is available on how digitalisation skills can be embedded in the curriculum for disciplines that are not traditionally or inherently computationally orientated, such as disciplines captured in the umbrella

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terms of the social sciences (e.g., education, law, sociology, psychology, sports science), the arts (e.g., drama, architecture, media) and business (e.g., management, tourism) and, also, some of the sciences (such as chemistry, physics, life sciences). This highlights the urgent need for rethinking the non-STEM and the wider non-computational curricula and finding space for I4.0 competencies if UK HE is to appropriately empower its graduates.

Throughout the education sector, there is a challenge with finding academic staff with the necessary I4.0 skills. It is said there is widespread lack of relevant digital skills among academics in a number of disciplines for doing data-intensive science which is a fundamental impediment to harnessing the potential power of big data and associated skills and consequently passing on these skills to students. A survey of graduate students in environmental sciences (Hernandez et al. 2012) found that over 80 per cent of students received no formal training in computing or informatics; 74 per cent had no skills in any programming language; 72 per cent of the students understood the term metadata but half had not created metadata for their dissertation and had no plans to do so. In their paper, Strasser and Hampton (2012) reported that when ecology instructors are asked why they do not train students in such foundational skills, they indicate the following eight obstacles: limited time, topics were not appropriate at their course's level, topics were or should be covered in a lab section, students in the course did not have the necessary quantitative or statistical skills to cover the topics, lack of funding or resources, the course was too large to cover these topics well, the instructor was not knowledgeable in these topics and the topics were or should be covered in other courses. Essentially, we as educators are attempting to fit more material into already-full courses and curricula, and those delivering do not necessarily feel prepared to cover or address topics relevant to big data and data-intensive skills.

Not addressing data analytic skills in non-computational-orientated subjects impacts on employment prospects for all graduates regardless of their subject specialisms. In their survey on employability of STEM and non-STEM graduates, Grinis (2017) found that STEM shortages are not only about 'not enough' STEM graduates but also about 'not enough' STEM skills and knowledge taught in non-STEM disciplines. Additionally, the report makes the important and somewhat counterintuitive finding that it is wrong to equate STEM jobs with STEM occupations only, as 35 per cent of all STEM jobs belong to non-STEM occupations. The survey also found that STEM skills and knowledge posted in STEM vacancies within non-STEM occupations go beyond 'Problem Solving' and 'Analytical Skills' but, in many cases, could be acquired with less training than a full time STEM degree. Moreover, STEM recruiters within non-STEM occupations often wish to combine STEM knowledge and skills with non-STEM knowledge (such as by recruiting graduates from the humanities). As such, there is a strong argument for rethinking digitalisation/datafication skills in non-computationally orientated subjects in order to better serve students and employers.

Step 3: Embed Digitalisation Competencies in the Curriculum: The Datafication Way

Once the necessary ID4.0 skills to incorporate have been identified and a person or mechanism to deliver it has been sourced, it becomes time to embed it within the curriculum. In the context of UK higher education quality processes, this is typically done via two mechanisms. The first mechanism, benchmarking to competitor programmes, is external-facing and can be done via desk research and interrogating counterparts at other universities. It is also important to take a global perspective and to look beyond just UK higher education to see what, for example, Asian universities are doing or private providers are working on. The second mechanism is internal. Through taking the time to look at existing programme learning outcomes, assessing the existing mapping of programme outcomes to modules, understanding how your module fits within the broader programme ecology, it should be possible to design an effective, learning-rich and enjoyable datafication activity that constructively aligns the programme learning outcomes, the module learning outcomes and classroom activities without needing to make formal modifications to the programme documentation or creating new modules.

Data (and Big Data)–orientated skills are wide ranging and cover a range of proficiencies (Figure 14.2). These skills (and the language used) are broadly familiar to those in non-computationally orientated disciplines who may already be using these terms within their research methods modules and individual research practice. Figure 14.2 details a process educators can follow to realise I4.0 content in the curriculum. The subject-specific threshold question would be asked about each of the five elements of data competency. To give an example for law, a module leader in the law school could ask 'how is use of data for predictions relevant to my module?' They may consider the use of emerging applications for

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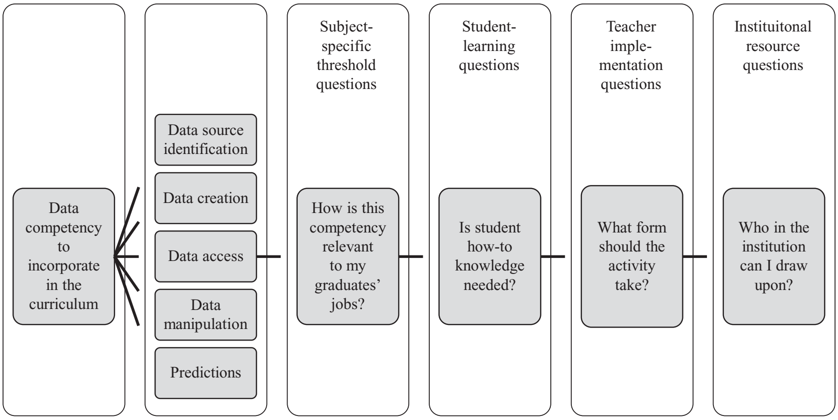

Figure 14.2 Datafication competencies and links to classroom activities

predictive law enforcement (e.g., terrorist profiling based on a person's internet usage) and ask what students need to know about this application (e.g., the ethics of it, biases inherent it in, design philosophy behind it, how it works, how it is created, legal issues, how it could be different). The lecturer can then design an activity around it and see if there is someone who could lend expertise to covering the subject (e.g., paying to bring in a guest speaker from industry, organising a field trip to a police station that uses data-informed profiling, ascertaining expertise among university employees). This can then be taken a step further by, for example, getting students to design their own profiling system in an ideation session and, taking it further, potentially building it with one of the tools detailed in Table 14.1. Following this workplace-informed process can lead to powerful outcomes for student learning and potentially take students down new transformative learning paths.

Many of the skills detailed in Figure 14.2 are relevant and applicable to most, if not all, subject areas. Graduate workplaces for business, chemistry, geography, biology and heritage students as well as many others, make extensive use of data at all levels. Standard and subject-specific data analytic and statistical packages are commonly used throughout the curriculum, such as SPSS and R. This universal status of data provides the opportunity to consider digitalisation competencies in terms of datafication. In this way, datafication becomes the natural entry point for embedding digitalisations skills into non-computational subject areas.

Conclusion

This chapter proposed a practical and industry-orientated approach to embedding digitalisation skills in non-computationally orientated curricula. Through proposing a datafication skills competency framework based on a three-stage model, the chapter intended to stimulate discussion amongst academics, policymakers and the wider industry on how to bring these crucial ID4.0 skillsets to students in a timely fashion. Lastly, as well as preparing students to success in the world of ID4.0, this chapter echoes Biot's (2017) call on universities to become 'University 4.0' institutions characterised by the embracing of I4.0 technologies in all aspects of the business be it operational or educational. Such moves would allow university institutions and university staff to become better placed to speak experientially of I4.0, machine learning and AI in the workplace.

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CHAPTER 15

Disrupting Curricula in the Area of the Humanities

Joshua Patterson

In 'The Recession-Proof College' (June 2020), authors for the *Chronicle of Higher Education* seek to advise 'college leaders on how they can protect their institutions' future by creating programs that align with student interests and propel them into rewarding careers' (Kafka 2020). This piece and others further centre academic programs as a strategic venue in maintaining enrolment and cutting costs. Even before COVID-19, the previous ten years were called a 'lost decade' of higher education funding (Mitchell, Leachman and Masterson 2017, p. 1). Within this context, higher education curriculum decisions were already subject to an intensifying discourse on the 'value' of particular types of study, with policymakers across the political spectrum explicitly denigrating traditional humanities and liberal arts programs (Jaschik 2014).

As particular states centre higher education's job preparation function, funding is diverted to match these new priorities. The impacts of changing perceptions of fields, along with growing access and variety of the student body has already precipitated periods of massive change in US higher education, particularly in the curriculum (Brint 2002). More recently, analysis has shown a steady and growing decline in student interest in humanities degrees (Schmidt 2018; Bradburn and Townshend 2020). It is with respect to these local and international shifts in understanding of higher education's broader societal role that humanities program leaders face the challenge of sustaining and growing their departments (Pucciarelli and Kaplan 2019).

Given the scope and scale of the challenges faced by humanities programs, it is remarkable that any might succeed in increasing their footprint on their campuses and institutional budgets. In one case, leaders of a humanities program took advantage of evaluative technology and the discursive power of the digital to expand (Kaplan and Haenlein 2016). At the University of Alabama (UA), in 2016, the Department of Religious

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Studies[1] added a Master of Arts (MA) program. That program incorporated digital skills as a key focus and strategically deployed the digital to reframe the issue of employability for students. Through instrumental qualitative case study design, I interviewed faculty within the program, on external review committees and administrators across the institution.[2] These data answer why the faculty pursued their particular program design, how they perceived themselves within various discourses in higher education and how their proposal was perceived by gatekeepers across the institution.

History and Background

From the perspective of a long-tenured participant in UA's Department of Religious Studies, Dr Avocet,

> The department has been . . . tremendously successful over the past eighteen years. It has taken a lot of hard work. None of the things that anybody sees today came from nowhere. None of them came naturally. Some of them were sheer accidents; some of them were long planned and worked toward.

The eighteen years in question span Avocet's arrival to the time of this interview in the summer of 2019. The *things* Avocet mentioned related directly to the department's addition of an MA to its degree offerings, which received final approval in April of 2016 and began with its first students in the fall semester of 2017. Prior to Avocet being hired, 'in 2000 . . . the [religious studies] department was classified as being non-viable by the Alabama Commission on Higher Education'. When considering the transition from non-viability to adding an MA program, the recent history of this religious studies department is remarkable. Another faculty member, Dr Bishop stated it this way:

1 As distinct from theology or ministerial training, religious studies has been institutionalised within the humanities by the American Academy of Arts of Sciences, the National Endowment for the Humanities and the American Council of Learned Societies (Bradburn and Townshend 2020). Religious studies has been present in US universities dating back to the late-nineteenth century, but it expanded most rapidly in the 1960s and continues to expand today.

2 This chapter will quote anonymised participants from seven interviews, ranging from forty to ninety minutes in length, and including faculty from within the unit, faculty outside the unit who reviewed the new program proposal and university administrators. These data were collected for a larger instrumental qualitative multi-case study with study approved and accepted by multiple university human subjects review boards (Patterson 2020). The data relayed in this chapter draws exclusively from interviewees at a single case, the University of Alabama. The interviews were iterative and relied on a semi-structured approach.

> So, this would be our thing that would continue to show that we're a serious department. I wasn't here, obviously, when the department was at its lowest point . . . they were almost closed and almost lost the major and the department was literally dying, just literally aging towards retirement, death. We went from that to having enough – chockful – of young faculty who are doing really good work and master's students and I think that was a good book end to that story.

The apotheosis of the department of religious studies, as noted by Dr Avocet, was a product of the hard work of dedicated faculty but also concurrent with a rising tide across the broader institution. UA had nearly doubled its enrolment in the last twenty years, going from just over 19,000 in the year 2000 – where it had hovered near, going back to 1981 – to over 38,000 by 2017. The university was chartered in 1818, and like many US universities, grew slowly. The following century and a half was punctuated by dramatic episodes, such as the near complete burning of campus by Union troops during the US Civil War (Eckinger 2013), and the university becoming a 'national dateline' for educational desegregation during the famous standoff between then Gov George Wallace and federalised National Guard soldiers, on account of UA's first black students Vivian Malone Jones and James Hood (Clark 1995, p. ix). The final half of the twentieth century was characterised by continued growth and leadership which sought to change negative perceptions of the university through innovation, hiring and construction (Wolfe 1983). A period of stability from 1981 to 2000 preceded the unprecedented growth that would later culminate in the reclassification of UA for the highest possible research category.[3] Pursuit of that milestone aided the religious studies faculty greatly in attaining a new degree program, an effort that was also the product of careful and strategic use of the *digital*.

The religious studies faculty at UA came to the decision to highlight *digital skills* and include that as a focus for several reasons and with a model in mind rooted in recent undergraduate alumni experiences. The focus on the digital was a natural outgrowth of prior work of the departments' faculty. Also, it helped to address concerns among the faculty about the ethics of launching a new terminal master's degree in the humanities, and

[3] In 2018, UA was reclassified as an R1 or Very High Research Activity institution (Thornton 2018). That designation is the highest classification of research activity afforded by the Carnegie Classification of Institutions of Higher Education (The Carnegie Classification of Institutions of Higher Education 2020) and is coveted status among large US universities (Rabovsky 2012; Toma 2012; Boardman and Bozeman 2015). Such a designation requires that institutions possess a certain ratio of undergraduates to graduate students. As such, at the time the Religion and Culture degree was being reviewed, there was a need for more graduate students to achieve a strategic goal of the central administration.

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finally, faculty were astute that a digital focus would be perceived favourably by reviewers primed to scrutinise career outcomes for humanities graduates.

Wherefrom?

Religious studies at UA had already established a reputation for maintaining a digital presence, and the decision to include a focus on digital skills in their new MA program would stem, in part, from that. A former department head, Dr Avocet, described this organic development as something 'that was in my head as a model'. That model stemmed from the department's historical web presence and employing undergraduate students to maintain it. Avocet noted that the department website was a 'pretty active, dynamic place'. Student majors were active on the site, and student workers maintained it. Avocet pointed out that the department 'tend[ed] to hire a lot students'. Avocet continued:

> It was apparent that the students who helped with that, a whole bunch of them continued to use those skills after they left us . . . but one student in particular, the first job she got was in a real estate office – I remember this – because she knew how to make web pages. She's got a job now . . .. We gave her a set of skills that she could use.

In addition to a vibrant home page, the department had been particularly active for some time on social media and to a strategic end. Avocet remarked: 'So given that atmosphere here, I think the majority of people understand that there's a reason why we post on Facebook. Oh, there's fun reasons of course, but there's some very practical reasons why we have an Instagram . . . Twitter . . .. They get that even though they're not all necessarily involved in that.' An external faculty, Dr Crow, noted the success of the religious studies department's online presence and broader promotion activity. Crow said, 'I think they are extremely good – unusually good – at advertising themselves.' Another administrator, Dr Grebe remarked that 'their big plan is to take over the world and they might actually be able to do it. Because they're very clever . . . they advertise well . . . the department as a whole, it's just really, really interesting'. The department benefitted from a perception as savvy, particularly in digital realms, and also was specifically aided by a digital evaluation tool.

They Turned out to Be a Jewel in the Crown

Another function of the digital in the construction and evaluation of the new MA program in religious studies at UA related to how the program's productivity was evaluated. The UA administration employed a digital evaluation tool called Academic Analytics. Dr Dove, currently in the provost's office said, 'I was [working in the dean's office] at that time and I thought the department was ready to develop the graduate program at the Master's level.' The dean's office was a critical early ally and supporter to the nascent degree proposal, and according to Dr Dove, that support was undergirded by those digital evaluation tools. Dove said, 'Certainly the productivity, the publications . . . that department is ranked pretty high by Academic Analytics.' Dr Dove also noted that they 'thought the religious studies department received less attention until the Academic Analytics data came up'. A growing number of research universities are using Academic Analytics to evaluate the research productivity. These tools 'aggregate, curate, visualize, and contextualize data . . . and provide powerful, user-friendly business intelligence tools to visualise and identify patterns from those data'.[4] It is clear from the quote above that UA administrators not only utilised the software to evaluate faculty and units but also trusted the data enough to shape decision-making at the institution. In their role in the college dean's office, Dr Dove said,

> I was able to pull the data for religious studies and alerted both the dean and the chair and said 'Look at this'. [Religious studies] is not a big department. They were one of the smallest departments in our college, they turned out to be the jewel in a crown, you know, it was so beautiful. And I think that was one of their main drivers for the dean to give the permission to go ahead.

With student successes from the BA in mind and established digital literacy among the faculty, the department moved forward crafting their proposal with support from their dean, aided in large part by a digital evaluation tool.

Not Your Usual Digital Humanities

The digital skills the department would come to emphasise are mediated by their context in a field where such proficiencies are not the norm. Dr Finch expressed, 'there's a lot of different stuff that [students] probably wouldn't access in a traditional religious studies grad program'. Avocet described the program as 'a little off the beaten path when it comes to what religious studies usually is'. Dr Bishop, the first professor in the program to

[4] 'About Academic Analytics'. https://academicanalytics.com.

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teach the digital skills foundation course pointed out that they were 'not a digital humanist'. Bishop continued 'but I have read some of that stuff and interacted with some of it in graduate school. I knew enough to be dangerous'. The benefit, of course, was that the degree was not explicitly a digital humanities degree but one that incorporated digital skills.

Digital humanities as a category can be a bit of a blank canvas, and the faculty at UA were clear to distinguish between their use of digital skills and digital humanities-proper. Avocet described their program as 'not your usual digital humanities'. Faculty noted areas of overlap with the digital humanities, like digital archives, museum exhibits, etc. and also noted more fundamental computational skills their program would focus on, like coding, data management, analysis and web design. Their digital skills also took a particular focus on *public scholarship*. The syllabus for the foundations course for digital skills – taught by Dr Bishop – listed learning outcomes related to quantitative and qualitative data analysis with digital platforms, designing and building a website, using content management systems to build a digital archive and audio and video production of religious studies scholarship intended for a public audience. Early semesters of the course attempted to build partnerships with the campus digital humanities center, and several students pursued a digital humanities certificate. Faculty drew on digital humanities models, understanding that the digital humanities and programs like theirs were still quite innovative within the broader category of the humanities.

Especially in the Humanities

One key aspect that shaped faculty motivations for including a digital focus was their sensitivity to broader perceptions of the humanities vis-à-vis the digital. First, faculty were insistent that humanities programs already provided marketable skills. Dr Egret said that 'the humanities is not just a factory for the professoriate, but it's also something that feeds society in a zillion different ways'. Dr Finch pointed out that the faculty's prior work teaching about religious studies,

> helps our students and alumni to develop critical thinking skills and a variety of ways of engaging the world around them more critically that has been helpful for them, whatever field they go into. [Our alumni] report back to us that the critical thinking skills, the writing communication skills, the ability to think differently about the world around them, those skills have been useful for them in their careers.

Even while faculty resisted broad narratives denigrating the application of humanities skills in careers, they were aware that administrators would be focused on employability for any new humanities program. For example, Dr Egret said that, 'especially if you are humanities program, especially in Alabama, I think there's something about demonstrating your perspective value, like literal monetary value. I don't think you can get away with the same "joy of learning" rhetoric anymore'. Dr Dove, an administrator, noted that 'especially in the humanities' career outcomes were 'an obvious question'. Beyond the anticipated landing with their administrators, the faculty were also frustrated by trends in their field related to career diversity. As noted:

> Maybe I'm not looking in the right place but . . . I don't see anybody in North America thinking seriously about the state of the humanities in higher education with a view toward what their graduate programs do and what the students in their graduate programs will end up doing.

Egret, Finch and Bishop all iterated hopefulness that their approach to including more practical skills in graduate education would push their disciplinary colleagues further in that way of thinking. Also though, they believed that the unique focus on digital skills in their program made it stand out among its peers.

What for?

They Seem Eager to Come to a Program Like Ours

Another key function of the digital for this program related to student recruitment. Dr Crow noted that the focus on digital skills 'established what would make this unique . . .. Administrators, they looked at this and thought, "Wow, here's a department that wants to use technology", and by doing so will have a kind of a market niche in terms of the recruitment of students'. Dr Avocet reflected that prospective students 'seem eager to come to a program like ours'. Avocet elaborated on the appeal of the program:

> I think the way we created the program . . . certainly helped to distinguish the degree in people's minds . . . the deans, higher admin, the board trustees, let alone the applicants, I think that part did help set the program apart in people's minds and help persuade them that we were thinking practically about what the students would do after two years.

Reviewers and administrators were confident that the program would not have any trouble surpassing the viability numbers required of new

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programs,[5] in part because of the digital focus. Dr Crow noted that 'there didn't seem to be any dangers about viability'. Dr Dove said that they 'never had a question that the department was not able to produce the number required'. And, of course, recruitment of students was related to the prospects of future employment.

Employability Matters, Even If It's Not the Only Thing That Matters

The faculty spoke at length about their own concerns for prospective students' careers. As Dr Avocet bluntly stated:

> The world doesn't need, I don't think, another master's degree program in religious studies . . .. So if the long-term viability of this department is – to whatever degree – linked to graduate education,[6] the challenge then becomes how we can do it in a way that is inventive, kind of novel, and effective.

Dr Egret said that they 'see student perceptions so immediately tied to . . . a sort of pragmatic anxiety about what you do with the thing [graduate degree]'. Avocet mentioned this as being present from the very first planning meetings, an awareness that 'the long-term viability of the program is probably . . . linked to meeting the needs of students who wish to have a terminal liberal arts master's degree that they will put to use, who-knows-where doing who-knows-what'. These aspects contributed to making the program, in Avocet's words, 'distinctive . . . practical, and of interest' to prospective students.

Even beyond their concern for future students, faculty keyed in on employment outcomes for their program because of how those were

[5] Viability, defined by the number of graduates in a set of years, was a fundamental evaluation criteria for prospective programs and an element of their review after they are established.

[6] The acceptance of the necessity for the addition of the MA was shared among the faculty in the department, and even faculty and administrators outside understood how it fit into a long-term viability strategy for the unit. It is of course notable given how strongly the faculty felt about challenges for students with a terminal MA. Indeed, several faculty named feelings of skepticism and even resistance when they first heard the idea. It was the development of the digital skills and the potential boon they would have for students – along with the institutional necessity for expansion – that eventually enticed those reluctant faculty not just to accept the new MA but to champion it. Dr Finch summed this up succinctly: 'With the current state of academia . . . I was concerned about the ethics of starting a program . . .. That concern was not unique to me by any means. Everybody was kind of aware and that was a part of the conversation to begin with . . .. But then we kind of, as I'm sure you've heard from others, tried to construct the program in a way that non-academic careers were not just the alternative, but they were an initial part of the program from the beginning. Where students would be prepared both to go on to do PhD work, are prepared to have a variety of skills that would be useful in a variety of jobs.'

emphasised in the review process. Dr Crow, who serves on a committee that reviews many such proposals noted that specific career projections are 'a required part of every proposal that comes to us . . . . Part of what the Alabama Commission on Higher Education asks for is very specific information about that. What is the hiring demand in local, state and regional and national?'[7] Each of the faculty remembered and remarked on the specificity required in describing not simply in general terms what jobs students might get but how the program would as Bishop stated, 'prepare people for the Alabama workforce'.

Although faculty were critical of evaluating programs solely on employment prospects for students, they also shared concern for their students and their investment in an MA. Dr Crow, outside the unit, summed up this sentiment succinctly saying 'graduate educators need to have sensitivity to the employability of our students. And that matters in a totally fair legitimate way even if it's not the only thing that matters'. Dr Bishop spoke about a desire to have a program that would 'focus on the skillset that would be transferable [. . . and] that would not allow students to feel trapped when they graduate'. Dr Egret described this as 'pushing the specificity of the so-what factor'. Finch went to lay out how those concerns shaped the programs, asking rhetorically, 'what jobs might they be training for? How would we train them for those jobs? What do we need to do?' Finch felt that these requirements at the system level, though not perfect in their intent or impact, were helpful in challenging the faculty to incorporate employment into the conceit and structure of the new program.

We're Living in a Digital World Now

The digital aspect of the MA program was a key part of its successful review process at UA. It was part of what Dr Egret described as a 'one-two punch' alongside the social theory emphasis. Egret predicted that the program would have appeal to administrators even if they didn't 'give a [expletive] about religious studies'. Dr Bishop remarked that 'the digital practical skills aspect was super helpful at selling it to people outside the

[7] The University of Alabama is part of a multi-campus institution, which is coordinated alongside over thirty others by the Alabama Commission on Higher Education (ACHE). Among state-level governance, ACHE is classified as a coordinating system, with non-voluntary but limited authority. Such a structure is said to fall near the midpoint of state control in higher education governance (McGuinness 2003). ACHE was relevant to this case and mentioned by participants because it sets for the terms for review and has the final approval authority over new academic programs like the MA in Religion and Culture.

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field and along the way'. Dr Crow, who served as a reviewer of the proposal, said that administrators saw it as 'perfect, a grand slam'. Crow went on to say that

> what appealed most strongly higher up was that it had the technology angle to it, which is something that I'm sure you're not surprised to hear this, but that all administrators want from our college through the university, through the board they think it's the magic elixir for everything.

Dr Dove, in the provost's office, confirmed the resonance of the digital aspect of the program, noting favourably how the program positioned itself, Dove pointed out that 'We're living in a digital world now.' Dr Grebe, in the graduate school, described the program as 'hip and interesting and different'. Grebe went on to say that 'I get what they're doing and I see the possibilities . . . the students will have skills that make them marketable.'

As religious studies faculty reflected on questions related to employment for new students, they had clear examples in their mind, and as they supported the program in its first years, additional models arose. Avocet recounted that a BA graduate had gotten a job in a real estate office doing web design. Because the department had recent successes to reference, that too provided credibility to their plan. Dr Crow noted this and said, 'I think there was a realistic sense of the kinds of positions that people could be prepared for . . .. This program will situate people well to flexibly move within different kinds of areas, be it media, teaching, or some kind of NGO work . . .. So everything struck us as perfectly reasonable.' Several faculty pointed to students working with magazines and museums. The appeal or positive reception of the digital skills among reviewers shows the buzz-word nature of the term but was also tied specifically to how it would sustain the program's enrolment and provide for gainful of employment of students.

Conclusion

Already, the plans that UA faculty had projected are coming to fruition. Avocet noted that 'our very first graduate works at a museum in downtown Atlanta . . .. One of our current MA students, doing museum studies certificate, is from Northeast Alabama. She's home for the summer, volunteering at the local museum and putting together a traveling exhibit from a Montgomery Museum that's coming up to North Alabama' (Patterson 2020). Dr Egret recounted about the three graduates the program had had so far: 'And each of those three students is doing radically different thing in I think radically successful ways. And so, it's already putting into practice the way that we see the whole Digital humanities social theory thing working together, and that's cool to see.' Faculty recounted the power of these stories in sustaining viable enrolments, just as they predicted. Digital skills attracted students, employed alumni and assuaged wary administrators.

Through a case study of a recent curricular expansion, this chapter details the potency of digital as a signifier of innovation and employability for humanities graduates. This narrative highlights an example of emphasising digital skills as having broad utility to college graduates and explicates how that narrative emerged, was crafted by faculty and finally received by evaluators. Additionally, this chapter details how a graduate program in the humanities comprehensively incorporated the digital as content and outcome. This instance of curricular disruption is emblematic of the adaptive change in higher education noted in Chapter 1 of this volume and is all the more interesting in how it draws on and builds upon other noted examples of digital disruption. The introduction to this volume also notes the indelible mark of COVID-19 on contemporary higher education, and while the events of this chapter occurred before the pandemic, the factors that shaped them have only been intensified sense.

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PART IV

Networking and Social Activities

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CHAPTER 16

Working Adults' Networking and Social Activities in Lifelong Learning

Mamun Ala, Ingrid Day, Tareq Rasul, Sumesh Nair and Megan Baker

Recognising that social interactions and networking, and the sense of community they engender, exert a profound effect on learning and peer support (Kezar 2014), this chapter explores the mechanisms and measures for implementing and evaluating the impact of networking practices in the online learning environment. The Australian Institute of Business (AIB), a highly experienced online provider of postgraduate business education, has been long and deeply invested in testing, trialling, measuring and implementing approaches that draw on the potency of social networking and interactivity as an embedded element of the student journey. We believe that socially networked interactions in the online learning environment, as Fox (2005, p. 108) suggests, '[have], as no educational process has had before, the capability to facilitate and enable new forms of imagined community'. As Kaplan argues (2021), 'studying is not only learning content and acquiring skills, but is also about networking and making friends'.

We draw a key distinction between opportunities for inviting and eliciting feedback and evaluation and opportunities for peer-to-peer dialogue, networking and co-learning. AIB invites regular feedback in a variety of ways: for example, students are invited to Q&A webinars with senior management, student and alumni surveys are conducted each term and alumni panels and reference groups provide structured input into emerging issues and opportunities. AIB also convenes events such as public webinars on topical issues (to which students are invited) and prepares artefacts such as the *AIB Review*,[1] which publishes academic commentary on contemporary social, economic and cultural concerns. While we consider these activities briefly in the following discussion, they are not the primary objects of our interest. Rather, we are concerned with the ways that *social* interactions and networking in an online environment enhance learning, build community, impact professional advancement and create a lifelong connection with peers

[1] www.aib.edu.au/blog/aib-review/welcome-to-the-aib-review/.

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and with the institution. We also consider the extent to which such activities can – or should – be hosted by the institution, be self-initiated and administered by students themselves or be a hybrid of the two. In our experience, the latter is the most effective approach.

AIB is Australia's largest provider of fully online postgraduate business programmes, with over 14,000 professionals globally studying in its flagship MBA programme over the years. The MBA enjoys notably high levels of positive feedback from students (see, e.g., the national Quality Indicators for Learning and Teaching [QILT]), which AIB believes – and student feedback affirms – is attributable to a life-changing learning experience; to expert, highly engaged and motivating faculty; and to the peer-to-peer learning and networking that facilitate and produce positive outcomes. The MBA is designed as an experiential programme that connects the professional experiences of working adults with the curriculum (Kolb 2015; Smith 2016). These experiences are not considered in isolation; rather, students are connected with the professional contexts of their peers in a range of collaborative learning environments such as weekly webinars, asynchronous online forums and social media environments, which constitute a suite of available interactive modalities. These approaches have not been invoked by a pandemic crisis, and in that sense AIB is differentiated from some other institutions who, as described in Chapter 1, 'hard-line enemies of online teaching and convinced opponents [who] were forced to take their first, second, and third steps in the newly imposed digital world of higher education'. Instead, it can be argued that AIB has been a front-runner in catalysing the dispositions, experiences and aptitudes of a generation of 'digital natives' within an educational context (Kaplan and Haenlein 2016).

In selecting our case studies, we have been mindful of several further dimensions. First, while considerable research explores the nature and impact of student *interactivity* on learning outcomes (Kaplan and Haenlein 2016; Kent, Laslo and Rafaeli 2016; Kaplan 2017), we are examining in a very particular way the interactions that are *social* in nature – perhaps they can be characterised best as *informal*. While often formally structured, with a specific social networking intent, such informal interactions are relatively organic in terms of what students choose to 'do with' them. This contrasts with the more traditional, relatively formal academic settings and relationships such as tutorials, collaborative assignment work and structured team activities. At AIB, unfettered by the need to make expensive real estate 'pay for itself', we have deliberately eschewed the formal lecture. Instead, student classes are conducted as facilitated discussions – in itself, a 'social' approach to learning.

The following case studies have been identified as contributing to this view of interactivity and its positive impacts. The Alumni Insights Survey is considered because it serves to validate our assumptions about the positive, sustained impacts of social networking. The discussion is organised in the following way:

- Student-centred institutional networking and engagement initiatives. Recognising the need to embed Boyer's seminal works in scholarship and embrace adult learning as a lifelong practice (Boyer 1996), AIB responds to student appetites for networking and creates multiple activities and events throughout the year that act as touchpoints for student engagement. This category is framed by the impact of socialisation on learning and the complexity of integrating social spaces with learning spaces. Activities include the creation of an online community for the graduating class to connect and network and a virtual graduation celebration.
- Networking opportunities using social media platforms. These are framed by core issues in the use of social media platforms in higher education (including the question of whether social media used by students or alumni should be autonomous or facilitated or coordinated by the institution) (Kaplan and Haenlein 2016; Kaplan 2017). Activities include AIB student communities on social media: AIB has 45 private social media community groups for students and alumni, with a total membership of over 15,000. These groups allow students to interact, form relationships and obtain support from peers. Referring back to Chapter 1, these opportunities are designed to enhance learning as well as to lead to the 'creation of a feeling of closeness enabled by the digital' (Mucharraz and Venuti 2020).
- Institutional benchmarking and data collection. This category includes AIB's annual Alumni Insights Survey and Report and Alumni Industry Panels.
- Institutional further learning activities. These are framed by opportunities for communication with critical stakeholders. Activities include AIB Masterclasses and the AIB Review.

Student-Centred Institutional Networking and Engagement Initiatives

Arguably, the central challenge that faces fully online higher education institutions is how to keep students engaged and connected to peers,

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teachers and the institution. Socialisation lies at the centre of networking and engagement by students. Eminent German pedagogue Rudolf Lochner defined socialisation as 'the process of forming groups' or 'the formation of community' (Brezinka 1994, p. 10). Socialisation and social activity are related terms with sociological, psychological and pedagogical connotations. As a sociological concept, socialisation involves transmitting skills, social norms and values (McCann 2013). This section attempts to understand the concepts of socialisation, social activities and social networking in the context of online higher education, in addition to the role of academic institutions in addressing and facilitating adult learners' socialisation needs and positive experiences. In short, it echoes the assertion in Chapter 1 that 'higher education is not only about learning and teaching but also about exchanging with fellow students and creating networks and friendships for life'.

The educational dimensions of online social networking attract considerable debate among scholars and practitioners due to the complexity of integrating learning spaces with social spaces. Multifaceted challenges to overcome include participants' varying goals and objectives and individualised dispositions and contexts, in addition to issues of authentic interactions and privacy. Since the technical infrastructures used for instructor-learner or peer-to-peer social interactions were often not designed for learning and teaching, they may need to be repurposed when used in an educational setting (Hemmi, Bayne and Land 2009). A careful choice of communication platforms (e.g., blogs, social networking sites, YouTube) and communication strategies is essential to support teaching and learning activities meaningfully – for example, by augmenting Learning Management Systems and promoting teaching presence, student engagement, participation and collaboration and social networking (Ophus and Abbit 2009; Boling et al. 2012; Rennie and Morrison 2013).

Academic institutions adopt a range of socialisation approaches. Each approach aims to achieve a specific purpose or goal; there is an inherent end-means relationship. At AIB, the promotion of social activities and networking is designed to solidify the relationships between the institution, students and alumni. Socialisation is a mechanism for understanding the needs of students and alumni, helping each party to understand how they want to be treated by others and enabling them to recognise the meaningful role of academics in supporting their lifelong learning (this is further discussed later in this chapter).

Being a fully online business school, AIB did not need to affect any major changes to its modus operandi in response to COVID-19. However, the pandemic has been an impetus for the organisation to explore innovative, collaborative venues further to create greater engagement with current students and promote a cohesive community of alumni. Below are two examples of recent student-centred institutional networking and engagement initiatives undertaken by AIB.

Initiative 1: Student Community Q&A Sessions (Virtual Town Hall Meetings)

Each study term – six times per year – AIB's executive team hosts student-facing interactive town hall–style online sessions, with an open invitation to all students. This provides the opportunity for students to have direct and unfiltered access to the key decision makers at AIB. The webinars are two-way: AIB shares updates on the things that impact the student experience, and students pose questions or make suggestions regarding matters they would like addressed or considered.

For students, the outcomes of these sessions include the ability to be forthcoming with any concerns or ideas and ensuring that they feel heard and valued. For AIB, the organisation gains insight into how the student journey is being lived and what can be done to improve it continuously. With the student base primarily comprising working adults, this approach treats students as the adults they are. It positions them as colleagues in the continuous improvement of AIB's student learning experience rather than as pupils. These sessions were well received in 2020 as they are a medium through which students can feel connected with their community and form meaningful interactions. Three hundred and fifty students engaged in the nine sessions that were held in 2020.

The community sessions champion AIB's commitment both to challenging conventions and 'being human', through a test-and-learn approach driven by student input, and to being open and accessible. Further, they advance AIB's student engagement and retention focus by providing a medium for interaction and open dialogue.

Initiative 2: Virtual Graduation Celebration and Community Engagement

To adjust to COVID-19, which necessitated the cancellation of AIB graduation ceremonies – the pinnacle of a working adult's postgraduate journey – AIB explored innovative ways to celebrate graduates' achievements. Rather than attempting to replicate the graduation experience in an online setting, AIB used engagement-focused approaches that reflected the mindset of 2020 while also honouring the achievements of graduates.

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At the centre of the initiative was the webinar, hosted by the leaders at AIB. The event was purposefully configured to promote a sense of community, organised as a large meeting with all graduates able to see one another and feel connected to their cohort. The online event was accompanied by several other initiatives, including a social media campaign focusing on user-generated content from graduates. Graduates were also each mailed a mortarboard for them to wear at the event. The social campaign included a celebration compilation of graduates' self-recorded videos of their celebrations at home and an AIB Class of 2020 Instagram filter.

The event and celebrations were well received by the graduating class, who were grateful for the opportunity to celebrate despite the lockdowns and unusual conditions of 2020. The relevant engagement figures are given below:

- Number of graduates who registered for the event: 306
- Number of graduates who attended the event live: 281
- Number of views on the shared recording of the event: 219[2]
- Number of video celebration submissions: 56
- Number of views on the celebration compilation video: 31,571
- Number of AIB Instagram filter engagements: 236.

This initiative supports the organisation's core values, particularly 'being human', not accepting the status quo (by pivoting to an online format) and honouring the investment made by students. This was also highly positive for the AIB brand, with social media being used to amplify the event and the celebrations of the graduating class.

Networking Opportunities Using Social Media Platforms

Social networking sites (SNS) are the defining communication media of our times (Appel et al. 2020). Facebook had approximately 2.7 billion monthly users in 2020; the number of social media users totalled 3.6 billion in the same period and is projected to increase to 4.41 billion by 2025 (Tankovska 2021). This data indicates the penetration of the media in terms of its reach into the general population. Therefore, using social media for instructional and communication purposes in the higher education sector significantly impacts student communities through its reach, coverage and convenience (Zachos, Paraskevopoulou-Kollia and

[2] As of 21 December 2020.

Anagnostopoulos 2018). Indeed, some studies indicate that higher education students favour the use of social media tools for instructional purposes (Chugh and Ruhi 2018). Various studies have alluded to the many benefits of using social media in this context (Chugh and Ruhi 2018). One study revealed that the opportunity for efficient communication and collaboration among students and academics is one of the significant benefits of social media in higher education (Chan and Leung 2016). Further, social media use in higher education contributes to student satisfaction (Rahman, Ramakrishnan and Ngamassi 2020) and focused social networking activities positively correlate with student achievements and grades (Marker, Gnambs and Appel 2018).

The AIB experience challenges the view of Koranteng Wiafe and Kuada (2019), who argue that SNS do not facilitate knowledge sharing and, therefore, have no impact on student engagement. Further, it challenges the suggestion that SNS focus only on communication with the students but not on student engagement and collaboration (Alkhathlan and Al-Daraiseh 2017).

While the benefits of SNS for instructional and collaborative learning purposes are matters for further research, Kowalik (2011) argues that, given the apparent advantages in easy communication, educational institutions should use SNS to engage and collaborate with influential stakeholder groups such as current students, alumni and prospective students. Examples of the use of SNS by AIB to successfully engage with key stakeholder groups are given below, challenging the notion put forward in Chapter 1 that (At least for the major part) 'socialising is easier to do in the real world than in the virtual one'.

Initiative 3: Facilitated and Unfacilitated Social Media Community Groups

AIB's use of SNS for instructional and course delivery purposes is relatively limited; however, online interaction and networking among students is enabled through online forums and discussion-based webinars.

External to the official learning environment and administered with minimal moderation, AIB hosts forty-five private social media community groups for students and alumni. These communities are location based and subject and career focused. The communities allow students to connect, form relationships, seek and provide support and build confidence through the shared experiences of peers. Since the inception of the first group in 2014, this networking and engagement approach has been embedded in the learning journey, providing a balance between facilitated and unfacilitated peer engagement and support.

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AIB's private student communities on SNS grow on average by 1.7 per cent each calendar month, averaging 150–250 new memberships per month. The groups are adopted widely by working adult students for whom the collaborative approach to learning resonates well. This is unsurprising as AIB's students comprise autonomous learners who chose to study online for the flexibility and scheduling benefits.

Student engagement is supported through the organic nature of these groups, with AIB taking a light-touch approach to facilitation. They also benefit student retention, with participants engaging with peer groups for non-judgemental support and advice.

Institutional Benchmarking and Data Collection

Higher education institutions (HEIs) are engaged in complex marketing strategies at global, regional, national and local levels. Many compete to attract internationally mobile students who generate significant revenue (Blanco-Ramirez 2015), while others seek to attract more local students due to their different target audience. Consequently, brand building in the context of higher education has become critical to remaining competitive (Maringe and Gibbs 2009). Therefore, HEIs rely heavily on institutional branding to distinguish themselves from competitors and occupy a meaningful place in prospective students' minds. As part of branding strategies, HEIs also benchmark against competitors to determine and promote relative performance in terms of maintaining high academic standards and meeting the requirements of students and relevant industries.

The concept of benchmarking was initially introduced in the context of business to continually improve organisational performance (Henderson-Smart et al. 2006; Tasopoulou and Tsiotras 2017). This term was first used in the education domain in the UK higher education sector in 1957 (Jackson 2001). In the Australian context, the Australian Universities Quality Agency (AUQA), established in 1999, introduced the institutional review process so that educational institutions could self-assess their outcomes and measure their development needs compared to others (Henderson-Smart et al. 2006). Prior to this, Australian universities had maintained individualised quality assurance mechanisms to maintain and promote their educational standards (Henderson-Smart et al. 2006). AUQA was dissolved in 2011, and its responsibilities were transferred to the Tertiary Education Quality and Standards Agency (TEQSA). As an Australian higher education institution, AIB regularly benchmarks its programmes against other Australian higher education institutions to measure its performance and inform planning. AIB also seeks critical feedback from respective industry experts. Essentially, AIB promotes networking and social activities to achieve two important objectives: maintaining long-term, mutually beneficial relationships with alumni and industry and collecting benchmarking data. Related initiatives undertaken by AIB include the following initiative.

Initiative 4: AIB's Annual Alumni Insights Survey and Report

Since 2010, AIB has conducted an annual survey of all its MBA alumni to gauge their career progression since completing the MBA and to capture reflections on the value of the degree undertaken. The survey also provides AIB with valuable information regarding graduates' demographics, jobs and industries, skill sets and preferences regarding their ongoing engagement with AIB. The findings inform the annual AIB MBA Alumni Insights Report. The most recent 2020 survey received 482 complete responses, representing 7 per cent of the targeted alumni audience and providing a sound representative sample.

This initiative is highly beneficial to AIB's branding and marketing efforts because it helps develop a demographic and professional profile of alumni and, thus, identify our prospective student audience and how to reach them via our marketing. Understanding who our customers are and what they seek and value also informs the overall student offering and experience.

Initiative 5: Alumni Industry Panels

In 2020, AIB launched its alumni industry panel initiative with the creation of four panels attached to key academic discipline areas and one Customer Experience panel, which focuses on the overall experience students have with AIB – from first enquiry through to lifelong alumni membership. Panel positions were available to ten to fifteen graduates per panel. These panels help AIB harness the expertise of diverse and highly skilled alumni to consult on current trends and challenges within each industry. The insights from these panel sessions (held four to six times per year) help ensure that AIB's qualifications reflect up-to-date, real-world business practice and best prepare students for the future of business. The panels also provide an opportunity for proactive alumni engagement with AIB and for panel members to share knowledge, learn from others in their field and connect with peers.

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The alumni panels are one of AIB's most popular alumni engagement opportunities, attracting over 220 expressions of interest for the five panels, resulting in 70 alumni panel appointments. Led by discipline leaders, the panels have proven to be a highly engaging and mutually beneficial initiative, allowing alumni members to network, build their professional profiles and contribute to the future of AIB. The 158 alumni applicants who were not successful in their application have formed AIB's Alumni Reference Group, which provides a means for this engaged audience to provide input on a semi-regular basis, thereby promoting engagement with future initiatives.

The alumni industry panels help inform the future course curriculum in each discipline area and ensure that teachings reflect current business trends and practice. The panels also support AIB's alumni engagement growth and promote brand advocacy.

Institutional Further Learning Activities

A key goal of AIB's social activities and networking is to strengthen the relationship with alumni by supporting their lifelong learning. This goal is consistent with the institutional recognition of the social nature of learning. Collaborative learning opportunities offered to alumni are primarily informed by a community of practice (CoP) framework. Wenger, McDermott and Snyder (2002, p. 34) define a CoP as 'a group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment'. Alternatively, a CoP is viewed as a group of individuals with common interests and shared expertise, who share their knowledge and experience spontaneously, creatively and productively (Agrifoglio and Metallo 2015; Hou 2015). Wegner (1998) proposes three key dimensions of an effective CoP: mutual engagement, joint enterprise and shared repertoire. The quality of interaction depends on the strength of members' social relationships and participation in working activities. To create and manage a well-functioning CoP, an academic institution can play an important role in facilitating and promoting a cohesive community of alumni (through supporting networking and social activities), encouraging them to learn new skills, discuss professional practice, share ideas and seek support from peers and academics. Given that alumni wish to gain value from their engagement (Pedro, Mendes and Pereira 2020), the creation of effective collaborative learning opportunities is considered an essential part of alumni–alma mater relationship management that seeks to improve alumni loyalty. The literature suggests that loyal alumni will have both cognitive commitment and affective commitment to the alma mater and they will be willing to share experiences, provide material and non-material support to the alma mater and repurchase services offered by the alma mater (Iskhakova, Hoffmann and Hilbert 2017; Pedro, Mendes and Pereira 2020). Related initiatives undertaken by AIB include the following initiative.

Initiative 6: AIB Masterclasses

AIB's thirty-day Masterclasses are short courses on business topics that are pertinent to managers, leaders and professionals. The masterclasses provide an opportunity for MBA alumni to continue their learning with AIB in relevant topic areas. Through these short courses, AIB is able to extend and deepen the existing relationship with its alumni. Masterclasses also provide an intimate opportunity to grow one's professional network by undertaking the masterclasses alongside likeminded masterclass participants. The Business Consulting masterclass, which ran three times in 2019–2020, has been continuously favoured by AIB alumni. This is unsurprising as consulting is a common career path taken following the MBA (and 30.5 per cent of alumni insights survey respondents indicated owning a business). Masterclasses are currently AIB's primary non-award product. For AIB's alumni, the masterclasses provide a meaningful way to engage with lifelong learning and do so with a familiar provider.

Initiative 7: AIB Review

The *AIB Review* is AIB's quarterly industry publication that brings the expertise and insights of the AIB community regarding topical issues to alumni and the wider community. It forms part of AIB's commitment to delivering ongoing value to alumni and the wider student community; it does so by positioning AIB and its faculty as a force in modern business thought leadership. The *AIB Review* is distributed to alumni, current students and prospective students by email and on social media. It also invites comments and dialogue, thereby forming a dialogue rather than one-way communication.

The two editions published in 2020 – on the topics of COVID-19 and climate change – have attracted over 6,000 article reads, strengthening both AIB's public brand and the individual profiles of each contributor. This is highly beneficial to the school's reputation and credibility. In late 2020, submission access was opened to Alumni Industry Panel members;

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in 2021, this has been extended to all alumni – providing them with the opportunity to have their writing and industry insights published by AIB. Though not a direct networking outcome, it provides an opportunity to grow networks through professional branding outputs.

Conclusion

Drawing on our extensive experience of using networking and social activities in delivering higher education, this chapter has stimulated reflection on the principles that frame associated activities such as student-centred institutional networking and engagement initiatives, networking opportunities using social media platforms, institutional benchmarking and data collection and institutional further learning activities. By highlighting evidence-based best practices for the use of networking and social activities in higher education, our experience, insights and conclusions in this chapter have addressed a range of pertinent questions regarding the extent to which social activities should be facilitated by the institution, be self-initiated and administered by students or alumni themselves or be a hybrid of the two. The discussion of a range of traditional and innovative initiatives undertaken by AIB and the response and outcomes have demonstrated that the latter is an effective approach. We have offered a lens through which to explore the rise of networking and social activity in higher education. Our long experience of online delivery and network development ensures that the insights offered in this chapter can be usefully adapted by others seeking to establish ecosystems and networks to support their student and alumni bodies.

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CHAPTER 17

Students' Social Networks in a Digitalised and Multicultural World

Abel Ebiega Enokela

Online higher education has made education highly accessible to people from different parts of the world. Technology as an agent of transformation and interconnectivity has taken higher education to a lofty height but not without attendant challenges resulting from some negative impacts on learners. Even though educational technology has gone a step ahead in making curriculum design and lecture delivery as interactive and attractive as possible, students may still be missing a great deal in their overall development and fitness into the world at large. Stewart (2013), while commenting on the rising platforms of Massive Open Online Courses (MOOCs), posits that there were visible emerging disruptions in the educational sphere as aftermaths of the proliferation and massification of online studies. These developments mean that the ascendancy of digitalisation in the educational sector, though with many benefits, has created significant disruptions, thereby changing the texture of education universally. Increasingly, the impacts of digitalisation and universalisation of education are getting stronger with the deployment of artificial intelligence into the sector. The COVID-19 pandemic has also hastened the process of online education as conventional universities are even embracing it as an alternative to face-to-face teaching being a measure for curtailing the spread of the coronavirus. The questions that come to mind are as follows: Can online education platforms successfully replicate the same quality of education obtainable in traditional or conventional education campuses? Wouldn't students' social network processes be jeopardised with the rising digitalised education being churned out to students? Perhaps, students still need to be in physical contact with peers and college/university staff to fully feel the impact of higher education in building strong networks and relationships that can stand the test of time. Education entails three domains: cognitive, affective and psychomotor domains. With the rising trends of online classes, is education not tilting more towards stimulating the cognitive domain? What happens to the affective

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skills like leadership skills, interpersonal skills, courtesy and affection, which can foster bonding among students and staff? What do we say about psychomotor skills like sports, dancing and singing activities that can strengthen students' social interactions? Can Edtech or artificial intelligence maximally address these concerns? The need to explore these questions critically to forecast what the future holds for online education and the challenges of students' social networks, interpersonal relationships, attachments and socialisation processes in a multicultural world is urgent to provide a platform for the enhancement of policy evaluation and formulation for digitalised higher education globally. There are rising cases of depression and suicidality attributable to loneliness and non-existing physical interactions among peers. Thus, social networks, bonding and attachment amongst students can serve as antidotes to loneliness and depressive moods that could be associated with prolonging physical distancing from peers, a feature that seems to have overwhelmingly dominated the digital education space. Worrisomely, while digital education continues to enjoy accolades and documentaries of success stories, there seems to be a lack of scholarship pointing to areas the system is wreaking havoc on holistic education. Therefore, it is time to take a critical look at digital education to identify gaps in the system for improvement or adjustment to sustain the objectives of holistic education in an emerging multicultural global village that is yearning for educational internationalisation and inclusivity.

In this multicultural world of ours, students come from different parts of the world to establish relationships with others from diverse sociocultural backgrounds. Pursuit of education on higher institutions' campuses has led to students coming in contact with life partners. It has created a better understanding of other people's cultures, leading to enhanced intercultural competencies. Students' campus social network has also boosted peace and increased bonding among international students and their schools. Campus activities like students' unionisms, club meetings, beauty pageants, dance competitions, congregational religious worships and many other non-lecture room social engagements have created robust invaluable multicultural and intercultural experiences for international and intra-national students in most conventional higher institutions of learning. These activities that can expand students' social networking scope for socialisation, mental health and fun are not usual features of an online educational system. Social media have enhanced access to communication through e-platforms like Twitter and Facebook and aided online students' social networking activities.

Nevertheless, this seeming social networking breakthrough orchestrated by the revolution of social media platforms is still insufficient or inadequate to create the much needed optimisation of social networks, attachments and bonding required to foster students' psychological and social well-being. The multicultural nature of students may be difficult to appreciate in an online educational setting because of limited access to interpersonal relationships. Hence, the need for social and interpersonal platforms that can bring students together physically to shape their multicultural worldviews to enhance tolerance, peaceful coexistence and international and intra-national connectivity that can culminate in a decent global village is a sine qua non. The success of higher education should be hinged firmly on adaptation to social changes and challenges emanating from diverse societies and aspirations of students from various parts of the globe. These emerging challenges should place in the hands of higher education service providers the responsibility of incorporating multicultural factors into educational services. Therefore, to have a kind of education that celebrates inclusivity, multiculturality and interculturality, higher education service providers should create avenues that would bring students together physically with fellow students and staff to interact, cross-pollinate and co-develop ideas that can enhance immediate and futuristic psychosocial benefits.

Considering the preceding, the concern or objective of this chapter is to look at the social networks of students within the context of a digitalised higher education system. This study is a conceptual piece. 'Conceptual piece focuses on integrating and developing relationships among constructs. Thus, the onus is on developing logical and complete arguments for associations rather than testing them empirically' (Gilson and Goldberg 2015, p. 127). Hence, this study attempts to create a new perspective in digital education within the context of prioritising students' social networking processes as key elements needed in a holistic educational system. Holistic education has to stretch beyond digitalisation boundaries to meet its overall objective of raising men and women with the right quality and quantity of education that fits the challenges of today's emerging issues of multiculturality, interculturality, humanness and personhood.

The Concepts of Digitalised Education, Social Networks and Multiculturalism

The three primary concepts in this study – digitalised education, social networks and multiculturalism – need to be explained in line with the

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objective of this study for better comprehension and appreciation of the philosophical frameworks behind the position of this modest contribution to knowledge.

The Concept of Digitalised Education

Digitalised or digital education can be defined as online teaching and learning processes through educational technology. It is an open pedagogical model which interfaces both learners and teachers through online mechanism without physical interactions. The Institute for Academic Development, University of Edinburgh (2018), posits that 'digital education is the innovative use of digital tools and technologies during teaching and learning, and is often referred to as Technology Enhanced Learning (TEL) or e-Learning'. Online pedagogy as a technologically dependent form of education requires a certain level of proficiency in online devices by both teachers and learners. There are many types of online education like SPOCs: small private online courses, SMOCs (synchronous massive online courses) and MOOCs (the Massive Open University course), to mention a few of them. There are also many online education providers such as Coursera, edX and Udacity, to mention a few. MOOCs and SPOCs platforms have brought about a revolutionary trend to educational sector (Kaplan and Haenlein 2016). It is good news that online education is universalising higher education due to its accessibility, flexibility and, perhaps, affordability.

Additionally, digital education has equally conquered 'distance' which used to be one of the greatest challenges to international education. Educational technology or Edtech has potentially made digital education available to a great extent. Edtech can be very helpful during educational crises (David et al. 2020), especially during a pandemic era like COVID-19. Nevertheless, holistic education still needs to carry other vital ingredients to make it effective in the real world. Thus, it is safe to postulate that virtual education can lead to a scarcity of social and interpersonal skills that are harvestable, usually through physical contact with fellow students, teachers and staff of institutions of higher learning.

The Concept of Social Networks

A proper grasp of the concept of social networks or social networking would serve as a good foundation for this study. The social network has been variously defined by many people depending on their ideological leanings. For some, a social network means a site designed for communications for a group of people with a common interest. According to TechTarget (n.d.), 'a social network is a website that allows people with similar interests to come together and share information, photos, and videos'. Social network as a term seems to have acquired a relatively narrow definition in some quarters because of the great impact of social media platforms like Myspace, Facebook, Twitter, YouTube, LinkedIn and more on social network connectivity and interactivity. However, in its broader and logical sense, a social network can be seen as an interactive social structure or process consisting of people linked together based on common goals, values and interests. In other words, as a sociological construct, it refers to social relations among a network of individuals who interact to achieve shared interests and values. This definition is receptive to both digital and non-digital communicational channels as means of a social network.

Nevertheless, at this point, it is pertinent to conceptualise and operationalise our definition of a social network within the interest and scope of this chapter. Hence, a social network is operationally used in this chapter to refer to a composite of physical interactivity and connectivity among learners of higher institutions of learning. Having clarified the position on the definition of social network in line with the philosophical framework of this contribution, it is also necessary to take the argument further by postulating that digital disruption on higher education has intensified artificial peer interactions and engagements, which lack the originality and the psychosocial dynamics that can ignite the type of socialisation competence that is required to help students to acquire adequate interpersonal skills for the real world. Inasmuch as we applaud technological advancement, we should also look at the aftermaths birthed by it and be concerned about the immeasurable psychosocial values that are being eroded by it. Johann Heinrich Pestalozzi, a Swiss pedagogue and education reformer, once stressed that teaching has to stimulate one's head, heart and hands, meaning teaching should be a proportionate composition of cognitive, affective and psychomotor domains of learning (Gazibara 2013).

The Concept of Multiculturalism

Multiculturalism is a concept referring to the integration of different cultures of people irrespective of race or colour. According to the International Federation of Library Association and Institutions (IFLA

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2020), 'multiculturalism is the co-existence of diverse cultures, where culture includes racial, religious, or cultural groups and is manifested in customary behaviours, cultural assumptions and values, patterns of thinking, and communicative styles'. Multiculturalism thrives on the notion of cultural pluralism and equality among diverse groups. The key element in multiculturalism is respect and identity by people within the community where the tenets of multiculturalism are upheld. Multiculturalism abhors racism and any form of dehumanisation.

Closely connected to multiculturalism is 'interculturality', which, according to Dietz (2018), refers to 'the relations that exist among diverse majority and minority constellations in a society, not only of cultures but also of ethnicity, language, religious denomination, and/or nationality'. The concept of multiculturalism is essential to this chapter because successful higher education must address multicultural and intercultural development to create exposure for students' social needs to increase their interactive competencies.

Multiculturalism has a role to play in students' socialisation processes and should be taken very seriously. Students in online platforms do not come together in the real world to understand one another, as do students of regular campuses. This could create a gap in terms of multicultural and intercultural competencies among such students. Students without multicultural competencies are unlikely to fare well with people of different cultures because of their lack of exposure to real campus life. They may not be able to learn cultural tolerance through physical interactions with peers from diverse regions. Education should go beyond mere impartation of knowledge to impact the social lives of its beneficiaries.

Education as a Means of Fostering Students' Social Networks in a Multicultural World

Holistic education transcends academic activities and touches other vital areas like social network activities that can bring students of diverse backgrounds together. Interactions of learners help them to build relationships that could enhance better quality of life. Students' social networks in higher education of learning can create lasting impacts on students and put at their disposal opportunities for social adjustments and multicultural integrations. Although pandemics tend to make students' peer interactivity unattractive because of social distance requirements, it is still not in the nature of individuals to remain totally isolated from peers who share values and interests together. Prolonged social isolation, or lack of being in physical contact with fellow students, comes with a mix of psychological distresses, which can impede emotional stability and warmth. One may argue that students of digital education platforms still have physical contact with peers around them. Still, it must be noted that peer interaction with those who are not students under the same educational programme is unlikely to satisfy the underpinning fundamentals in students' peer social engagements. Thus, such peer interaction lacks full substitutionary potentialities for students' socialisation needs. Ettekal and Mahoney (2017) postulate that youth who engage in organised out-of-school activities such as sports, academic clubs, service projects and faith-based groups reported positive social, emotional, psychological and physical benefits than those who did not. This finding strengthens the fact that campus students are more likely to develop a sense of togetherness which could translate to affection and mutual love among fellow students than their online counterparts who have limited access to students' peer activities in the real world.

One of the social activities that can positively impact on campus students is leisure participation. Students' leisure time creates valuable time for interaction and bonding among students on campuses of higher learning. Zerengok et al. (2017) observe that leisure time participation enhances socio-cultural benefits among international students in a multicultural campus. The qualitative study investigated the benefits and impacts of active leisure participation on the social adjustment of international students in a mid-size metropolitan university in Manisa, Turkey. The findings from the study revealed, among other impacts, sociocultural benefits of acculturation, socialisation, sense of belonging, academic success, networking, excitement and psychological support. The study's findings are a testament to the fact that physical social networks among students in higher institutions can enhance mental health and overall social adjustment. Thus, social networking among students is a viable antidote to many psychosocial disruptions that can emanate from physical isolation from peers. This stresses the fact that students of online platforms are likely to be grossly limited in benefitting from networking with peers for optimal bonding among them. The fact remains that students of the online extraction do not participate in leisure together maximally and are thereby denied the opportunity of benefitting from one another psychosocially.

Similarly, Yang and Chau (2011) also observe in a study involving forty-two freshman Chinese students at a Hong Kong university that active social engagement in social activities in the university by the students led

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many of them to the attainment of some valuable competencies, including interpersonal and collaborative skills, self-confidence, open-mindedness and independent judgement and making of new friends. The researchers stress that most of the forty-two participants in the study were actively involved in out-of-class activities. Conventional universities avail students the opportunity to interact with one another in a very supportive way. Digital education, with all its technological advancement in artificial intelligence, is yet to maximally fill the gap of meeting students' psycho-social needs through social involvement. Thus, educational benefits that are firmly domiciled within the domain of students' social networking, interpersonal skills and other social competencies in conventional campus education are still elusive with digitalised education since it keeps its beneficiaries away from physical contact. Social involvement creates exposure to students' diverse cultures, opens the door for talent development, promotes social interactivity and integrations among students. Entertaining activities like games, dance and singing, which can help students relax, are common features of conventional campuses.

Students' union government as a forum for students' sociopolitical relationship has consistently helped students develop skills that can sharpen leadership proficiency and enhance the courage to rise to challenge perceived injustice on campuses. Students under the umbrella of student unionism learn the tenets of governance that can be viable tools for good governance which can help them even after graduation. Wonah (2019), while writing about student unionism in Nigeria, stresses that the students' union government is a students' organisation present in many colleges, universities and high schools with its own building on the campus and committed to students' representation locally and internationally. On a global scale, the students' union body has helped to resolve social and cultural conflicts among students, thereby serving as a reconciliatory mechanism to bring students of diverse cultural backgrounds together through dialogue. Hence, students' social network activities through students' unionism can lubricate intercultural fabrics among students in a multicultural higher institution.

The interpersonal relationship of students on conventional campuses can help to reduce communication and language barrier problems. Research findings suggest that students from different regions and cultures have been observed to experience communication and language barriers in distance learning platforms (Hallberg and Wafula 2010; cited in Berge 2013) because such students do not have access to qualitative peer interaction, which could help to minimise the challenge of social connectivity.

Although language and communication barriers exist in conventional campuses, the level will be relatively low because, through constant social engagements, students in conventional campuses could adjust and improve their communication and language skills.

Many activities bring students of conventional higher institutions together to boost their social networking in the real world. Involvement in these activities physically has a higher level of impact on students. For instance, activities like dancing, singing and religious worship sessions bring students together emotionally. Participants of dance can feel exceptional emotions and expressions of powerful feelings as they move their bodies rhythmically to music that touches their souls. Thus, dancing among students is a form of nonverbal interaction that could produce joy, unity and affection. Students' religious activities on campuses have been noted to be strong influencers of connectivity among them. According to Alyssa (2007), college students' involvement in campus religious activities can impact their psychosocial adjustment and development in terms of cultural awareness, social integration, academic success, cultural well-being and spirituality.

Findings gleaned from research and personal experiences of students of conventional campuses establish an avalanche of evidence supporting the necessity of students' social networking activities to enhance multicultural and intercultural interactivity and connectivity. Students' bonding and attachment processes are hinged on stimulating activities that are related to their psychosocial environment. Education prepares individuals for the world of work and other facets of life. Therefore, effective education must espouse to qualitative materials that can help individuals fit into the larger world with challenging complexities occasioned by the constant change in human behaviour.

Sustaining Social Networks of Students in a Digitalised and Multicultural World

Digital education has come a long way and has fast-tracked the much-expected universalisation of education. From the comfort of the office or home, education can be accessed. This is a laudable technological achievement. However, it is expedient to emphasise that digitalisation has created some disruptions and gradually the original blueprint for holistic education would become forgotten history. Students' network activities and interpersonal fabrics are being affected by educational digital disruptions.

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Operators of online platforms of higher education need to evaluate the colossal damage to students' social networking as a result of physical distance of learners and work out modalities that can help to raise the bar in favour of students' connectivity to bring them close to the real world rather than being stuck in a world of artificiality. Online education may be relatively effective in terms of lecture delivery, but there are challenges of inclusivity in terms of addressing the multicultural diversities of learners and their socialisation processes. Furthermore, students' involvement in social activities helps them to attain affective and cognitive development. Hence, institutions of higher learning should make provision for students to meet one another for friendships and understanding of one another to enhance positive relationships. Chickering and Reisser (1993), cited in Alyssa (2007), notes that students' communities should create enabling competent environments for interdependence, purposefulness and congruence. They further stress, among other things, that students' communities as a means of students' development, should encourage regular interactions among students and support ongoing relationships, provide platforms for collaboration, be small enough to make every member feel important and include all people from diverse sociocultural backgrounds (Chickering and Reisser 1993; cited in Alyssa 2007). The postulations of these researchers capture succinctly what holistic education should look like. Peer relationships can help socialise an individual through interpersonal interactions, which can be considered very important for an individual's social development, especially among adolescents (Little 2020). The position of Little (2020) strengthens the fact that peer interaction has a lot to offer students, even at the level of higher learning. A holistic higher education platform should promote the development of cognitive, affective and psychomotor domains of learning in equal proportion. Comprehensive pedagogical structure must be oriented towards students' benefits which is a major objective of education. Gordienko, Sokolova and Simonova (2019) assert that the objective of pedagogy is to educate an individual with social value, internal freedom, high moral and spiritual development which is composed of ideas of freedom, humanism, social justice, truth, goodness and beauty among others. These qualities are difficult to attain through an educational system that is mainly digital in nature without students' physical interaction.

Having established the essentiality of physical interaction and social network of students in higher institutions of learning with their multicultural benefits, it is important to look at some practical steps online education service providers can take to help online students of higher learning to acquire the expected education that can help them to fit into the larger society properly. In the first place, online education service providers should come together as a team to look at the issues of students' social networks and interactions with the intent to address the educational gap embedded in a process of raising students without social interactions. Digital educational providers could have a blended approach to improve students' socialisation needs. Students from various regions of the world, based on agreed modalities, could be encouraged to have frequent activities that will physically bring them together to network and interact to establish fruitful relationships. Similarly, matriculation and convocation ceremonies should be conducted with students being together in various groups with representatives of their schools in attendance. Besides, there should be a central online transmission or broadcast of such ceremonies from all the groups for students to link up with their colleagues. This is a blended approach, where there are a bit of physical contacts among students in various regional groups. Social media platforms like Zoom, Cisco Webex and so on can be used to link all the groups together for all students to have a feel of one another. It is advisable for online service providers to have special arrangements with conventional colleges and universities to allow their online students to participate in social activities like sports competitions with campus students on regular campuses.

Online education service providers should keep pace with technological advancement to make students' online interactions more effective to complement regular physical activities that should be in place for students' social networking functionality. Virtual world platforms can help individuals interact with one another like real life (Kaplan and Haenlein 2010), which could be deployed to create interactions among students. Multicultural consciousness should reflect in all online education platforms to boost a sense of belonging and inclusivity. Succinctly, 'technologization and digitalization should not be approached as a goal in themselves; digital transformation processes should be based on universal human values and preserve the unique sociocultural code of a nation' (Gordienko et al. 2019, p. 970).

Digitalised education has become a 'necessary evil' that must cohabit with us because of its transformational potency in the education sector despite its disruption. Hence, service providers of online education should design action plans for implementation to flatten the curve of this disruption in relation to students' network activities that could enhance holistic education.

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Conclusion and Recommendations

This chapter looks at students' social networks in a digitalised and multicultural world. The main thrust of this effort is to present an argument in favour of prioritising students' social networks to enhance effective adaptation to a world yearning for multiculturality, interculturality and inclusivity. It is pertinent to acknowledge that digital education has revolutionised academia; but as clearly stated in the general introduction of this book (Chapter 1), we should avoid altering everything about conventional universities since 'all change is not growth, as all movement is not forward'. Therefore, the online academic world needs to make some reformations beneficial to digital transformation efforts. Hence, emphasis in this chapter is on holistic education, which should appeal to students' cognitive, affective and psychomotor domains. Digital disruption seems to stand in the way of holistic education as physical contact of students in an educational plan is very important for their psychosocial development.

Recommendations are necessary to address digital disruptions in education as related to students' networking activities. Therefore the following suggestions are recommended to advance digitalised education in a multicultural world:

- Educators and online service providers should work out modalities that will enhance effective online education with the understanding that physical contact of students is important and should reflect in teaching and learning processes and curriculum content.
- Educators of online courses should be conscious of the diversities of cultures of online students and avoid portraying racial inclinations or tendencies in study materials.
- Government educational agencies or ministries should formulate policies that could uphold holistic education at all levels. Monitoring and quality assurance teams should ensure online education service providers have a rich plan to enhance students' social networks.
- Educational technology manufacturers should consult education stakeholders widely before manufacturing any educational digital devices to ensure the inclusiveness of stakeholders.
- Students should consult experienced counsellors with a robust educational counselling background before enrolling for educational programmes, including online education. This will help students to choose education programmes that will align with their personality structures. The academic counselling session will cover areas like personality traits

which can reveal a lot about the personality mix of an individual. Introverted students are likely to fare better in digitalised educational approach than their counterparts who extroverted.

- Counsellors also need to support students who have already chosen a digitalised education mode to prepare them emotionally for the mode of study they have chosen. Counsellors should advise digital education students to engage in interactive activities with students in conventional campuses as a substitutionary strategy to deal with loneliness and depression that could be associated with prolonged physical distancing associated with digitalised education.

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CHAPTER 18

Universities' Online Networking Operations
Expectations and Perceptions

Xianghan O'Dea

As described in Chapter 1 of this book, making new friends and developing social connections is considered a key part of students' university experiences, and university campuses have traditionally been the social hubs for new and existing students. However, the COVID-19 pandemic and the associated campus closures have forced universities worldwide, including in the United Kingdom, to move to online teaching in a rapid manner (Kaplan 2021). As a consequence, students have had to communicate and network with each other predominately online (Watermeyer et al. 2020). The situation is particularly challenging for first-year students, due to the fact that they are new to the university environment and have not yet managed to establish their social circles. Many UK universities may have already provided alternative social events online. However, it is unclear how effective they are in supporting year-one students' social development.

Even though there has been a large quantity of studies exploring the impact of pandemic on higher education – the focus is on the effectiveness of online learning and teaching – little attention has been devoted to students' social development during remote learning. Gaining an in-depth understanding in this area is highly important, because students are likely to suffer from negative feelings, such as loneliness, distress, anxiety and depression, if they are unable to develop a desired level of social interactions with others (Margalit 2010). This consequently may have a significant impact on their academic performance (Clark, Algoe and Green 2017).

This study aims to close the gap and make a contribution to the literature by developing an in-depth understanding of the effectiveness of one UK university's online networking operations from the students' perspective. It seeks to answer the following questions:

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- How effective are universities' online social and networking events in supporting year one students' social development during online learning?
- What are the main causes to the difficulties these students experience regarding their social development?

Social Connection

Social connections refer to the feeling of belonging in a group and of closeness with other people (Inagaki 2018). Due to our social nature as human beings, developing and maintaining social connections is essential for our daily life and our society (Petersen, Fiske and Schubert 2019). There are different types of social connections. Some are intimate, such as family and best friends, and some are more distant, such as nodding acquaintances. Research shows that well-being is associated with both quality and quantity of social connections, as they help reduce social and emotional loneliness and give support and help to cope with stressful and challenging situations (Sun, Harris and Vazire 2019; Ortiz-Ospina 2020). This consequently leads to a happier and healthier life (Holmberg 2014).

To help build positive social connections, individuals need to develop better and more effective communications with others. A number of factors, such as proximity and nonverbal cues, trust and rapport building and self-disclosure, are considered particularly crucial for this purpose (Clark, Algoe and Green 2017).

Proximity and nonverbal cues are commonly associated with face-to-face interactions. The former describes the physical distance between people during their social interactions, and the latter refers to visual cues, such as tone of voice, facial expressions, body language and hand gestures. A study conducted by Allen (1977, 2006) explored the relationship between the frequency of social interactions and proximity, within both face-to-face and digital communication scenarios. The Allen curve, which has been tested and supported by many studies (McElhaney 2019; Ball 2020), claims that individuals tend to socially interact more with those to whom they are in close proximity (five feet vs. fifty feet). In addition, it appears people who have regular face-to-face social interactions are more likely to keep the same level of contact through online communications (Waber, Magnolfi and Lindsay 2014).

Building interpersonal trust is viewed as an essential precondition for effective social connections and is equally important for online and face-to-face communications. It is believed that the trust developed through face-to-face communications can be transferred to the online environment (van der Werff et al. 2018). However, it is more challenging to build trust through online communications only, due to a lack of personal contact and personal touch (De Vries, Van and Peters 2018; Sheffi 2020). Therefore, individuals are advised to make more effort if they wish to develop trust and increase engagement online, such as taking the initiative to introduce themselves, paying more attention to the verbal and nonverbal cues and adopting rejoinders to statements/comments (mmm, interesting, or I see) or making regular eye contact to show engaged listening (Snow 2007).

Self-disclosure refers to the personal information that one voluntarily shares with others through face-to-face or online communications, and is interlinked with trust. The extent to which individuals wish to self-disclose (breadth and depth) has a direct impact on social intimacy and closeness, as it helps prompt a similar level of self-disclosure from other parties and consequently increases trust (Taddei and Contena 2013). On the other hand, once they have established trust through interpersonal communications, individuals are more inclined to self-disclose. Research also shows that people with weak social skills tend to find it easier to self-disclose through online social networks, because this type of communication does not require in person contact and they can remain anonymous (Ledbetter et al. 2011).

Social Communications among University Students

University students seem to socialise with others through both in person and online interactions. For example, they form their social networks and make close friends when attending on-site social events and activities organised by the university and their academic departments, in addition to attending the timetabled teaching sessions on campus. Year-one students are also offered additional social activities during welcome week. These activities are intended to help them better settle into the new environment and build the initial social bonds (Buckley and Lee 2018).

During their time at the university, students are also keen to use social media apps to share information, organise meetups and share personal experiences (Ledbetter et al. 2011). Through this type of digital communication, university students are able to gain the social support they are looking for as well. Statistics suggest that the most popular social media websites and apps among young adults (ages fifteen to twenty-five) in the

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United Kingdom are Facebook (82 per cent), WhatsAPP (79 per cent) and Instagram (76 per cent) (Statista 2020). Their enthusiasm towards social media is caused by the fact that they grew up with mobile phones and are used to using digital communication technology in their daily life.

Methods

This study adopts case study as the methodology, exploring the experiences of a group of year-one students studying in a regional UK university, with regard to the effectiveness of the university's online networking operations. It used semi-structured interviews to collect data. Ten participants were recruited to take part in the research using a volunteer sampling strategy. The participant recruitment email was disseminated to the sample population (the current year-one students studying at the university between 2020 and 2021) before the start of the data collection.

All interviews took place online using Zoom, and each interview lasted between forty to sixty minutes. In order to build trust and limit the effect of any power relationship, the researcher arranged a short pre-interview Zoom meeting (approximately twenty minutes) with all participants. The intension was for both parties to introduce each other and also for the researcher to provide a brief explanation of the research to the participants. At the start of the interviews, permission was asked and granted for the researcher to audio record the interviews.

The interviews were subsequently transcribed and thematic analysis was carried out using first and second coding methods. During the first cycle coding, the researcher read through the transcripts and the memos she had written after the interviews and then began to annotate the transcripts, identifying the key areas emerging in the interview transcripts (Bengtsson 2016). The second cycle involved grouping and developing the initial summaries and key areas into categories, and then themes, and also an understanding of the key story the data were trying to show.

Results

This study explores the effectiveness of universities' online networking operations through the lens of students. The findings in this section answer the first research question: How effective are universities' online social and networking events in supporting year one students' social development during online learning? The data indicate that the participants on the whole realised they were in an unusual situation due to the

COVID-19 pandemic but were still keen to 'meet new people and make new bounds' (Participant 4) when they arrived at the university. Some said, in particular, that they considered the first year of their studies 'the best opportunity to look for long term friends' (Participant 3), since coming to university is 'a new chapter in my life' (Participant 9). However, the reality seemed to be different from what they had expected, as they felt that they were unable to develop a sufficient number of social contacts and were also unable to build strong friendships (quantity and quality).

A Lack of Sufficient Social Contacts

At the time when the interviews took place, the year-one students were two-thirds of the way through their first semester. Almost all participants commented that they were 'feeling a bit disappointed' (Participant 10), as they did not get to know as many year-one students as they had expected. Consequently, many reported that they were feeling lonely, and/or depressed.

> It has been ten weeks [since the start of the semester], and I still don't feel like I know anybody on my course. To be fair, I am feeling quite lonely. (Participant 7)

> I don't have any friends here, and am feeling depressed, because I have nobody to talk to. Most of my housemates have gone home, I think I will go home too. It is pointless to stay [in my accommodation]. (Participant 5)

On the one hand, it appeared that the university did not provide adequate online networking opportunities. For example, when they first arrived, the participants reported, apart from providing a freshers' messenger group on Facebook (as discussed below), there were hardly any university- or department-led online social events during the welcome week.

> I was looking forward [to the welcome week]. I was ready to come out. [However], most of them (the events) ended up getting cancelled. . . I don't recall there were any online events though. (Participant 3)

> There weren't really any online ones [to put in position to replace these face-to-face activities]. (Participant 1)

After the teaching started, there did not seem to be many online extracurricular activities either. And if there were any, many participants commented the university did not promote them effectively among students, so that they were left alone to explore and find the information themselves.

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> No, I haven't received emails for stuff like online events. I think they send emails only for physical and in person stuff [that takes place] locally. (Participant 6)

> I don't think I received any emails for online events. . .I don't know where to find the info to be honest. (Participants 2)

Nevertheless, one participant (Participant 4) appeared to have a different experience. She mentioned that she attended a few online events organised by the Students' Union. She also joined two societies – singing and cheerleading – and attended a number of Zoom-based virtual society events, which, she felt, helped her get to know other students.

> We're doing different things. So we've done like a music quiz, and we've done a movie night where you can join all of your laptops to watch a film at the same time, and talk to each other about what we're watching and things like that. So there are lots of different social aspects out there. (Participant 4)

The participants admitted that these events were not widely publiciSed. However, she said, in the context of online teaching, it was important for students to take initiative and make better preparation before starting university, if they planned to make new friends.

> These societies weren't widely shared this time because of Covid. . . I decided before I came here, [in terms of] which societies I was going to join, so it was a bit easier for me. I just joined straight away and then I got involved in the social stuff. (Participant 4)

On the other hand, almost all participants reported their module tutors made little effort to help students develop social connections during online teaching. For instance, there did not seem to be any activities to assist them to break the social barriers at the start of the semester.

> When we first started doing our course [online], we didn't have any ice-breakers or team building [activities]. For example, there was no introduction like who's on the course, and what's everybody's name. (Participant 4)

Because their initial contacts were carried out online, and also because they were not familiar with each other, the students remarked that they could not fully take advantage of the social side of collaborative learning, even though they had online group discussions regularly (via the breakout rooms).

> In one module, they (our tutors) put us into groups in seminars, but it's not a social thing, [because] we don't know each other. . . We only get the questions answered in the group, and it's all. (Participant 8)

> I don't know these people. [Therefore] we know we all just have got to do the work, and got to do the assignment. We don't really socialise through that. (Participant 3)

Based on the comments of the participants, it seemed that at the institutional level, there was a lack of opportunity and support for year-one students to establish their social connections, both inside and outside the formal online teaching sessions. As discussed below, the university needs to understand the needs and expectations of year-one students and also to adopt a more effective way of providing more online events, as well as promoting the existing events.

Superficial Digital Friendships

The participants said that apart from attending online teaching sessions, they met others mainly through group chats (digital text messages) on social media. The common platforms reported included Facebook Messenger, WhatsApp, Snapchat and Instagram. Among the groups they were involved in, some, such as those for their halls of residence, and freshers and were created by the accommodation providers, or the Students' Union, were open to all year-one students. They were big and often 'had more than 100 people' (Participant 4). Some were created by students, and were often very small, and might 'only have several people' (Participant 5, Participant 8).

The students preferred to use these social messaging apps because of familiarity and also because these apps were convenient and flexible.

> I have the apps on my phone … I can use them anytime as I want to. (Participant 1)

> Sometimes I am busy, and sometimes I don't want to sit behind my phone all the time. I will reply [to the messages] when it suits me. (Participant 6)

Their engagement with social media seems to support what has been identified in the literature. Young adults are highly competent in the use of mobile technology and devices. They prefer using social media as the main information and communication channel because it is easy to use and access and also reliable (Dhir, Kaur and Rajala 2020).

Nevertheless, the participants on the whole considered the new people they met through online chats as merely acquaintances and those with whom they did not manage to develop close friendships. For example, they said that they knew very little about these new contacts, the conversations

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were very formal and often revolving around their academic work, such as the module assessments and lecture content.

> I [mainly] talked about work related stuff, because I suspect that we've got a way up to [go] to build up our relationships. I think it is going to be awkward to bring up the personal side of things until we have the opportunity to socialise in a social environment, and to get to know each other better. (Participant 7)

The difficulty in establishing interpersonal trust appeared to be a major barrier the participants were facing for building stronger and deeper friendships online. This might be because, as shown in the literature, the group chats offered no physical proximity or nonverbal cues, which were considered by the participants highly essential in helping them develop a good understanding of the individuals that they were communicating with and subsequently see their real personalities underneath.

> I probably won't recognise those on my module if I met them in person, because I don't get to see the faces so I can't put a name to the face. (Participant 9)

> I can read people quite well to know whether I can trust them or not [when I speak to them face-to-face]. But I cannot see their faces or hear their voices when messaging people online. (Participant 2)

As a result, the students said that they did not seek social support from the new friends they met online and were reluctant to open up to expose their real thoughts and feelings.

> It's difficult because I haven't met them. You don't know what they're like in person. (Participant 7)

> I don't trust people very easily. I prefer to meet someone [first]and kind of gauge what their personality's like before I open up to them. (Participant 4)

The situation the participants were in might also be because they were not willing to communicate with the new contacts using live video chats. In fact, when they were attending their online lectures and seminars, most participants said they chose to keep their camera switched off.

> The thing is that I have never spoken with these people before. I don't know them. For me, it just doesn't feel comfortable [to do a video or audio chat]. (Participant 2)

> I think my class is so shy when we do online things. Only one or two people will turn their camera on. (Participant 10)

The main reason, as discussed already, was that the participants preferred getting to know others first through in person contacts. In addition, some participants commented, it was because of the feeling of awkwardness or invasiveness.

> If I was the only one to turn my camera on and everyone else had the cameras off, it'd be very awkward because I'd be talking to a load of coloured blue blocks. (Participant 4)

> I feel it's invasive. You know if you sat in a class, you're on your table and everybody's there. But I think when you've got your camera on, you don't know who has and who hasn't and what people are doing. You are kind of open to insecurity. (Participant 5)

Nevertheless, it is worth pointing out that live video chats could potentially help the students form initial trust with others because they provide proximity to some extent and also some nonverbal cues, since both parties can see each other's faces and/or listen to each other's voices.

Discussion and Recommendations

The findings reveal that this group of students, while they were studying predominately online, did not manage to develop as many social contacts as they wished to, and/or form strong social relationships with others during their first year at university. The participants were not happy with the situation and felt that they were thrown in at the deep end.

Evidence of the positive impact of having a variety of friends on individuals' well-being seems to support what has already been identified in the literature. However, evidence of the difficulties and challenges the participants were facing regarding making friends online was not fully expected by the researcher, as most published studies show that keeping in contact with one another using social media apps on either learning and/or social activities is the norm in university students' daily life (Ledbetter et al 2011; Kaplan and Haenlein 2016). This view appears to be supported by the findings above. In this respect, it is important and necessary to explore the reasons for the situation the participants were in, so that the university can provide more appropriate and effective support and the students can better prepare themselves in future, especially if they met similar situation. Hence, the discussion section answers the second research question: What are the main causes to the difficulties these students experience regarding their social development?

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The findings suggest the main reason to be a lack of adequate help and support at the institutional level, with regard to in-person and online communications. For example, almost all participants reported that they were offered hardly any opportunities to meet other students in person. However, they believed, within the context of online learning, social interactions should be carried out at least in a hybrid manner. In other words, in order to make online communication work effectively, it is important and necessary for students to have face-to-face communications at some point of their first semester, as it will enable them to make an initial personal connection with their peers, due to the physical proximity, comfort and personal touch face-to-face communication offers. The comments of the students support existing research evidence. Humans are born to be social, used to seeking and maintaining contacts and companionships. We are likely to feel lonely when there is a lack of a desired level of in-person interactions with others in the community (Margalit 2010).

In the absence of face-to-face communications, the participants also reported that the university did not provide sufficient online extracurricular activities and/or networking opportunities to help year-one students to get to know and socialise with their peers. Meanwhile, it appears that many module tutors offered limited team-building activities during online teaching. The perceptions of the participants highlighted the weakness of university support systems during its online migration and also a lack of full understanding of the difficulties and challenges students experienced in relation to their social development when they were studying remotely.

If the findings shown above were supported by other evidence, then there would seem to be a serious problem in relation to the institutional level support. However, it is worth pointing out that online only communication during the COVID-19 pandemic was an extreme situation, since the university campus was forced to close and teaching had to take place online. Therefore, further research is needed to explore the perceptions of year-one students relating to online communication when they are able to have some in-person contacts with others on campus.

In addition, adjusting to teaching fully online was a new experience and also a steep learning curve to academic staff. As the primary goal of the university was to provide equally high quality online learning experiences to students as with face-to-face teaching, the demand for the emergency transition required academic staff to quickly adapt to the new situation, and to up skill themselves simultaneously. Consequently, supporting students' online social development may not have been the top priority of the academic staff. Consequently, further research in understanding the social development of year-one students in other UK universities when they study online predominately seems very necessary.

Apart from the fact that there was inadequate institutional level support, it seems that at the personal level, the students did not take sufficient initiative to try to solve the problems either. The situation the year-one students were in seemed to be much more daunting than what they had anticipated, and certainly pushed them out of their comfort zone. However, the participants on the whole appeared to be afraid of change and also not confident to rise up to the challenge. Instead, they chose to confine themselves to what they had already known and preferred relying on the university and their tutors to solve the problems for them.

Their reactions could be because these year-one students had not yet fully developed their independent problem-solving skills, given the fact that the majority of them were school leavers and were more used to being handheld by their teachers in their previous school. Even though they might have experienced online learning in their school, the situation they were in was different, as they had their friends groups and were familiar with the learning and teaching environment and approaches. In this respect, it is critical for the university to provide guidance and support to help students develop their resilience.

The rise of online teaching and learning during the COVID-19 crisis has stimulated the digital transformation of higher education globally and, consequently, digital education is likely to become the new normal in the post-COVID era. Based on the findings of the research, the following recommendations are offered to UK institutions and potentially higher education institutions in other countries using remote teaching as the main teaching approach. Firstly, Students need to develop resilience and learn to build their social contacts and circles with one another online by actively participating and engaging in the online activities. They should also come forward and make their voice heard about the challenges and problems they face in relation to their social development and the level and type of support they truly need.

Secondly, it is highly important for universities to offer year-one students the opportunities to meet others in person on campus, in particular, during their first semester, when they are transitioning into the university. These face-to-face interactions can take place through curricula and/or extracurricular activities, and at the start of their first semester, during the middle of the semester and/or towards Christmas break.

And finally, there needs to be a large variety of online events and activities taking place regularly throughout their academic year, in order

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to accommodate the different needs of the new and existing students. In addition, the societies and clubs should probably rethink their recruitment strategies to encourage students to join and participate in online events, for example, promoting their activities and events through student reps and also through these students-initiated group chats. To help reduce their nervousness and anxiety, clubs and societies may also consider encouraging year-one students to bring their friends or flat-mates along to attend the online events together. Meanwhile, academic staff may try to embed virtual icebreaker activities, such as quizzes, and Microsoft Teams games, such as pass the pen and twenty questions, into their online teaching to help students to get to know each other. They may also offer some time (ten to fifteen minutes in length) during seminars and workshops to allow students to socially interact with each other. These ice-breaker activities have proved to be effective in helping students ease nervousness and improve their engagement in online learning (Ernest et al. 2013).

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PART V

Certification and Diplomas

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CHAPTER 19

Shared Learning in Higher Education
Toward a Digitally Induced Model

Ulrich Hommel and Kai Peters

Online learning has created the opportunity for students to study anywhere in the world in a geography-independent manner. As noted in Chapter 1 by Andreas Kaplan, the present COVID-19 pandemic has made this even more evident. Rather than being a niche segment of a largely face-to-face educational eco-system, online education is rapidly evolving into the de facto ‘normal’, with many students currently continuing their studies remotely during lockdown, from wherever they may be, whether from home, from their student accommodation or from somewhere completely different.

While Higher Education Institutions (HEIs) are struggling with the challenges posed by the sudden shift from face-to-face to online delivery, they are nevertheless happy to receive registrations from candidates across the globe. They are also quite possessive of their students and seek to retain them throughout their studies, for financial reasons but also to ensure the quality and cohesion of their degrees. Technological change and evolving customer preferences, we believe, will work against achieving this objective in the medium to longer term.

These developments must be evaluated against the backdrop of regulatory initiatives fostering (cross-border) student mobility. Since 1999, forty-eight European countries and a number of more distant jurisdictions, acting on behalf of their HEIs, have signed up to the Bologna Process. Bologna signatories pledge to uphold transparent and comparable educational structures and promote international co-operation and mobility. Each signatory has also committed to the European Credit Transfer and Accumulation System (ECTS) which serves as a facilitating currency to support progression between institutions across the Bologna terrain.

Logic would have it that the combination of Bologna and online education would encourage extensive HEI co-operation, pan-European credit accumulation and virtual mobility. Extending Bologna Process commitments to other countries would grant students further virtual

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mobility and potentially also provide a means to affordable education globally. Sadly, the possibilities created through globalised online education have not yet materialised. HEIs spend vast amounts of time and effort building their own modules for each course and only few courses are truly shared. They are reluctant to accept micro-credentials from other HEIs, while ironically they are happy to adopt textbooks written by far away academics with no direct link to their own institutions.

This chapter sets out to explore these challenges further and does so by applying a narrow lens. We focus on the development of micro-credentials from existing degree offerings as well as the acceptance of micro-credentials towards degree programmes as facilitating mechanisms of shared learning (EDUCAUSE 2019). We link this discussion to the evolution of the Massive Open Online Courses (MOOCs) market as a vehicle for broadening a HEI's reach beyond institutional boundaries. We ultimately arrive at a set of conjectures about how the merging world of the theoretically face-to-face programmes, now delivered virtually, and the world of MOOCs and micro-credentials will create a new economic reality for higher education.

This chapter is structured as follows: first we will provide the theoretical grounding by explaining that the deinstitutionalisation of higher education is the other side of the shared learning coin. This will be followed by a closer look at the historical roots of micro-credentials from remote learning to MOOCs to now increasingly fungible micro-credentials. This discussion will then explore how micro-credentials are being deployed in the marketplace to support degree study. As a next step, we will take a closer look at the accreditation of prior learning, specifically how we can move from the systems in place to a framework that fits the new forms of shared learning. The chapter closes with reflections on how the general trend toward deinstitutionalisation and digitalisation can further strengthen shared learning models and what role COVID-19 is likely to play to speed up development.

Deinstitutionalisation of Tertiary Education

Hommel and Vandenbempt (2021) posit that higher education is undergoing a process of de-institutionalisation which involves the unbundling of traditional forms of student learning and the subsequent re-bundling that leads to a network- or even ecosystem-based provision of education. In its pure form, it can be understood as the deconstruction of a Lego structure and using the blocks to build something new, a phenomenon that we were able to observe in other service sectors as well (e.g., digital services, banking). Unbundling is often triggered by technological change, but the underlying motivations are typically linked to fostering market distinctiveness of the service offer and stripping away ancillary or less-valued features.

Many HEIs nowadays position themselves as surplus seekers (mimicking for-profit behaviour). Creating value for the learner (analogous to customer value in the non-academic sphere) has become a cornerstone of institutional change, inviting the disaggregation of the design and delivery of tertiary education, strengthening the involvement of outside specialists and therefore, in effect, moving away from the full-service 'business model'. Themes of the later discussion, stackable degree qualifications (Kofman 2018) and micro-credentialing (Milligan and Kennedy 2017) can be considered inherent forces of curricular unbinding across institutions, geography and also time.

The COVID pandemic has seen the emergence of the distributed university concept which is to be understood as a network of bilateral contracts between universities to temporarily host students that are foreclosed from coming to their home campuses. Basically, it is about creating student communities away from home, facilitated by partner institutions. Its implementation can serve as an intermediate step towards ecosystem-based provision where the host institution serves as an entry and exit point of the learning experience, while learning can involve the network of schools that the admitting HEI is affiliated with. In other words, students receive roaming rights, and the home institution must provide guidance and quality control to ensure that the learning journey is aligned with the students' career ambitions (e.g., International Partnership of Business Schools or IPBS is a recent variant of this model in mostly virtual space).

The following sections describe the evolution of shared learning in higher education. Our discussion will communicate scepticism regarding whether the full potential will actually come to fruition ceteris paribus. The process of deinstitutionalisation described here provides confidence that underlying forces are in play to make this happen.

From Online Learning to MOOCs and Micro-credentials

Origins of Online Learning

The origins of online education can be traced back to 1728, when a certain Caleb Phillipps, based in Boston, Massachusetts, advertised a shorthand correspondence course, advising that any 'Persons in the Country desirous to Learn this Art, may by having the several Lessons sent weekly to them,

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be as perfectly instructed as those that live in Boston' (Battenberg 1971). In 1934, starting with the University of Iowa (Gershon 2020), educational television broadcasts began. In the United Kingdom, this structure was adopted by the Open University as a founding principle in 1969 using facilities in London which had been freed up by the BBC.

In the same decade, early educational experiments were conducted using both stand-alone and early versions of networked computers to deliver education. PLATO (Programmed Logic for Automated Teaching Operations) was developed at the University of Illinois at Urbana-Champaign. In 1965, a five-year study exploring the impact of PLATO noted that 'the results of exploratory queuing studies show that the system could teach as many as a thousand students simultaneously, while still allowing each student to proceed through the material independently' (Bitzer et al. 1965).

The genie came out of the bottle with the development of the Internet in 1989, triggered by the introduction of the World Wide Web and hyperlinked texts, thanks to the ingenuity of Tim Berners-Lee and researchers at CERN. It represents the start of the modern era of education that has led to the adoption of online delivery by existing universities, the launch of new online universities and the emergence of specialist service providers to facilitate the online delivery of universities and to deliver programmes on their own. Regarding the latter, two basic models established themselves in the 1990s and 2000s. Pearson (formerly EMBANET) and Keypath offered universities turnkey programmes in exchange for a large share of the tuition fees paid by participants. In contrast, Blackboard, Moodle and Canvas offered universities virtual learning environments which could be populated with the universities' own materials to support face-to-face, hybrid or, in some cases, distance learning.

Both models, however, featured a closed shop approach: the education could only be accessed by enrolling in the programme of the specific university with the assumption being that students were seeking a degree qualification from their studies rather than credentials for individual modules. Since these early days, the Ed-Tech sector has made a quantum leap forward, with a vast array of software options available today to hyperlink and communicate with distant learners.

Education Moves Open Source

In parallel, a number of academics began experimenting with the online delivery to learners who were either not interested in pursuing a degree or were unable to afford going tuition rates. The starting point is generally ascribed to the MIT OpenCourseWare (OCW) project, launched in 2002, that moved course learning materials on a large scale into the public domain.

The MOOC movement was 'named' in 2008 by Dave Cormier, an academic at the University of Prince Edward Island in Canada (Kaplan and Haenlein 2016). Together with colleagues George Siemens and Stephen Downes, he conducted PLENK2010 (Personal Learning Environments, Networks and Knowledge) which sought to use technology to improve on the face-to-face classroom experience online.

By 2012, the so-called year of the MOOC, a number of platforms had already established themselves; edX developed with the backing of MIT and Harvard, while Coursera and Udacity grew out of projects linked to Stanford University. Rather than positioning themselves as ring-fenced online providers, MOOC platforms began as supermarkets of courses and with different ideas on how their supermarkets should operate. In some cases, the emphasis was on providing open educational resources provided by universities with eventually also low-fee certification options. Other MOOC platforms, like Udemy, made themselves available for anybody to post a course and charge whatever the market is willing to pay.

It was only a matter of time before universities started placing entire degrees on these platforms. San Jose State University and Georgia Tech made the first move in 2013 in cooperation with Udacity. Other universities followed quickly thereafter on this and other platforms. What is relevant for the narrative developed in this chapter is that these online degrees were initially offered at a fraction of the cost of the face-to-face version. The pricing encapsulated the basic logic of deinstitutionalisation that certificates of completion serve as micro-credentials (or digital badges) that can be stacked up to qualify for a degree.

Micro-credentialing and Its Fungibility

Micro-credentials can be used as a teaser to attract applicants to a degree programme and, hence, would then involve early-stage modules of the curriculum. They can be priced proportionally to the overall programme fee and then be used as a way of monetising parts of a degree offer. The Wharton School at the University of Pennsylvania for instance generated $20M from their MOOC portfolio in 2019 (Kato et al. 2020). Alternatively, they can be offered at a significant discount to lure participants into the educational experience on offer and, at the same time, to vet applicants on the basis of their performance in the micro-credential course.

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For the purpose of this chapter, the more relevant aspect is making micro-credentials transferable across institutions as a means of encouraging educational mobility and accessing specialised training within the wider ecosystem. At the end of their EU-funded study on micro-credentials around the world, Resei et al. (2019) concluded that chaotic terminologies, low standardisation and limited stackability and transferability are key barriers that need to be overcome to make micro-credentials more valuable and recognised. There is considerable truth in their assertion and the varying naming conventions deliver a first clue: MasterTrack Certificate, Xseries, MicroMasters, Nanodegrees and so forth. Non-aligned credit currency provides an added challenge; there are US credits, UK credits, ECTS and a whole host of other credit systems populating the world of micro-credentialling.

There are, however, encouraging signs of an emerging portability. A number of European initiatives, largely funded by Erasmus+ grants, aim to create more commonly accepted frameworks (Resei et al. 2020). MicroHE seeks to standardise transferable credentials to a minimum size of 5 ECTS (which aligns well with national accreditation policies), while OEPASS is pushing for a 'Learning Passport' to facilitate portability (MicroHE Consortium 2019). E-SLP, the European Short Learning Programmes project, seeks to encourage life-long learning by calling for micro-credentials to be aligned to stackable qualifications and be market driven to support long-term employability.

The European MOOC Consortium (2019), formed of various key national MOOC providers, announced a common micro-credential framework in May 2019. So far, more than 400 HEIs have signed up in support of the attempted 'standardization among the micro-credential offers by Europe's leading MOOC platforms and the universities within their networks'.

Lastly, and more globally, a consortium of university partners from Europe, Canada and the United States launched the Digital Credentials consortium – effectively a common repository which will store, display and verify academic credentials. The repository allows for single site storage and thus avoids the need to collect paper transcripts.

Market Deployment of Micro-credentials

Shared Learning across HEIs

Universities have strongly increased their micro-credential offerings. Class Central reports 1,180 micro-credentials of 13 different types for 2020, up by 360 compared to 2019 (net of China). Forty per cent of those were in the fields of technology or business (Shah 2020). At the same time, universities are also rapidly increasing their MOOC-based degree offerings with 67 available in 2020, up by 19 compared 2019, with 60 of them introduced between 2018 and 2020 (Shah 2020). Most offerings are still in English but recent growth has also led to more language diversity.

At the time of writing this chapter (February 2021), optional progression paths continue to be overwhelmingly within the same institution but options to diversify across suppliers are becoming clearly visible as well. The MIT MicroMasters in Supply Chain Management (SCM) is illustrative of this trend. At a baseline, it offers not only advanced entry into MIT's US programme but also into the equivalent offerings at its Spanish and Malaysian subsidiaries. Relevant here, more than two dozen other universities accept the MicroMaster credits for Supply Chain Management or MBA programmes (among them Arizona State, Purdue, Rochester Institute of Technology [all US], RMIT, Deakin, Curtin, Queensland [all Australia] and Sasin in Thailand). MIT is advertising partnership possibilities pro-actively and is also involving regional players (of lesser reputation and charging lower tuition fees). It is also replicating this model for other programmes such as Manufacturing, Statistics and Data Science.

These arrangements grant significant flexibility to learners in terms of pathway and degree tuition. The full face-to-face MIT-SCM experience costs USD 77,168 in tuition compared to USD 47,900 for the blended version with the MicroMaster. If one completes the degree at Duale Hochschule Baden-Württemberg, one of the regional partners in Germany, then the total cost amounts to USD 1,600 for the MicroMaster and a multiple of the EUR 650 semester fee to Duale Hochschule. By choosing other university partners, students can align their tuition expenses to their ability to pay within this spectrum.

New Kids on the Block

Large IT players (Google, Linux Foundation, IBM, SAS, Cisco, etc.) are pushing into this market by offering a rapidly growing number of professional certificates; edX has been particularly effective in moving such offers onto their platform with Coursera following suit. While not offering pathways to academic degrees, they have quickly evolved into 'gold' currency for learners interested in acquiring data-analytic, programming or 'anything digital' competencies. It does not take a giant leap of faith to ask oneself to what extent this divide between academic and professional micro-credentials will be maintained in the future.

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At UK-based FutureLearn, that bridge has been crossed. FutureLearn teamed up with Coventry University in mid-2020 to obtain validation for a range of courses: Cloud Computing Professional from Amazon Web Services, Data Analytics from Tableau, Financial Analysis & Decision Making from Tableau and Xero and Customer Success from Salesforce. Each of these micro-credentials, priced in the range of £500, awards the successfully assessed learner 15 credits towards a 180-credit masters degree. Similarly, the German NGO KIRON is offering refugees a MOOC-based study programme which, if completed successfully, can be applied for one year of study (60 ECTS) at a number of partner universities (Kato et al. 2020). One must wonder, what is an appropriate limit of shared learning and who decides?

When reflecting on this question, it is helpful to recognise the parallelism to how universities have established credit-recognition arrangements with chartered bodies, in particular in the United Kingdom. Chartered accountants, for instance, receive 120 credits of a 180-credit Master's in Accounting or MBA degree by virtue of having completed all of the professional body exams and having some years of work experience. The well-established two-thirds rule could therefore serve as a reference for what is reachable without sparking regulatory interference.

Widening Access to Tertiary Education

Let us recap. We are seeing an expansion of pathways from micro-credentials to degrees and more inter-university recognition of credits. The dividers between academic and non-academic provision are becoming more porous with potentially the majority of credits being eventually delivered by non-academic organisations. And we are achieving greater clarity about study loads, study levels and credits given. But what force may propel micro-credentials to the forefront of shared learning development?

One of the biggest challenges facing higher education is ensuring access – so that the reasonably well-to-do can reap a positive return from their educational investment but, even more importantly, that the under-serviced and shut-out parts of the world populations gain access to tertiary education. The real innovation of shared learning with micro-credentials is to break down the ivy-covered walls of prestigious universities and to make the exclusiveness of alumni 'club membership' a bit less exclusive. Along these lines, Laurillard and Kennedy (2017) call more generally for the use of MOOCs in the global south as a way of spreading educational access, which is seconded by Ghasia et al (2019) for the case of Tanzania. Gwin and Foggin (2020) make the case for micro-credential provision to advance the UN's Sustainable Development Goals among mountain and pastoralist societies. Kaplan (2021) discusses low-cost self-assembled 'MOOC MBAs' and Annabi and Wilkins (2016) call for MOOCs to become accreditable prior learning in general, an aspect that we discuss in greater detail in the next section.

Recognising the Achievements of Prior Learning

This section takes a closer look at the state of play within the world of Accreditation of Prior Learning (APL) as well as of the Accreditation of Prior Experiential Leaning (APEL). APL can be traced back to the medieval guilds in which master craftsmen inspected the work done by apprentices to determine whether they met the standards required by the guild. Over time, these apprenticeship processes were formalised and continue to this day, notably in Germany. Current efforts are under way in the United Kingdom to develop a similar structure. In contrast, APEL covers experiential learning ranging from apprenticeships to years of professional experience as well as specific skills and abilities gained through employment. All these systems have an end-point assessment to evaluate skills and competencies in common.

From Input Hours to Output Skills and Competencies

A key issue still to overcome is the basis of assessment. Study hours (input focus) loom large in this context, while much assessment in the 'real world' is based on acquired abilities (output focus). Take, for example, the United Kingdom, the concept of notional learning hours 'has progressively become the national standard' with 1 credit being the equivalent of 10 input hours (QAA 2011). An undergraduate (postgraduate) degree in the United Kingdom with 360 credits (180 credits) adds up to a study load of 3,600 hours (1,800 hours). The Bologna system arrives at a similar answer by going in the reverse. An annual full-time equivalent, defined as 1,500–1,800 hours, translates into 60 ECTS. Thus, each ECTS represents between 25 and 30 input hours. Needless to say, this is an inexact science. It is straightforward to keep track of contact hours but anything beyond that is theoretical. Different learners need to invest different amounts of time to accomplish out-of-class assignments.

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Linking Accreditation to Mobility and Shared Learning

The recognition of prior learning is ideally a standardised process that endows all learners with a commonly accepted currency reflecting past achievements. In 2002, France, for instance, introduced a system known as VAE (validation des acquis de l'expérience) which superseded the previous regime known as VAP (validation des acquis professionnels). It is a nationally legislated, structured framework combining a portfolio of experience with observation and ultimately with a jury evaluation which is guided by the Ministry of Education. A portfolio assessment generates a fee of a few hundred Euros for the candidate. In the early years of the framework, approximately 50,000 students applied annually through the VAE. In 2005, 21,379 students applied for recognition at national level with 59 per cent receiving a full degree. At the time of writing this chapter, 350,000 students have received degrees through the system with 60 per cent of them at a higher national level (statistics provided at francevae.fr). Other European countries (e.g., Denmark, Iceland, Netherlands and the Flemish part of Belgium, Portugal and Norway) also offer pathways to a full tertiary qualification through the accreditation of prior learning (Souto-Otero 2013).

The United Kingdom employs a much looser framework. The 2009 guidance from the QAA notes that learning not formally delivered and assessed from a higher education provider can nevertheless be recognised (Pollard et al. 2017). The burden of proof is however shifted to the applicant who must build a case through the development of a learning portfolio documenting what learning has taken place and how and where it relates to the desired qualification. Recognition rests with the receiving HEI and often involves a fee payment for the assessment review. A differentiation between degree and course credits is possible as well, that is, APL/APEL can lead to the acceptance of course credit equivalents but still requires fee payments for degree credits to qualify for graduation.

With the exception of the Open University which was built on the premise of openness and flexibility, the practical application of credit transfer is still minimal in the United Kingdom and correlates negatively with the brand value of the HEI. Prior learning also comes with a limited shelf life, with five years back being the most common threshold. Looking internationally, mobility is much more common in the United States and in Scandinavia (Junor and Usher 2008; Quinn 2013; Hovdhaugen et al. 2015).

Minimal tuition fees and generous maintenance loans further strengthen the mobility dimension in Scandinavian countries.

To sum up, there is still considerable unfinished business when it comes to making APL learning an integral part of higher education (Di Paolo and Pegg 2011). Accreditation is often the prerogative of the receiving HEI, involves fees that may crowd out learners seeking a qualification and applies depreciation to prior learning that may particularly harm individuals for whom education achievement is 'unfinished business' and vital for professional advancement.

Broadening Demographics

In terms of demographics, micro-credentials and therefore shared learning so far seems to appeal to a fairly narrow target group. Hollands and Kazi (2019) analysed the attributes of participants of MOOC-based micro-credential programmes in 2018–2019. Their findings indicate that the typical learner is either Caucasian or Asian, is well-educated (85 per cent with a bachelor's degree and almost 50 per cent with a graduate degree) and fully employed. Successful completers were between thirty and forty-four years old (with an average age of thirty-six) and mostly male. They earned on average USD 50,000 compared to USD 35,000 for starters and are mostly self-payers (two-thirds). One-third of participants were residents in the United States, two-thirds were predominantly from more developed countries in Asia and in Europe. A good number of participants aimed for salary progression or career advancement and a sizable fraction appear to have succeeded.

Considering the evidence, we share the view of Sean Gallagher, executive director of Northeastern University's Center for the Future of Higher Education and Team Strategy, that the original ambition of democratising education has so far not been fulfilled (Gallagher 2016). Overall, MOOC participant numbers, however, give reason for hope. More than 120 million individuals participated in courses delivered by Coursera, edX, Udacity, FutureLearn and Swayam in 2019 alone. Due to the COVID pandemic, more participants registered for courses in April 2020 than in all of 2019. For 2020 as a whole, the number of users reached 180 million (which is equivalent to the combined population of Vietnam and the Philippines). Technological advancement such as robust blockchain-based digital credential infrastructure will further contribute to market growth and advancement of the access agenda (Hamilton et al. 2019).

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Moving into the Post-COVID Reality

Chattopadhyay and Hommel (2021) explain the impact of COVID-19 as a dual-layered process. On the one hand, higher education has been exposed to gradual disruptions such as demographic change, changing educational consumption patterns and, most importantly, technological innovation that opens up new avenues for delivery. These authors describe them as so-called 'Gray Rhino' risks, highly probable disruptions that encroach on institutions slowly and are therefore often ignored for too long. On the other hand, COVID-19 has rapidly impacted the university sector as a 'High-Impact– Low Probability'–type event, which creates its own challenges and, in addition, acts as an accelerator for more fundamental dynamics, essentially putting the 'Gray Rhino' on 'Speed'.

This dual-layered phenomenon has pushed all countries around the globe into virtual communication space. Since March 2020, many millions of people have been working from home. According to a World Bank estimate, one in three can work from home, while in developing economies only one in twenty-six jobs provides that opportunity (Garrote Sanchez et al. 2020). The UNESCO estimates that approximately 70 per cent of students globally are studying remotely and many of them are in their third semester away from campus (Bouchrika 2020). Most universities have adopted a hybrid model that allows them to deliver face-to-face and online simultaneously with students being able to choose how to attend their classes and universities retaining the flexibility to switch back into online mode if the situation warrants it. It is a fair assumption that the hybrid model is here to stay allowing universities to maintain multi-channel delivery.

The impact on executive education delivers important pointers for the future of shared learning. Face-to-face open-enrolment courses have all but disappeared and all of the big providers have launched online open courses that, according to industry experts, have, however, attracted only few takers so far. Travel to campus appears to have been an important factor of the value proposition, while now they are competing against much lower-priced MOOCs. Many HEIs have continued to deliver customised (single client) courses which have of course been transformed into online delivery. At the institution of one of the authors, they have grown tremendously, and participant as well as sponsor satisfaction has surpassed previously delivered face-to-face versions. For the future, client organisations seem to favour hybrid formats with much-reduced face-to-face interactions and more stretched out teaching sessions that are considered more effective.

As the programmes formerly delivered face-to-face stay online or in multi-channel hybrid format, they will contribute to strong growth of the online learning market which is predicted to exceed USD 300 billion by 2025 (Research and Markets 2020). Surplus-seeking institutions will almost naturally turn to the benefits of interlinking MOOC-based micro-credentials with top-up options. Higher-ranked institutions can extend their market reach, lower-ranked institutions can more credibly move into areas requiring specialised knowledge and learners can customise their learning journey around their ability to pay.

True, traditional universities will accept this new reality reluctantly, citing a long list of issues concerning quality control, course design and local relevance. Ultimately, it is because they want a walled garden in which their students are locked in to ensure that they maximise their financial results. The changing economics of online learning, in particular the downward push of MOOC-based master's degree fees (Park et al. 2020), will, however, make it advantageous to break down these walls and to make themselves available for partnering. The reluctance of HEIs of good repute will slowly unravel and will work itself up the quality ladder.

We believe that these developments would be tremendously beneficial, as many more people around the globe then gain access to high quality, affordable education. Students would benefit from flexibility and an ability to pick and choose. National quality control systems will realise that nothing that is not already allowed is being done. Accreditation bodies, on the other hand, will need to come to terms with what this all means. One lives in hope.

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CHAPTER 20

Degrees of Disruption
Alternative Educational Credentialing

Angela Boatman and Katrina Borowiec

Growing numbers of students are enrolling in short-term, non-traditional educational programmes. A 2021 report from the non-profit organisation, Credential Engine, cited 549,712 credentials being offered from non-academic organisations, including digital badges, online course-completion certificates and other micro-credentials. Nearly 10,000 additional credentials were granted by Massive Open Online Course (MOOC) providers. Participants in these types of programmes can earn digital certificates indicating competencies in specific skills following the completion of a short course, typically ranging from a week to several months (National Education Association 2018).

An OECD report defined alternative credentials as 'credentials that are not recognised as standalone formal educational qualifications by relevant national education authorities' (Kato, Galán-Muros and Weko 2020, p. 8). Therefore, in the United States, any regulatory action of alternative credentials is currently the responsibility of individual state governments. While enrolment in these programmes has increased sharply in the past five years, over 90 per cent of programmes remain unaccredited. Lawmakers have struggled to regulate these new offerings without stifling innovation, since traditional state authorisation mechanisms were designed for brick-and-mortar programmes and not specifically focused on job training (Kelly and DeSchryver 2015).

Some argue that regulating alternative programmes is not as imperative as regulating degree-granting colleges, as students in these programmes typically invest less time and money compared to students enrolled in traditional two- and four-year degree programmes. In a free market, economic theory demands that if anyone can begin offering alternative

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credentials, then anyone will. However, there is no guarantee that new credential providers will deliver a quality product to students, especially since some for-profit educational entities have been known to target their marketing efforts to vulnerable populations of students (NPR 2017). Exploring some degree of oversight into this sector is critical.

To understand how states currently envision their role in regulating non-degree educational credentials, this chapter describes the shared issues and challenges of the authorisation process across five US states: California, Georgia, Illinois, New York and Washington. These states have all taken legislative action toward regulating short-term, career-oriented credential programmes. In each state, policies are enforced by a state authorisation agency responsible for regulating non-degree, private career schools.[1] After interviewing twenty-two participants from various state agencies and for-profit educational providers, we conduct a cross case analysis of the regulatory approval process and find that while parts of the authorisation process differ across our sample states, several shared challenges remain. The primary challenges for state authorising agencies include the following:

- limited budgets and resources, including human resources, to conduct an authorisation review or renewal
- institutions' response time when asked to provide information and, at times, their limited knowledge of the authorisation process
- difficulty assessing the quality of institutions' self-reported data
- old or outdated data reporting systems.

The final section of our chapter outlines four emerging themes pertaining to the alternative, short-term credential landscape overall. Specifically, we highlight the need for clear criteria to evaluate credential quality, the challenge of balancing state regulation with providers' autonomy, the tension between viewing short-term credentials as businesses or as educational institutions and the disruption and opportunities COVID-19 presents to the industry.

Defining Short-Term Career-Oriented Programmes

In this chapter, we focus on non-degree-granting career and technical oriented programmes, typically lasting one year or less in duration.

[1] These offices include the Bureau of Private Postsecondary Education (BPPE) in California, the Nonpublic Postsecondary Education Commission (GNPEC) in Georgia, the Illinois Board of Higher Education (IBHE), the Bureau of Proprietary School Supervision (BPSS) in New York and the Workforce Training and Education Coordinating Board (WTB) in Washington.

A recent RTI International report classified accelerated vocational training programmes into five categories: comprehensive career preparation programmes; standalone courses; university-affiliated non-credit, unaccredited programmes; fellowship programmes offering free tuition for admitted students and post-secondary education replacement programmes offering full-time programmes longer than one year (Arbeit, Bentz, Cataldi and Sanders 2019). Short-term career-oriented programmes have been a part of the post-secondary landscape for more than a century, focusing primarily on occupational training and job-oriented skills. These offerings could include anything from a short weekend continuing education workshop to a full semester-long course. Across the five states in our sample, the most common fields of study for short-term career-oriented programmes include the following:

- healthcare and allied health, such as medical assisting, patient care, pharmacy services and home health care
- computer technology, programming, data science, data analytics, cybersecurity and other computer related fields
- business management, entrepreneurial leadership and real estate
- cosmetology and massage therapy
- trades, such as heating, ventilation, air conditioning, welding, automotive, refrigeration and construction
- trucking
- culinary services.

The institutions offering these courses range from organisations enrolling twenty to fifty students, to larger schools with multiple satellite locations, to schools that are owned by a company which itself is owned by a holding company, educating thousands of students. Despite the size of these large institutions, the average institution authorised in our sample states has an enrolment of fewer than 100 students a year.

Given their short-term nature, the terms 'nano-degrees' or 'micro-credentials' have been used to describe the credential one receives upon completion of a programme. While most traditional higher education institutions use the terms 'certificate' or 'diploma', we use the term 'credential' to describe educational programmes that convey particular skills that students should demonstrate upon completing the programme. It could be a certification, a diploma, a degree, a badge, a license, an apprenticeship or a certificate of completion. We observe that, in the United States, different states, and even local regions, use different terms. The definition of a 'badge' in one place may be the same as a

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'micro-credential' in another; or these terms could carry different meanings. A term like 'micro-credential' may just be a new name for something a state or institution has been offering for years.

A short-term, career-oriented course has a narrow focus on career training without a general or liberal arts focus. These programmes may be offered in state or private four-year colleges/universities, but most are offered by outside providers as stand-alone programmes. Businesses may encourage their employees to complete micro-credentials that could stack to degrees, meaning they can be combined to move a student toward the completion of a degree or certificate, depending on how much general education is added. For students wishing to use short-term career-oriented courses toward a degree, these credentials either can be embedded within traditional degrees or completed alongside associate's or bachelor's degrees.

Target Population

A micro-credential can be used to serve many different audiences, including students in an existing degree programme, people who are interested in entering a new industry, alumni and others. Students in these programmes are not typically recent high school graduates. Many are changing careers, often have some post-secondary education and/or find themselves unemployed (SwitchUp 2018). Micro-credentials should be, in theory, nimble enough to evolve with the changing labour market, as they allow people to customise their learning to their current or future work situation.

Short-term credentials and career and technical education provides students other options outside of the traditional two-year and four-year degree. These short-term programmes often appeal to people who have not recently, or perhaps ever, considered college. The opportunity to enrol in a course without the need to complete a full degree is a welcome alternative to traditional higher education. An appealing aspect of micro-credentials is their flexible structure: students can step away and return again later in ways not always possible in traditional degree programmes.

Partnerships with Traditionally Accredited Institutions

While commonly these career and technical institutions operate as stand-alone educational institutions, the field is now seeing new partnerships between for-profit providers and traditional non-profit colleges through articulation agreements or other contracts. Sometimes these agreements are less formal and simply include bringing in faculty from a for-profit bootcamp, for example, to run a similar programme at a public technical school. Technical schools may also collaborate with coding academies to adopt credentials that are even more 'micro' than their certificate programmes. In these cases, micro-credentials are not designed to replace traditional academic majors but rather provide complimentary skills to help position undergraduate students as more competitive job market candidates.

For-profit providers may also license their curriculum to individual schools. For instance, a coding bootcamp might provide specialised instruction in advanced coding skills, outside the expertise of faculty at the accredited two-year or four-year institution. Typically, these lessons are not included in the formal curriculum but may provide elements of a course or a module, such as a quick burst on HTML. With these partnerships, students at traditional, accredited colleges may earn badges or other credentials automatically upon completion of pre-determined milestones. A dashboard can collect badges from different institutions or corporations, acting as a portfolio demonstrating students' skills to employers.

Research Methods

In order to assess the challenges inherent in regulating short-term, alternative degree programmes, we conducted semi-structured interviews with twenty-two leaders from fourteen distinct agencies/organisations. The state agencies included offices specifically charged with overseeing private career schools and those responsible for overseeing the development of micro-credentials, digital badges or other alternative programmes at public, degree-granting colleges. We also spoke with three private organisations including one bootcamp provider, one digital credential platform provider and one non-profit organisation focused on credential transparency. While we asked all participants about their general perceptions of alternative, short-term credentials, our conversations with state authorisation agencies focused on challenges of the authorisation process and the ways in which micro-credentials were impacting the field of higher education. We also reviewed authorisation agency websites and legislative policy documents.

Interviews were transcribed and uploaded to Dedoose 8.0.35 (2018) for analysis. Codes were developed inductively and refined iteratively (Lincoln and Guba 1985). We began by reviewing several transcripts and independently developing a list of 'open codes' (Merriam and Tisdell 2015). After

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comparing codes, we developed a full list of initial codes which included seven major categories or 'parent codes' (e.g., alternative credentials landscape, authorisation process, consumer protection) and several sub-codes. Following a round of independent coding and discussion, we then coded and audited the remaining transcripts, iteratively adding codes as needed. We analysed the data in three main sections: mechanics of the authorisation process, challenges in the authorisation process and commentary on the alternative credential landscape. For the first two sections, we first conducted a within-case analysis, where we identified relevant themes for each state. Then we conducted a cross-case analysis (Miles, Huberman and Saldaña 2014) to explore the generalisability of findings across states and to develop a more general understanding of how various contexts shape state authorisation practices. For the third section, rather than distinguishing among states, we viewed data across states and private organisations as one corpus representing diverse perspectives in the alternative credential landscape.

State Authorisation Process Overview

Alternative educational providers begin the authorisation process by filing an initial application, which can take anywhere from three to twelve months (or longer) to be approved. In some states, applicants are assigned a regulatory specialist to guide them through the process. The twin pillars commonly identified as driving the approval process are educational quality and consumer protection. The state regulating agency collects information from schools pertaining to the minimum standards outlined in their legislative code, which broadly include operating standards (e.g., curriculum, faculty, facilities, finances, complaint process, refund policies, safety), admission and academic achievement standards (e.g., transfer credit policies, enrolment disclosures and agreements, school catalog) and maintenance of student records. After initial approval, each state requires authorisation renewal, ranging from one to five years later.

Certain categories of schools may be exempt from authorisation. For instance, in California, accredited institutions do not require approval. In Georgia and New York, institutions that have been approved by licensure agencies in the state are sometimes exempt. Flight training schools are exempt in Georgia, New York and Washington, as well as schools offering free training to employees. New York and Washington do not require fully online schools without a physical presence in the state to obtain approval, whereas in California, these types of online programmes must obtain approval. Additionally, exemptions are generally not permanent. For example, in California, institutions are required to apply for a 'Verification of Exemption' every two years. In Illinois, a similar verification lasts only one year, while in Georgia, the exemption length varies.

Procedures for protecting students from false claims and fraudulent behaviour are embedded within the authorisation process. First, agencies work to provide data to consumers regarding credentials, competencies and job market outcomes, so prospective students can evaluate educational opportunities. Second, states inspect physical school sites to ensure that adequate safety protocols are in place, to interview students and faculty and to review student records. Third, approved institutions are often required to contribute a portion of tuition funds to a state tuition recovery fund, established to assist students who are faced with economic loss of tuition dollars due to an institutional closure. Finally, each state has a process for handling non-compliance matters for institutions under their purview. In many cases, the state agency discovers non-compliance issues through a student complaint that is then formally investigated by the agency. Schools operating without a license are typically provided an opportunity to formally apply for licensure before taking further action. The attorney general's office handles the most serious offenses, such as consumer fraud, which can potentially result in formal litigation and the revocation of a license.

Challenges in the Authorisation Process

When it comes to the authorisation process for alternative educational providers, state agencies continuously seek ways to streamline the process. This section briefly focuses on the major authorisation challenges identified by representatives of private career school authorisation agencies, as well as the perspectives from other actors in the alternative credential industry.

Budget and Resources

Limited budgets result in under-resourced offices responsible for the authorisation process. One participant noted that it was common in her office to 'wear several different hats' and to carry a 'significant workload'. Limited resources hinder agencies' progress toward their goals, requiring considerable human capital to discern between credible and not credible actors applying for authorisation. Frequent renewal cycles naturally require more resources, which are often limited in state agencies.

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Institution Responsiveness and Authorisation Process Knowledge

Obtaining approval to operate in a state requires agency and institutional cooperation. If one of the two parties is not responsive to requests for additional information, the process of authorisation or renewal can drag out considerably, sometimes for over a year. Additionally, if the institutions applying for approval have limited knowledge of the authorisation process, the timeline can be further delayed. State agencies work with many institutions to assist them with the application process, but because these agencies and institutions are often juggling competing responsibilities, this can lead to lapses in response time.

Self-Reported Data

As part of the authorisation process, institutions submit various items of information to the authorisation agency (e.g., financial data, faculty credentials). Since many private career schools do not receive Title IV funds from the US federal government, they are not required to report data to the federal Integrated Postsecondary Education Data System (IPEDS). This means the authorisation agency cannot easily verify the accuracy of data submitted for authorisation due to structural barriers and limited human resources. Beyond verification, the limited representation of private career schools in federal datasets limits policymakers' and the public's understanding of the short-term, alternative credential industry, as well as the students who enrol in these programmes and their completion and labour market outcomes.

Systems and Infrastructure

The underlying systems and infrastructure of any organisation affects its success and efficiency. The current system for collecting information from schools can be somewhat antiquated, with some institutions entering information into basic spreadsheets. More advanced systems would help to streamline operations. For example, in some states, while the public can view an online list of authorised non-degree granting institutions, the website does not allow them to easily download a list of authorised schools. Second, the systems do not facilitate data reporting and visualisation, making it more challenging for state agencies to share accessible information with the public.

Landscape of Micro-credentials in the United States

Respondents in our study identified the responsiveness of micro-credentials to meet market demands as a key strength of the industry, especially when compared to traditional higher education. As participants from these programmes demonstrate their value in the workplace, employers become more comfortable hiring others with short-term credentials. Micro-credential providers differentiate themselves within this growing industry by claiming 'that they can do it better, faster, cheaper'. In their quest to increase revenues, digital badge platform providers report a growing interest in micro-credentials from degree-granting institutions. A participant from a public higher education system cautioned: 'give people what they want or risk being left in the dust'.

These programmes are changing the landscape of higher education in dramatic ways. Below, we discuss four themes that emerged from our interviews regarding how institutions, state governments and consumers are adapting to this changing marketplace.

State Authorising Agencies Need Clear Criteria to Evaluate Credential Quality

Short-term credential programmes offer students opportunities to quickly retrain in new fields. While notably different from traditional degree-programmes, these programmes are often evaluated using similar quality standards. For example, short-term career programmes challenge prior assumptions as to what constitutes faculty 'expertise' (Kaplan and Haenlein 2016). While doctoral degrees might be required for faculty at many degree-granting institutions in the United States, skills acquired from on-the-job experience might be more appropriate for faculty teaching in coding bootcamps. Consequently, some private career schools have asked the state authorisation agency to reconsider their evaluation of faculty qualifications to be better aligned with current industry trends as opposed to traditional educational pathways.

In relation to this, actors operating in traditional higher education spaces can view micro-credential programmes with scepticism. For-profit providers commonly receive greater scrutiny than non-profit degree-granting institutions, which are presumed to operate in good faith. Many campus stakeholders at public non-profit institutions remain sceptical of micro-credentials, including, at times, those offered by their own institutions. In these cases, framing the credentials in traditional college

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terminology may be advantageous for the for-profit provider – for instance, describing micro-credentials as mini academic minors that can help to translate the skills one learns in these programme to a more traditional academic setting. Additionally, clear learning standards and assessments can better ensure high quality micro-credentials.

One participant from a non-profit organisation noted that his organisation's efforts to provide more publicly accessible information about short-term credentials will 'take a lot of pressure off the state of being the ultimate arbiter of what's good and bad'. Potential students and other stakeholders will be able to independently evaluate programme outcomes using searchable, public data.

Balancing Providers' Autonomy with Regulation

Receiving state authorisation is often a source of pride for a micro-credential provider. For instance, a representative from one state summed the issue as follows: 'A tension exists between autonomy and regulation in any business or any state. While our schools have, at times, been less pleased with the level of regulation that they have, they've also been the first to use that as a badge of honour.'

The short-term credential provider we interviewed noted this same tension. Regulation processes were not traditionally designed for short-term bootcamps or distance education programmes. For example, some students complete short-term credentials just in case they later want to utilise the skills. However, state agencies evaluate schools with the assumption that every student intends to earn a credential or get a new job. At one participant's prior institution, students would enrol in the short-term programmes as a hobby: 'But they [the school] were held to the graduation and placement outcomes of every other programme, and there was no flexibility for saying these people they will sign on whatever dotted line to attest to the fact that they don't want a job from this.'

In comparison, degree-granting institutions that offer micro-credentials were not subject to the same level of external oversight. A representative from a state authorising agency recognised this difference: 'For our degree-granting institutions, if they're authorised at the institutional level, they have the flexibility or autonomy, if you will, to create non-degree granting programmes that they might want to offer for a particular purpose.' Nonetheless, degree-granting schools faced other challenges, such as buy-in from campus stakeholders and concerns about outside providers 'watering down' their curriculum.

For-profit Providers as Businesses versus as Educational Institutions

The need for balance between autonomy and regulation – and the tension that sometimes ensued – was related to how state authorising agencies viewed these private, non-degree providers as primarily businesses rather than primarily educational institutions: 'We have always treated these entities as educational organisations first and businesses second, and we've been very aware of not flipping that around . . .. My estimation is in some states, there's a perspective that these are businesses first, and therefore, their registration or their authorisation is really registration as a business.'

In contrast, a participant from another state viewed career schools primarily as businesses: 'It's a fine line because these are businesses. Yes, they're schools, and there's minimum requirements, and they pay fees, et cetera, et cetera, but they're small businesses.' These viewpoints are illustrative of the broader continuum with which states view private career schools as primarily businesses or educational institutions.

Short-term credential providers are often seeking ways to improve their programmes and to start new programmes to respond to market demand. This can cause friction when the operation sometimes moves at the speed of a business and not a state agency. One participant noted: 'What causes the real challenges to the business is when we try to plan for launching a new programme and we go about it the right way and apply for approval and do those steps. And yet we're delayed sometimes quite significantly, due to just the backlog at the regulator.'

From the provider's perspective, delays from the states sometimes negatively affect students, leading students to receive a 'subpar' programme. In comparison, approval for micro-credential programmes at public institutions generally falls under the faculty governance structure. Accordingly, degree-granting schools have more autonomy with respect to their curriculum and programme offerings than is typically afforded to private career schools.

COVID-19 Disruption and Opportunity

The COVID-19 pandemic caused considerable disruption for both non-degree granting micro-credential providers and public post-secondary institutions in the process of designing new credential programmes. The pandemic especially affected those providers that offer practical, hands-on training that must be done in person, such as truck driver training.

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The pandemic also slowed the momentum surrounding micro-credentials at public institutions. Hiring freezes and staff layoffs limited the resources that would have otherwise been available for managing micro-credential implementation efforts. Yet, one participant has recently seen micro-credentials implementation plans ramping up again. She attributes this renewed interest in micro-credentials to economic ripple effects of COVID-19: 'Folks are starting to email me again because I really think now they have come out from the fire of it. They can see that micro-credentials are going to be a way that we are going to be able to help the people who have been laid off as a result of the pandemic. We are going to shift our focus to that.'

State agencies are already receiving applications from schools seeking to offer new credentials to meet the career needs of those displaced due to the pandemic. These programmes show promise in terms of helping people quickly transition back to the workplace.

Conclusion

This cross-case analysis provides insight into how five US states authorise short-term career-focused credential providers and compares challenges facing state authorising agencies. The shared challenges facing states in the authorisation process highlight several broader policy considerations that serve to disrupt the standard discourse in higher education.

As career-training programmes adapt to changing labour markets, industry-hiring norms change as well. It is simply not the case that a traditional college degree is required to secure a job in some industries; yet almost every field requires some type of credential for employment. Short-term career training programmes are challenging the assumptions of what it means to receive a credential and what it means to be a 'college'. This raises important questions regarding the process and timeline for approving institutions, particularly for a market and curriculum that is changing so rapidly. What metrics and data must be measured to differentiate high quality programmes from lower quality programmes?

With the explosion in credentialing, state authorising agencies struggle to stay on top of all the outcomes data necessary to gauge institutional quality. The onus should be on the institutions to make their outcome information transparent. As a condition of receiving an operating license to issue educational credentials, the state regulatory office should require these institutions to make certain data points public, transparent, searchable and comparable across institutions. This should be required as the price of doing business in the state. This onus on the institution for reporting data, combined with increased methods for verifying this data, will resolve several challenges facing state authorising agencies.

Career schools are working to redefine their role in relation to workforce development, while offering programmes that appeal to a diverse student body. Credentials that can be used alone or in combination with other requirements toward a degree offer additional avenues for accessing post-secondary education to underrepresented student populations, such as older students, women, veterans and students of colour. Programmes such as micro-credentials that allow for the greatest flexibility and professional relevance will appeal to some students previously uninterested in traditional higher education.

Student financing for short-term programmes remains an issue in the United States. At the federal level, the ability to use short-term Pell grants for micro-credentials would support students with limited incomes but who are in need of new skills to secure employment. Financial provisions for non-traditional providers of post-secondary education to access federal monies is still up for debate. A potential solution is to encourage traditional post-secondary institutions to collaborate with short-term career programmes. Effective collaboration depends on how nimble and effective colleges and universities are in authenticating and recognising post-secondary learning wherever it occurs. As noted by Kaplan (2021), reiterated in Chapter 1 of this volume, and underscored by participants in our study, the COVID-19 pandemic has sparked considerable change and innovation in the higher education sector, making it an opportune time for higher education institutions to evaluate their offerings and to facilitate collaboration toward improving educational opportunities for all.

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CHAPTER 21

Born-Digital Universities
Facing the New Competitive Landscape

Albert Rof, Andrea Bikfalvi and Pilar Marques

As pointed in Chapter 1, the COVID-19 shock has accelerated the digital transformation (DT) of the sector, as digitalisation is the necessary ally to continue operating and making some previous predictions and threatening forecasts of potential disruption in education due to new digital technologies becoming a reality (Posselt et al. 2018). This forced acceleration of the digitalisation (Agasisti, Frattini and Soncin 2020; Kaplan 2020a), with 67 per cent of HEIs replacing classroom teaching with online distance teaching and learning during the pandemic (Marinoni, van't Land and Trine Jensen 2020), has changed the competitive landscape, rapidly diluting the previous differentiation between some of the strategic groups (e.g., face-to-face universities versus born-digital universities) and increasing the competition between them due to significantly reduced mobility barriers (Adam 2016). The COVID-19 shock has been revolutionary and has impacted the entire higher education system, causing a drastic shift in the scale of change (Alvesson and Sveningsson 2015) in a sector that was already immersed in a continuous digital transformation process that needed to stay relevant (Khalid et al. 2018). Already a major concern for incumbent participants, the problem is fast being exacerbated by the emergence of new competitors from outside the industry, notably educational technology (EdTech) companies (e.g., Coursera), understood as companies that apply 'technological resources and processes for learning and teaching purposes' (Kaplan 2020b) entering the sector (Kaplan 2021). This is occurring because digital technologies are reducing entry barriers, with the consequent threat disruption for the whole HEI sector (Posselt et al. 2018; Kaplan 2020b).

This new competitive landscape augurs a complex scenario for the sector, including possible closures of universities in the short, medium and long terms (Marinoni, van't Land and Trine Jensen 2020), and also raises concerns about inequality of learning opportunities, as revealed during the pandemic when a third of HEIs were not able to adapt fast

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enough to the new digitalisation-COVID-19 forced reality (Marinoni, van't Land and Trine Jensen 2020).

In this new scenario, a myriad of questions arise, among which is 'digital transformation or digital disruption of the HEI?' (Kaplan 2020a), which seeks possible answers to the degree of change, ranging from a more moderate transformation to extreme disruption. Consequently, the purpose of this chapter is to answer the following research question: How are born-digital universities facing the new competitive landscape?

The present chapter addresses this question by examining the case study of a large and pioneer born-digital university established in Spain. Despite being born digital, the studied HEI was already immersed in a continuous digital transformation process due to rising threats coming from EdTech players' new business models. Qualitative in approach, the research design observes the studied HEI in two separate moments, pre- and post-pandemic, to better understand the reaction of the HEI to both EdTech competitors and traditional 'digitalised' HEIs. The dual effect triggered by COVID-19 is that the born-digital HEIs have suddenly started to compete with a strategic group that was not previously considered a direct competitor, namely, face-to-face HEIs, while also recognising the need to accelerate their reaction to the potential disruption coming from the innovative teaching models developed by EdTech players (Kaplan and Haenlein 2016; Kaplan 2020b), who were also born digital but with a native digital mindset.

This introduction is followed by a theoretical section that sets the frame for the research and identifies the gap. The method section describes the followed methodological process and the chosen case study. The results present the empirical findings, which provide evidence of both interviewees' direct quotations and structured codifications of the expected changes as response to the new competitive landscape. Next, the discussion considers the results in the light of the research question and the theoretical background. Last, a concluding section provides an overall assessment of the chapter with its highlighted contribution and future research proposals.

Theoretical Background

Competitive Landscape in HEIs

The complex environment means that HEIs must adopt appropriate strategies to operate in an increasingly challenging and competitive globalised market (Pucciarelli and Kaplan 2016) moulded by the disruptive potential of new technologies (Posselt et al. 2018) and in a sector where rankings are criticised but habitual (Qureshi et al. 2021). Research productivity is most often a primary dimension in HEI rankings (Qureshi et al. 2021), while more student-centric dimensions – definitely prioritised by new EdTech players (e.g., 'No-Pay MBA') (Kaplan and Haenlein 2016) – are less prominent. Meanwhile, Edtech is accelerating the emergence of EdTech companies, who are gaining reputation as a source of talent for employers through providing degrees and certifications that are gradually increasing in relevance in the market and complement the previous monopoly of HEIs (Kaplan 2020b).

This COVID-19–forced digitalisation partially dilutes the previous differentiation between some of the strategic groups (Porter 1980) such as between face-to-face and born-digital universities. Labianca et al. (2001) concluded that universities generally seek to emulate other universities like themselves, with the factors that define these referent strategic groups more associated with identity attributes (e.g., reputation, image) than with similarity at the structural level (e.g., size, governance). They point to two distinct motives that may drive emulation choices beyond direct competitors: (i) benchmarking other players more broadly to find sources of competitive advantage (self-enhancement) and (ii) the need for self-preservation when there is external threat, with looking for the possible solution among direct competitors with similar problems making little sense.

The COVID-19–forced digitalisation has contributed to reducing mobility barriers (Adam 2016) between groups and increasing the competition among industry incumbents. For example, 'face-to-face' HEIs have been urgently digitalised (Marinoni, van't Land and Trine Jensen 2020) to approach the 'born-digital' HEIs. Digital technologies are also reducing entry barriers for tech entrepreneurs, with new pure online educational platforms (e.g., Coursera) entering the market and threatening traditional HEIs (Posselt et al. 2018) when they grow, raise capital and become unicorns (The Complete List of Global EdTech Unicorns – HolonIQ 2021). In response to the emergence of EdTechs, face-to-face universities should leverage the advantages derived from combining on- and offline channels (Posselt et al. 2018), among other options, to avoid disruption (Kaplan 2020b). However, greater uncertainty hangs over born-digital HEIs, a context that needs further research, as both new start-ups and digital giants (e.g., Google) join the sector, thus contributing to shaping the EdTech strategic group. As one of the most relevant

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protagonists of the new strategic group of EdTechs, Google has recently announced plans that they 'could change the future of work and higher education' (Bariso 2020). The company offers Google Career Certificates, a selection of professional courses that teach students how to perform in-demand jobs. Their value proposition is based on flexible online training at the student's own pace, job-ready skill development, short duration, no prior degree or experience necessary, courses designed and taught by Google employees, a certificate from Google, connection to top employers through the Google hiring consortium, access to career resources like coaching sessions, mock interviews and a resume builder tool, support in searching for jobs and apprenticeship opportunities, all at a fraction of the cost of a traditional university education. It currently offers IT support courses, available in Coursera, and plans to open courses in other areas such as data analytics, project management, and UX design. According to Kent Walker, senior vice president of global affairs at Google: 'College degrees are out of reach for many Americans, and you shouldn't need a college diploma to have economic security'; 'In our own hiring, we will now treat these new career certificates as the equivalent of a four-year degree for related roles' (Bariso 2020).

Critical Success Factors for Choosing an HEI

Extant research has also explored the variables that impact the successful adoption of digitalisation for teaching and learning by business schools (Gupta, Seetharaman and Maddulety 2020), with student competencies, faculty competencies and technology diffusion emerging as the most important. Other variables with a positive influence are university culture, competition to HEIs, infrastructure and cost. However, industry expectations regarding candidates' digital literacy, business school responsiveness to companies' needs and industry perceptions of online vs. face-to-face do not influence this digitalisation adoption in a significant way, revealing a gap between the expectations of the corporate world and business schools in line with previous research that has identified this low responsiveness to changes in the reality of the business world as a weakness of HEIs (Pucciarelli and Kaplan 2016).

Extant research has analysed the main factors that impact international students' decisions as to which country to study in and the specific HEI (Lapina, Roga and Müürsepp 2016), including, in order of importance, academic quality and reputation, international students and staff and an individualised focus on students. Last, of moderate importance are factors such as tuition fees, support, access and availability, among others. Additional research in the context of private HEIs (Shah, Nair and Bennett 2013) has shown that the main factors influencing students' choice of HEIs can be grouped in six areas: student perception (reputation, word of mouth, etc.), access and opportunity (pathway to university, easy of entry, location, etc.), learning environments (small groups, personalised treatment, online learning, etc.), quality of teachers (professional expertise, individual interaction, etc.), course design (e.g., duration, practical orientation, work experience, flexibility and specialised content based on professional profiles) and graduate success (e.g., professional students' success). Additional research in the context of a business school (Khalifa 2009) has grouped the key aspects for choosing a business school into six elements and thirty items based uniquely on the perception of students, having validated an important list of selection criteria published in different publications (Joseph and Joseph 2000; Soutar and Turner 2002; Gray, Shyan Fam and Llanes 2003; Veloutsou, Lewis and Paton 2004). According to Khalifa (2009), the six elements valued by students are the degree programme, university environment, accessibility, university characteristics, employability and preparation for the job market.

In the online context, additional research has explored the factors that lead to successful e-learning in universities (Alhabeeb and Rowley 2018), showing that from the students' perspective, and in order of importance, there are seven factors of influence: technology infrastructure (e.g., reliable and easy to use technology, communication tools), instructor characteristics (e.g., ability to motivate), student characteristics (e.g., digital skills), e-learning systems resources (e.g., online test/quizzes, course interactivity, assessment of learning progress, updated learning material), support and training (e.g., online help desk) and ease of access and searching support (e.g., user experience or UX). Additional research has identified seven critical factors that most influence the satisfaction of the e-learner (Sun et al. 2008): student's computer anxiety, instructor attitude, course flexibility, course quality, perceived usefulness, perceived ease of use and variety in evaluation methods.

Method

To answer the research question, this chapter looks longitudinally at a single case study of a pioneering born-digital HEI headquartered in Spain. Qualitative in approach, the research design observes the studied HEI in

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two separate moments, pre- and post-pandemic. This look at these two different moments is relevant because the shock effect of COVID-19 has significantly changed the competitive environment in general and especially that of the born-digital HEI. Case studies provide qualitative, rich data and allow for the study of current management challenges (Yin 2009). The complexity and depth of the combined impacts of COVID-19/DT make the use of a single case suitable to thoroughly observe the experiences and insights of its participants regarding DT and its impact on the BM both pre- and post-pandemic and particularly on the online learning value proposition. The single case selected for the core purpose of this study is a pioneering born-digital HEI headquartered in Spain: medium-sized, private but partially state-funded, with an international community of 4,000 remote professors, which has grown from 50,000 to 75,000 students in five years. Based on a purposive sampling, semi-structured interviews were conducted with executive committee members, who were carefully selected based on various criteria (function, position, experience and contractual relationship). Four in-depth interviews lasting between one and two hours were conducted with the Director Management Office (DMO), the Vice Rector of Strategic Planning and Research (VRSPR), the Vice Rector of Competitiveness and Occupation (VRCO) and the Vice President of Operations (VPO), and the issues of digital transformation and challenges and opportunities in the pre-pandemic phase were discussed. In a second stage, the topics of the impact of COVID-19, forced and accelerated digitalisation and the envisioned future were discussed in follow-up interviews with the same participants. Two additional cases were added as a contrast to highlight the polar nature of the selected case study, a traditional face-to-face HEI, as an example of transformation, and Google EdTech, a potential player and an example of a disruptive training provider. The research was completed with observation of competitors' websites, involving the collection of 'live data from naturally occurring social situations' (Cohen, Manion and Morrison 2007). Observational procedures are fitting to this analysis of updated information published on websites in an inductive, unstructured observation phase involving taking notes of relevant information, especially regarding core topics of the analysis (critical success factors, trajectories of change).

Results

Student Value Dimensions for HEIs

Based on research of the literature and direct observation of players, we defined a model with seven critical success factors (CSF) from the perspective of an eighteen-year-old student who must choose a higher education alternative, namely, university quality, programme quality, attractive learning environment, high employability, limited cost, faculty quality and technology availability (Table 21.1). Each of these seven factors was detailed in sub-dimensions, totalling twenty-one descriptive items.

All the items were qualitatively evaluated at a past and future level to describe the evolution taking place in the sector, leading to the creation of value curves for each strategic group (face-to-face university, digital-born university and the new EdTech players and using the Google career certificates initiative as the referent model) and their comparison as an adaptation of a strategy canvas (Kim and Mauborgne 2004).

As regards university quality, the sector is moving from degree certification to certification of competences, as stated by some participants:

> The main challenge is to assume that our source of income cannot be subordinated to the fact that we are degree sellers, because we are near to the labour market no longer recognizing or assuming as evidence the fact that a person has an official qualification signed by the head of state. Therefore, with a business model that previously focused on this kind of monopoly of universities issuing official titles and foreseeing that this is not the added value that companies will ask of universities, we must make sure that all the added value of what we do goes beyond the monopoly of certification. We see the foundations of this monopoly vanishing as a challenge, but it is also a tremendous threat that hangs above us .... If we do not take this route in time, our certification will become worthless. (VRCO)

As regards programme quality, the industry sector tends to offer maximum flexibility in terms of learning resources, course design and learning and assessment methods, as stated by participants: 'Regarding how we do it, the main challenge would be to increase personalisation' (VRCO); 'We are moving from eminently textual materials to multimedia packaged materials' (VPO); 'We have to have a model that allows students to take the tests by themselves wherever they are' (DMO). Regarding an attractive learning environment, the sector is moving towards offering a student-centric personalised experience, as stated by one of the participants: 'Education must be personalised and its adaptability and quality increased' (VRCO). As for high employability, the sector is moving towards providing more services to increase students' employability and success, as stated by some of the participants: 'Our first responsibility in the environment in which we live is to guarantee employability'; 'Artificial intelligence and

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Table 21.1. *Value curves of HEIs' new competitive landscape*

Dimensions	#	21 Items /subdimensions	Authors	Past	Future
University quality	1	Academic recognition	Shah et al., 2013; Lapina et al., 2016; Khalifa, 2009	Degree certificate	Competence
	2	Social recognition	Khalifa, 2009	Functional (have a degree certificate)	Social (share a degree certificate)
	3	Culture (values, differentiation, goals, etc.)	Gupta et al., 2020; Lapina et al., 2016; Khalifa, 2009	Traditional	Modern
Program quality	4	Learning resources	Alhabeeb et al., 2018	Limited and proprietary	Unlimited (curation of best resources
	5	Course design (relevance, updating, flexibility, etc.)	Alhabeeb et al., 2018; Shah et al., 2013; Khalifa, 2009; Sun et al., 2008	Rigid	Flexible
	6	Teaching methods (face-to-face, hybrid, online)	Gupta et al., 2020; Shah et al., 2013; Khalifa, 2009	Limited	Flexible (multi-mode)
	7	Assessment methods	Alhabeeb et al., 2018; Sun et al., 2008	Limited and fixed	Flexible and diverse
Attractive learning environment	8	Personalization (size of class, individual interaction, support, etc.)	Lapina et al., 2016; Shah et al., 2013	Limited	Complete
	9	Physical accessibility - location and facilities (accommodation, sports, parking, etc.)	Lapina et al., 2016; Khalifa, 2009	Physical proximity	Digital proximity
	10	Digital accessibility - Online platform and support	Alhabeeb et al., 2018; Lapina et al., 2016	Limited	Total
	11	Students' qualities (internationalization, digitalization, motivation, etc.)	Gupta et al., 2020; Alhabeeb et al., 2018; Lapina et al., 2016; Sun et al., 2008	Low importance	High importance
	12	Social platforms (digital or physical social facilitation)	Khalifa, 2009	Physical places	Digital places
High employability	13	Employment support (job-market preparation, internships, etc.)	Khalifa, 2009	Low	High
	14	Graduates success	Shah et al., 2013; Khalifa, 2009	Difficult to observe	Transparent
Limited cost	15	Tuition fees, scholarship opportunities	Gupta et al., 2020; Lapina et al., 2016; Khalifa, 2009	Limited	Flexible
Faculty quality	16	Digital attitude	Gupta et al., 2020; Alhabeeb et al., 2018; Sun et al., 2008	Limited	Native
	17	Digital skills (motivational, pedagogical, interactive, etc.)	Gupta et al., 2020; Alhabeeb et al., 2018	Limited	Native
	18	Faculty expertise (teaching, professional, research)	Gupta et al., 2020; Alhabeeb et al., 2018; Lapina et al., 2016; Shah et al., 2013; Khalifa, 2009	Academically measured	Socially measured
Technology availability	19	Technological infrastructure (reliability, labs, WiFi, cloud, services, eg., e-mail, etc.)	Gupta et al., 2020; Alhabeeb et al., 2018; Sun et al., 2008	Basic	Sophisticated
	20	Technology design focused on user experience (UX)	Alhabeeb et al., 2018; Sun et al., 2008	Basic	Sophisticated
	21	Integration and difussion of technology (multi-device, standards, big data, augmented reality, flipped learning, etc.)	Gupta et al., 2020	Basic	Sophisticated

Face-to-face HEI
Born-digital HEI
EdTech

analytical data gives us the opportunity to systematically track the labour market .... Therefore, we can guide the student much more effectively and at the same time make it more personalised' (VRCO).

As regards limited cost, the sector is moving towards providing more free options (e.g., MOOCs) and flexibility (e.g., subscription-based), as stated by one participant: 'Doing this subscription service tomorrow is impossible since neither technology nor processes would support it, but we are thinking about it. The limit is maybe the market' (VPO). As for faculty quality, the sector tends to include expert profiles with high social impact in the faculties, as stated by one of the participants: 'Digitisation allows for much larger faculty teams who transmit their knowledge. You can have the best experts conveying knowledge to students' (VRSPR). And in terms of technology availability, the trend is to establish technology partnerships to be able to always offer the student the best experience that technology allows, as stated by one of the participants: 'An ecosystem of companies has begun to work with our university via this commitment to digitalisation and the implantation of more and more technology' (VPO).

Business Model Innovation of a Born-Digital HEI

The tremendous COVID-19 impact has forced the whole sector to move online, increasing the competition faced by the studied HEI, whose reaction has been to urgently accelerate its business model transformation to be able to deliver a full customised online learning experience. The multitude of changes that are taking place in the current competitive landscape, in addition to those expected to happen soon, have caused the studied HEI to react by combining the execution of actions with immediate impact with the design of emerging plans to build its transformation towards offering a fully personalised learning experience. Adapting from (Wirtz 2020) and (Waterman, Peters and Phillips 1980), the results show (Figure 21.1) that the current situation of HEIs is trapped midway between the stabilisation model (mainly because it was not until just prior to the pandemic that the face-to-face strategic group was considered a direct competitor) and the evolution adaption model (basically because the studied HEI was starting to react to the increasing presence of new EdTech entrants to the market). The COVID-19 shock has acted as a triggering factor because born-digital HEIs have suddenly started to compete with both a strategic group that was not previously considered a direct competitor, face-to-face HEIs and also with the innovative teaching models developed by EdTech players, also born digital but with a native digital

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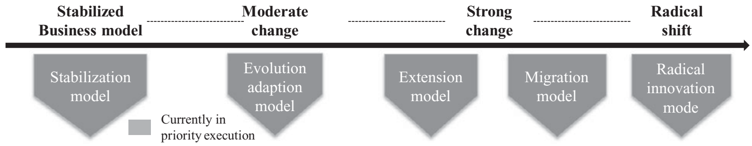

	Stabilization model	Evolution adaption model	Extension model	Migration model	Radical innovation mode
Strategy	Increase business orientation and establish the purpose	Develop new professionalizing offering based on market needs. Strategic segment: 18's. MOOC's	Be a guide for the student's employability. Subscription model. Technology integration	Gain student's trust for lifelong learning AI-enhanced personal tutor and recommendations	The student decides everything (co-creation): personalized unique learning experience based on job opp.
Structure	Adapt structure to digital transformation challenges Staff development, promote digitalization and cooperation	Leverage the 4,000 remote expert teachers and hire new talent based on job-market demanded skills	Incorporate 'star teachers' to increase attractiveness. Major integration of the HEI with external partners and suppliers	Establishing alliances and participating in more ecosystems (e.g., innovation)	Creating and managing combined robot / human structure
Systems	Integrated platforms and capabilities (CRM, ERP, virtual campus, etc.) Better planning.	Leverage new tech and data, faster time to market. Apply guarantee of authorship and identification	Flexible enrollment. External technical integration to gain speed and flexibility.	Automatized AI-enhanced processes	Student-centric automatized processes
Shared values	Re-invest digitalization savings into more value for the student	Leverage digitalization to improve quality of teaching and research. Increase student's ROI on employability	Co-creation with other key stakeholders (society, companies, governments, etc.)	Break the tradeoff "cost, access, quality" of education	Eradicate education inequality. Max. quality of the student-centric learning journey
Style	More business style. Keep technological investments	Shifting towards a shared digital mentality. Test everything. Build community	Major return to society and main stakeholders	Maximum sustainability	A model in SDG
Staff	Better internal cooperation	Better external cooperation	Attract best digital talent	New roles in place (e.g., AI, big data, etc.)	Managing the robots that make decisions that influence people
Skills	Overcome staff digital barrier. Know the student to improve UX. Social CRM skills	Integrate the cloud and analytics in the normal way of working. Know how to collaborate	Measure the quantified return of the students in terms of employability	AI, big data skills	Skills to manage robots

Figure 21.1 Change models as development paths for business model innovation: 7S framework.

SOURCE: Elaboration based on the integration of Waterman et al. (1980**) and** Wirtz (2020)

mindset, who can potentially disrupt the sector, as stated by one of the participants: 'It is clear that we have competitors who are much more powerful than universities (Google, etc.) that probably have advanced prototypes of all this personalised labour-competence-based learning process. The universities like MIT and Harvard will survive, but will we ourselves survive?' (VRSPR). Motivated by the triggering effects of the COVID-19 shock, HEIs have accelerated their transformation towards the new mission, anticipating a radical shift in their current business models, a process that will have to be managed progressively through the intermediate stages of extension and migration of current business models due to their great impact on the different parts of the organisation. The final outcome will be a radically transformed business model, a transformed structure and a totally new competitive landscape (see Annex).

Discussion

Our results confirm previous research on increased competition in the HEI context (Pucciarelli and Kaplan 2016) and the existing threats due to digital technologies (Posselt et al. 2018). However, the originality of this research is that it analyses the need for an urgent ‘business-oriented’ response (Pucciarelli and Kaplan 2016) from a large and pioneering born-digital HEI headquartered in Spain to a huge change in the competitive arena due to the shock caused by COVID-19 and the relevant emergence of EdTechs. This situation positions born-digitals as trapped between two relevant competitive pressures. First, during the pandemic, traditional universities have mostly been able to migrate online, a strategy which may soon loose relevance (Marinoni, van’t Land and Trine Jensen 2020) but could also drive these traditional players to move to hybrid models based on traditional assets that are lacking in born-digital universities (Posselt et al. 2018). And second, a born-digital HEI has neither the resources nor the capabilities to deal with the emergence of EdTechs in the short run (Kaplan 2020).

Our research also uncovered emulation choices beyond direct competitors as has previously been confirmed (Labianca et al. 2001). For example, born-digitals are benchmarking EdTechs to find sources of competitive advantage in a quest for self-enhancement. Traditional universities in turn have mostly migrated online (Marinoni, van’t Land and Trine Jensen 2020) as a short-term (initial) response to the pandemic, overcoming their likely weaknesses of low responsiveness to environment and competitive changes (Pucciarelli and Kaplan 2016).

From the perspective of the studied HEI’s management, the research also confirms the perceived risk of possible closures of universities (Marinoni, van’t Land and Trine Jensen 2020) for non-adapted players (Kaplan and Haenlein 2016). Meanwhile, the rise of EdTech ‘could change the future of work and higher education’ (Bariso 2020), the growth in capital raised and EdTech unicorns (The Complete List of Global EdTech Unicorns – HolonIQ 2021). Research has also confirmed that the aim of EdTechs is to gain prominence as a source of talent for employers and providers of degrees and certifications, thus threatening the current HEI monopoly to this effect (Kaplan 2020b).

Integrating previous research (Sun et al. 2008; Khalifa 2009; Shah, Nair and Bennett 2013; Lapina, Roga and Müürsepp 2016; Alhabeeb and Rowley 2018), this chapter offers a deep and real business analysis of HEIs by proposing a systematic assessment of the sources of value for students, which are represented in seven dimensions of critical success factors in students’ choices of HEIs. These seven success factors are made up of twenty-one sub-dimensions, from which we propose past and future student preferences. The three typologies of HEIs are evaluated according

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to past to future preferences. In doing so, we aim to capture the transitioning state of students' preferences, acknowledging that students are also immersed in the global digitalisation and pandemic processes. Last, responding to the need for a more business-oriented analysis and planning of the digital transformation of HEIs (Rof, Bikfalvi and Marques 2020), another contribution of this chapter is the use of the McKinsey 7-S framework to present the business model changes needed to be made by HEIs to face the current disruptions, bridging the normative-practice gap of business model change for the digital transformation of HEIs.

The analysis provided in this chapter can be considered in future research on the strategies of HEIs and other new educational actors and may be especially useful for HEI managers to think about their competitive positioning and the strategies to be developed to improve their business models. Policymakers can also derive lessons from the findings as regards the type of actors in the current and future educational landscape and the policies to influence the possible future scenarios.

Conclusion

The COVID-19 shock on society is evident and HEIs are no exception. The ongoing digitalisation has been accelerated and accompanied by a forced transformation, further generating significant changes in HEIs' competitive landscape. In an imaginary scenario, the proven operational capacity of HEIs to change and adapt to the emergency situation might become fully integrated and further develop and consolidate as a strategic capacity to change (Alvesson and Sveningsson 2015). This dramatic adaptation will be essentially required in a sector whose boundaries are being aggressively trespassed by new EdTech competitors with innovated-digitalised business models.

The future of higher education depends on how well it will succeed in managing the emerging challenges and in leveraging increased cooperation with governments, communities and other stakeholders (Marinoni, van't Land and Trine Jensen 2020). Furthermore, there is a demand for the updating of teaching methodologies to effectively develop employer-demanded skills and offer better job-related services (Kaplan 2020b). On the whole, there are a myriad of factors which threaten to transform the three basic missions of the university: teaching, research and public service (Pucciarelli and Kaplan, 2016).

While the chapter contributes with a customer (student) centric approach for value creation based on a business model that contemplates

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Table 21.2. *Business model innovation of a born-digital HEI: 7S framework*

Strategy	Establishing and sharing the picture	Increasing the business orientation of the management team and recognising the strategy formulation as a dynamic and iterative process needed to adapt to rapidly changing market conditions
		Establishing the vision, purpose and direction of the HEI to clearly share the new value proposition
		Unconditional commitment of the management team to 'truly' becoming a digital university (e.g., sustained technology investments)
		Aligning resources to execute the purpose (e.g., sustained technology investments, hiring digital talent, etc.)
	Student engagement strategy: individual student-centric	Unique and personalised student-centred learning experience, before, during and after the learning process itself
		The student decides everything: when they begin to study, what they study, at what pace,and where, how and when they sit exams
		Being a guide for the student, an advisor to constantly improve their employability (e.g., by automatically tracking labour market needs)
		Establishing a trusting relationship throughout the student's learning life (e.g., helping the students to manage their professional career and transitions)
		Always seeking to know the student better (e.g., data analytics) to offer him a better experience
	Digitalised solutions strategy	Offering each student a personalised learning solution that allows them to acquire the desired skills to match the required competences for an identified professional opportunity
		Incorporating algorithms for recommending key teaching resources (internally developed or externally selected), based on the student's profile, their learning preferences and their objectives
		Incorporating a personal tutor, based on artificial intelligence, to offer expert recommendations to resolve queries and problems and improve the student's learning process
	New offering	Developing a policy of the constant development of a short-term, professionalizing teaching offer, aligned with what the market needs right now

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Table 21.2. (*cont.*)

	Targeting new customer segments	Globally searching for a new segment of students who seek to quickly train in the areas of the market where there is demand at that precise moment.
		Being able to understand and be prepared to design and offer a teaching experience according to the needs of younger university students (18-year-olds), a segment that naturally connects better with the face-to-face university model, especially due to the social experience derived from it
	Innovating the business model	Adding enough value to the teaching offering to break the dependence on income derived from the monopoly based on issuing official degree certificates
		Being able to combine a paid teaching offer with a free but also high-quality teaching offer (e.g., MOOCs).
		Offering based on a subscription model, different learning service packages.
	Reformulating the value chain	Integration of externally developed technology to provide a better experience (e.g., Google suit for education)
		For an individual student, integration of the best existing learning resources with multiple formats and always updated. This learning material will include personalised comments and marks to support the student
		Student co-creation: the student decides the programme, the itinerary, the pace, the kind of interaction, etc.
		Automated recommendations based on intelligent algorithms (e.g., the library recommending learning resources)
Structure	New structure	An organisational structure that allows the challenges of digital transformation to be faced and improvement of the personalised learning value proposition
	External organisation structure	Managing a growing base of more than 4,000 remote expert teachers and bringing in new experts in the new skills demanded by the job market
		Being able to incorporate 'star teachers', the best globally in their area of knowledge, to improve the attractiveness of the value for the student
	Organisation model	Promoting the personal development of workers, remote work, work-life balance and international mobility
	Increasing internal cooperation	More cross-functional cooperation to eliminate silos that fragment the student experience

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	Increasing external cooperation	More connection between the HEI and the external world, creating a distributed company that interconnects the internal structure with external partners and suppliers (e.g., technology providers such as Google).
		Working together with other HEIs, industry, society and governments to overcome digital transformation challenges (e.g., knowledge exchange, virtual internships, professional projects, etc.)
		Establishing more alliances and participating in more ecosystems (e.g., in research)
Systems	Operational excellence	Integrated platform and capabilities (CRM, ERP, virtual campus, etc.) to efficiently manage all relationship, communication and transaction processes with different stakeholders (potential students, students, teachers), teaching programmes and courses, teaching materials and resources, administrative services (e.g., enrolment at the student pace), support and service, etc.
		More planning of all the activities and processes to be able to operate excellently
	Faster adoption of digital trends	Greater and constant growth in technological integration with third parties to be able to evolve at the market pace (speed and flexibility)
		Constantly analyse the opportunities that new technologies offer and adopt those that fit the desired strategy (e.g., more interactive teaching materials)
		Capturing emerging market needs and developing and delivering new products faster and more flexibly
	Guarantee of identification and authorship	Establishing digital processes that fully guarantee the identity of the student and the authorship of the content and teaching activities provided (e.g., exams)
		Offering reliable training certificates valued by the labour market
	Data-driven learning system	Continuous teaching improvement based on data analytics
		Continuous monitoring of students in their learning process, use of the virtual campus, teaching materials, etc., to automatically improve learning results
	Communications, processes	Industrialised and scalable processes to offer relevant, fast and automated communication with students to deliver an experience comparable with leading digital technology companies (e.g., Amazon)

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Table 21.2. (*cont.*)

Shared values	Eliminating inequality	Ensuring maximum access to the university offering in terms of cost and the required technology to avoid the digital divide
	Increasing quality	Taking advantage of digital technologies and partnerships to keep improving research and teaching quality (e.g., developing new technologies and systems to guarantee student digital identification)
	More open culture	Creating more opportunities for participation and connection with society
	More value for the student	Continuously re-investing the savings achieved through digitisation in added value for the student
		Continuously working to increase students' employability and possibilities for professional improvement
Style	Sustainability	Trying to improve the sustainability of everything the HEI does, with a return to society mentality (e.g., a project to transfer capabilities for e-learning deployment to other international HEIs)
	Digital mindset	Shifting towards a digital mentality to adapt to a digital world
	Business orientation	Increasing the business orientation of the management team and recognizing the strategy formulation as a dynamic and iterative process needed to adapt to rapidly changing market conditions.
	Technology investments	Keeping a sustaining technology investment strategy to always be in a digital transformation process
	Piloting and experimenting	Testing everything on a small scale (e.g., even if in a basic way) to continuously experiment, learn and improve
	More community	Developing new projects and activities that build community (e.g., fostering new venture creation, etc.)
Staff	More collabouration	Leveraging collaborative tools to cooperate more on a cross-functional basis (internal) and with external contacts (e.g., research, technology, etc.)
	New roles	Defining the new roles needed to fulfill the new mission, artificial intelligence specialists, big data, etc.
	Attract digital talent	Being able to offer an attractive professional opportunity to attract the best digital talent in data, cybersecurity, etc.

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Skills	Skills to know the student	Learning how to know students' needs and learning preferences better to provide the best experience
	Skills to measure ROI	Learning how to measure the quantified return a student gets from the investment made in the HEI, based on professional improvements
	Digital skills	Continually investing in digital skills development to eradicate the digital barrier, resistance from teachers and staff (e.g., new competences in video)
	Cloud skills	Knowing how to work increasingly in the cloud
	Collaboration skills	Knowing how to work increasingly collaboratively, with both internal and external teams shaped by projects
	Data skills	Continually increasing the capability to manage and analyse data
	Social CRM skills	Developing the capacities to efficiently attract, manage and retain students in a digital environment of social networks, search engine marketing, multi-channel experiences and mobile telephones.

trajectories of the digital transformation along 7S, a series of intriguing questions remain unanswered. Further research might find avenues for exploration to answer questions like 'Who will win, the incumbent HEI or the disrupting EdTech player?', 'Will the winning strategy be customer engagement and/or integrated digitalised solutions?', 'How will personalisation and customisation of the learning process be done in the face of emerging AI and big data technologies?', 'What will the role of the teacher be and how will staff be moved around the HR cycle?' and 'How will cooperation between different stakeholders be achieved?', to mention just a few (Table 21.2).

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CHAPTER 22

Personalisation of Higher Education
From Prospects to Alumni

Grzegorz Mazurek and Karolina Małagocka

Technology and digital interference are changing higher education, although less rapidly than other industries. The medium of these changes is the increasing use of data in university management, designing the student journey and creating the educational experience. The path to data-driven education began with the collection of data reported to policy-makers. At present, this approach finds application also in the various forms of support offered to students entering university, in the solutions adopted to assist them in making progress and succeeding in education.

One of the forms of practical application of data is personalisation, defined as 'the strategic creation, modification, and adaptation of content and distribution to optimize the fit with personal characteristics, interests, preferences, communication styles, and behaviors' (Bol et al. 2018). This means an increasing influence of students on the process of acquiring knowledge and reaching a diploma but also an opportunity for higher education institutions to tailor activities to the interests, needs and behaviours of individuals. Personalisation is increasingly and rapidly becoming a central expectation in the digital revolution of higher education.

Digital interference is a challenge as well as an opportunity for universities, in terms of defining their place in the market and their role in society, which means transforming from being self-focused to serving others. The concept of University 4.0 involves educating students to be global citizens who understand sustainability thinking, which involves being deeply connected to the industries and communities around them (Barnett 2011). This transformation is not only about redefining its role but also how it delivers knowledge and continually expands the groups that its educational offerings reach. Expecting that online courses delivered on platforms such as Coursera, edX and Udacity would disrupt the higher education sector never happened in fact. Even the activity of EdTech start-ups, which became increasingly present in the landscape of higher education, did not result in rapid or dramatic changes. As analysed by Kaplan in

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Chapter 1, introducing technologies and enforcing changes for themselves should not be a strategy of HEIs, whose strength is still providing a service based on interpersonal relationships. A university, open to serving others and widening access to education, is an institution that provides flexible modes of learning to suit personal goals. This includes switching between in-person, blended or completely remote learning. At the same time, the future is moving beyond esteemed academic degrees and embracing life-long skills enhancement. For higher education institutions (HEIs), this means mixing degrees, creating shorter courses and working extensively with external partners to co-create qualifications that meet the demands of the changing reality. HEIs will not only have first-generation students coming to the university but also graduates with the need to supplement the skills acquired during their studies on a just-in-time basis. This requires the perfect match of the educational offer to the needs of many. Personalisation and data-driven decisions bring this goal closer and create challenges on many levels starting with privacy concerns, the status of higher education and others.

The changes in HEIs are the result of the prevalence, as well as the subordination, of education systems in many regions to the rules of the market. Researchers working on this subject point out that increasing competition, declining demand due to demographic indicators, as well as the growing specialisation of educational institutions can be associated with a growing trend of consumerism and the perception of students as customers (Tomlinson and Watermeyer 2020). As a result, today's HEIs are not so much recruiting as selling an educational service with the resulting consequences, which include an increasingly conscious and guided approach to the student-customer life-cycle. Students are becoming 'savvy shoppers' constantly comparing the offerings of different HEIs which must respond to their changing needs of quality and experience. The studies postulate the requirement to move away from the one-size-fits-all approach, in which technology and the transformation of HEIs into market-based institutions are to be extremely helpful. It seems necessary to personalise the educational offer and one's experience with the HEI from the very first contact as a prospect to the stage of a returning lifelong learner (Alamri, Watson and Watson 2021). The Chapter 23 outlines the roles of personalisation at successive stages of the student life cycle. Starting from stage one with communication and on-boarding to student support through the learning stage with the option to adjust pathways, pace and scope to the degrees stage, which may become less homogeneous due to increased personalisation.

Stage 1 – Personalisation during a Student's Induction into a University: Communication, On-boarding and Support Services

Communication personalisation starts with websites visited by prospects to learn about educational offerings. It includes tailoring content and appearing messages to one's interests, using data to identify and then personalise messages. Comprehensive digital personalisation includes collecting data from student geolocation, public IP addresses and custom searches to create targeted messages and position themselves as the best fit based on the academic programme, extracurricular activities or careers the prospect may be interested in. Communication is done on a personal level, increasing engagement and creating a unique pathway to enrolment.

Universities are increasingly using professional software to support prospective students through personalised communication. Wharton School uses Hub Spot's CRM in conjunction with Salesforce to automatically identify and qualify based on specific demographic and behavioural characteristics. The system automatically checks if potential students meet Wharton's criteria and then invites them to join the Salesforce community of their choice. Once they are engaged, it is far easier to identify their interests and then present matched options from the education offering. The mechanism of operation is like other recommendation systems, such as on Netflix, Amazon and other platforms. Enabling real-time personalisation and entering into dialogue with prospects at the earliest possible stage of their contact with a school increasingly means the difference between a newly admitted student and a prospect lost to a school that better understood their needs.

HEI campuses across the country are beginning to see the benefits of meeting students on mobile devices, striving to make their usability extend beyond the mobile version of the college website. With most students preferring to visit a website to review programme details online before contacting a school, and student engagement then shifting to platforms built with short content in mind, universities are being pressured to provide relevant information during each contact via a form with an option to ask a question, chat on the site or the university's social media profile, Messenger and others. Without proper automation, recruitment teams may find it difficult to deliver relevant content at the speed required by students. Apart from this, they will not have the ability to tailor communications at each stage of the student recruitment process, preventing potential students from accessing the information that leads them to register.

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At least two additional forms are increasingly being offered: apps and chatbots. Both aim to bring useful content when prospects or students need it and to collect data on likes, interests and past behaviour. The information available all the time and delivered on time is becoming part of the HEI culture. Research on chatbots used in recruitment has been conducted by academics from Kozminski University and MIT indicate that they were positively perceived by prospective students (Ciechanowski et al. 2019). Also, they can answer a vast number of questions asked by applicants, such as the Lola chatbot used at the University of Murcia in Spain, which has been answering questions about the campus and study organisation since May 2018. Lola handles an average of 800 enquiries, most of which are created outside of administration hours. This case is particularly often described because it simultaneously proves that, with a level of more than 38,000 questions, more than 90 per cent of the answers were correct, which leads us to believe that the experience of interacting with the chatbots is rewarding. At the same time, it allows us to identify the areas that cause the most uncertainty. These are used to prepare new services and programmes to shape a better educational experience.

At this point, it is worth emphasising that artificial intelligence is marketing game-changing technology, as software helps people, acts on their behalf and supports the recognition of their needs. Meanwhile, AI, as the Internet or social media before it, is changing the rules of interaction between entities and stakeholders, influencing ways of communicating in everyday life (Haenlein and Kaplan 2019). Chatbots operating in education have the transformative potential to automate repetitive activities such as answering prospects' and students' questions; they can act as assistants for daily tasks, provide information about upcoming classes, credits or deadlines and at the same time provide universities with data and the ability to understand what motivates prospective students and engage them on their terms (Forrest and Hoanca 2015). The challenges include privacy issues. There is no personalisation without personal data and its use. However, students should know what is being collected and for what purpose. With the introduction of regulations increasing the level of protection and control over personal data, its collection, processing and use by HEIs are becoming a challenge. In the current situation, data protection and privacy laws such as GDPR or CCPA, which regulate the scope of data use, at the same time allow their use in justified cases related to the security of the state and citizens. For all other activities, the express consent of the providers is needed. More detailed provisions concerning, in particular, processing without consent and the right to erasure make it necessary to precisely inform students about activities related to their data, while at the same time creating new requirements for university administration. Currently, observed trends in legislation may be perceived as a manifestation of the recognition of privacy, as a fundamental human right requiring state protection and subject to further strict regulation (Mazurek and Malagocka 2019), which will not fail to influence the application of data-driven strategies in higher education. It may be tempting for universities to watch databases proliferate in this digital age of transformation and increasing opportunities to apply insights from analytics, however, it is still important to reassure students that they have the option to delete their profiles and also to make all parties involved aware that they deserve easy access to what has been collected.

An additional aspect that can be counted among the challenges related to the personalisation of communication is the creation of data repositories of significant size and sensitivity of the information contained, including that about the intellectual capabilities or well-being of individuals. This raises the question of whether the management of such collections should remain in the hands of individual universities, the responsibility for their security should rest with the administration or whether national or even supranational repositories should be created. This solution would provide additional funding for security but also data mining in search of patterns.

Stage 2 – Personalisation during the Student's Life: Personalisation of Learning and Student-of-One Pathways

Students, who are customers of brands such as Amazon, Netflix and Spotify, expect personalisation. After positive experiences with marketing practices, and the first stage of contact with HEI, the time for the educational experience has come. In this aspect, digital transformation is also making its mark by increasing the emphasis on a new model called personalised learning, which is a distribution of the traditional models used in education.

Similar to other models used in digital transformation, personalised learning also draws on established learning theories, in particular, Bruner's constructivism and Benjamin Bloom's research calling on the academic community to replicate the effectiveness of one-to-one tutoring or small group work – on a large scale, where the focus is on the student rather than the teacher. Redding (2014) stated that personalised learning is replacing the traditional one-size-fits-all educational model, which is based on time, place and pace, with one that engages students in meeting their

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own needs, goals and interests. They are also based on a rather mythical notion of the average student, which assumes that you can conduct evaluations and assess progress based on some averaged pattern. However, the challenges posed by digital transformation, the increasing personalisation of almost all aspects of life, as well as their technological development, require talent refinement, moving away from a learning model based on linear progress over time to a model that frees students from artificial constraints (Zhang, Basham and Yang 2020).

Thus, personalised learning can be defined as prioritising the needs of individual students when developing curricula and teaching materials. It involves tailoring content to individuals' needs, interests, goals and prior experiences to enhance knowledge, skill acquisition and intrinsic motivation. Administrators at some universities and colleges have realised that personalised learning can improve learning outcomes, thereby increasing retention rates and even returning alumni. Consequently, decades after Bloom's research and postulates, the higher education community is only beginning to evolve towards personalised learning. Even before the COVID-19 pandemic, many universities were providing online materials, implementing cloud-based tools, offering platforms for collaboration or examination and even further education, but their contribution to the total reception of the curriculum was limited. In theory, lectures that require little personalisation or human interaction have for years been able to be recorded as multimedia presentations that students can watch at their own pace and place. Similarly, some parts of the programme have long been able to be delivered by resources outside the university, for example, through elements from the Coursera or LinkedIn Learning platform, but it was only the enforced mode shift to distance learning that accelerated the exploitation of these opportunities.

Another aspect of personalisation during the life of a student is the creation of individual pathways. Digital technology enables these to be created on a large scale, for virtually every student. This is based on vast amounts of data which are then used to support student learning, designing next steps including giving guidance on which modules should be included and which can be omitted in conjunction with the learning outcomes achieved at an earlier stage. The aim is to enable students to learn according to their profiles and to provide greater flexibility. An example, in addition to others already in use, is the personalised professional master's degree programmes implemented by CU Denver. They provide the opportunity to develop knowledge and skills in a chosen field, while also offering the chance to personalise your education through a tailored programme of interdisciplinary courses. The programme involves using half of the credits to deepen knowledge and skills in a chosen professional field and the remaining half of the credits to select interdisciplinary courses related to the student's interests or areas that they feel they should develop.

Dynamic personalised pathways are rare, although a certain degree of autonomy in the choice of additional courses is standard, most often still not a data-driven, decision-making process, but only leaving a certain degree of choice in the hands of the student. However, it can be assumed that with the development of the use of data and the progressive personalisation of the 'student-of-one', pathways-options will become more widespread, also due to the possibility of supplying them for life, work and the costs of education understood directly – as tuition fees – or indirectly. Elements such as competency-based learning, virtual coaching, internships and peer-to-peer support could offer students rich education and career alternatives. Emerging tech platforms and connectivity could allow for scales, such as the ability to provide multiple, single-student pathways for thousands of students across hundreds of careers and fields.

The good things about personalised learning include the ability to reach more students and adult learners, the option to form partnerships with different industries and the continued expansion of offerings to include training pathways and certifications. Improvements in educational technology and a better understanding of individual learning needs may lead to freeing up resources from courses that can be served by digital elements. That will create momentum for universities to engage more resources in research-based teaching, personalised problem solving and mentoring. Students would also have more resources at their disposal as they would not have to spend years on campuses following a top-down agenda. Instead, the focus could be on group assignments, elective classes, interactions and career guidance, which cannot be done remotely and require face to face involvement. This is a hybrid model of education that can make education more accessible also to those who constitute a growing group of customers: lifelong learners. While the number of student-age people in the population is declining, mainly in the US and European markets, adult and returning students can be an important customer. For this group, affordability is one of the factors of the educational offer, others will be the match with already acquired qualifications, directly linked to the degree, diploma and certification process. Another important aspect will be to discover what can enhance the qualifications of the professionally active student. Apart from this, for working people, who have developed

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habits, often combining work and family responsibilities, higher education models that are 'based on everyone and relevant to no one' will not adequately meet their needs. The advantage of universities over the increasingly widely available courses offered by EdTech companies may be the assurance of continuity of learning based on certificates, diplomas and credits obtained, as well as the personalisation of pathways, which will combine virtual elements with in-person learning.

The personalisation of learning and pathways tailored to the student also comes with challenges. An Orwellian perspective presents them as the process of replacing contact with lecturers with computers and technology and the excessive profiling of students, putting decision-making in the process of acquiring knowledge in the hands of algorithms with all their bias and finally data mining only to result in the creation of 'playlists' instead of curricula. As a result, the process of acquiring knowledge, the mentor-student relationship and the value of diplomas or certificates will be blurred. An OECD study on the use of ICT in teaching shows a negative relationship between the use of technology and feelings of attachment and engagement (OECD 2019). Initial work based on the COVID-19 experience and distance learning is already emerging and seems to confirm these findings (Daniel 2020; Kedraka and Kaltsidis 2020; Lassoued, Alhendawi and Bashitialshaaer 2020). Consequently, the personalisation of learning during the student's life seems today to be technologically feasible to the greatest extent possible and even attractive given the changing audience structure of educational provision.

Stage 3 – Personalisation at Successive Stages of Education: Students for Life and Skills over Degree.

A student completing a personalised pathway instead of a fixed curriculum can be seen as more than just a closed cycle from acquisition and recruitment to graduation. The credits system and the increasing capacity to store, aggregate and analyse data make it possible to see alumni in terms of a customer for life, students who return to the same institution each time they need a new educational element. This approach represents a shift away from linear thinking in terms of primary school through secondary school, then through bachelor's and master's degrees and only at the final stage or afterwards, additional studies become relevant. Meanwhile, education should be continuously personalised, providing the possibility to assemble it from available elements, depending on the demands of a particular community, regional development or planned career

(Krishnamurthy 2020). Drawn from the mindset typical of sales and support companies like Salesforce, viewing the customer path as a cycle rather than a line, are bounded by an exit and entry point. This also means focusing on delivering value continuously and calculating revenue, rather than focusing on one sale and its associated profit. For private universities or those operating in countries with a tuition model, this appeal can be translated directly. In other regions, it can be understood as a model for extending free educational services with paid elements, as well as for continuously supplying the market with skilled people, which fulfils the assumptions of universities serving their communities and surroundings.

Another perspective related to personalisation in higher education is the adoption of a 'skills beyond degrees' perspective. Today, degrees are still very relevant, they are a confirmation of competences and valences in critical thinking, analytical and others. They are a confirmation of status, while at the same time they regulate access to forms of work which, with development, have come to require corresponding diplomas and certifications. These certificates exclude those who do not have them, 'handicapping' them in the pursuit of status-based rewards. Consequently, dominant social groups use the relevant connotations and associations of having a higher education in a given society to reinforce their access to the good of highly valued qualifications (Bendixen and Jacobsen 2017). Nevertheless, we are approaching a situation in which skills will be more important than diplomas. This will disrupt the conventional thinking that assumes a university degree is the surest route to success in working life and that having a degree correlates with better employability and higher income. This tendency is also a part of the ongoing discussion about the decline of the leading position of universities as providers of educational services and knowledge to the market (Kaplan 2018). This happens in regions where students face high tuition fees but also in education systems where the university is 'free' and all that remains is the opportunity cost of spending several years acquiring knowledge that will most likely have to be revised or supplemented many times over. It is debatable whether a traditional higher education is still the best way to provide the skills needed to compete in unpredictable labour markets, which are so volatile that most of the jobs that current students will do have not yet been created.

Currently, diplomas still function as a beacon that confirms the worker's skills. A diploma signals its 'quality', especially for potential employers, because the employer may not be able to effectively verify it, nor is the employee able to credibly demonstrate their skills. However, in a situation where university qualifications are becoming more widespread, the

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benchmark required for a comparative analysis will be lost as pathways and the programme range become personalised; then recruiters and employers will increasingly demand them to prove their preparation for their duties. This means greater openness to candidates without a higher education, which may, in certain situations, promote people from groups at risk of exclusion, while it may also reduce the importance attached to diplomas, making the effort to obtain them unprofitable. In the age of ubiquitous disruption and an unpredictable evolution of professions, it will be difficult to maintain the ethos of acquiring knowledge and obtaining an academic diploma.

The challenge of increasing personalisation is to maintain the quality now associated with degrees and the accountability of the process. Offering different pathways and content may increase satisfaction, enable a broader customer base for education but it is also a route to diluted expectations, greater inequality and difficulty in maintaining schools' accountability for the core service of awarding appropriate degrees.

The shift towards online studies to on-campus activities provides opportunities to personalise learning beyond current and common practice. Students with fewer classes requiring physical attendance can select courses based on their interests without having to consider timetables, the availability of lectures, classrooms and time limits. Regardless of whether the studies are paid for with time allowances or free of charge, as in most European countries, with this solution there are also no costs connected with moving or the necessity of permanent residence in a place that makes studying possible. It is also an option to take up a job and combine these two aspects. At the same time, the student has more options for linking professional growth with education, which may affect their well-being but also further needs for the development of skills and competences. Therefore, it can be assumed that studying in the full-time mode gaining in-person degrees will become exclusively for wealthy students. Consequently, on-campus programmers will become synonymous with status but may also be a quality mark which will result in innovation instead of serving everyone becoming a route to increased stratification.

The importance of diplomas is also derived from the guarantees provided by the state through the established regulation, these assume the credit hour and requirements to be met to obtain a certificate. Meanwhile, the expectations of students and employers aim to demonstrate whether graduates can think critically, reason analytically and solve problems. The autonomy of universities in many higher education systems is limited regarding financial resources, management system, university profile or programme design, making it difficult to adapt educational, research or consultancy offerings accordingly. A strict framework imposing forms of study limits innovation in providing different certifications, ways of acquiring knowledge through masterclasses, various courses and even development programmes based on credits earned outside the in-class system. Innovative methods can be used as an element of personalisation towards predefined degrees; however, they should first be included in the system by the respective authorities and considered in accreditation systems. Only then will the degrees obtained retain their value and the education system will be transformed using new models and not just newer technologies.

Conclusion

Personalisation in higher education concerns the whole life cycle of the student, which starts from the moment of entering university to today's trends of lifelong learning. Personalisation is becoming possible to an increasing number of points of contact between the student and HEI simultaneously with the availability of technologies that make it possible to continuously acquire, process and analyse data and apply the resulting conclusions. The personalisation of education carries the promise of data-driven decision-making while maintaining, as it were, a scientific notion. However, as this chapter shows, a distinction should be made between the narrow use of private information and the broad one characterised by the use of anonymised data. Although the situation is changing dynamically, we mainly observe the effects of narrow use in communication, personalisation of messages. We are still in the early stages of creating personalised learning paths based not so much on the choices and preferences of individual students but fed by the data. On the one hand, the personalisation of learning appears as an opportunity to strengthen the trend towards lifelong learning and to enable people from different backgrounds to undertake studies. At the same time, doubts arise whether breaking the homogeneity of diplomas will not devalue them both socially and economically. There is also a lack of proven models of generalising conclusions and patterns resulting from individualised student paths, and thus from individual failures and successes, using available technologies, large anonymised databases could be created, allowing for mistakes to be avoided in the educational process. The creation of such benchmarks could, on the one hand, strengthen the drive to personalise learning and, on the other, reduce the level of doubt about what the grades obtained in such a process will signal.

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PART VI

Careers and Professionalisation

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CHAPTER 23

About University Career Services' Interaction with EdTech

Elizabeth Knight, Tom Staunton and Michael Healy

International trends in higher education include a growth in focus on the importance of supporting graduate career destinations (Burke and Christie 2018) and the rise of EdTech as a major force in higher education (Selwyn 2014; Peters and Jandrić 2018). This chapter will explore how these two trends intersect in university career services.

As Chapter 1 mentions, there is an ever increasingly competitive market for contemporary higher education (Kaplan 2021), thus universities are under growing pressure to demonstrate that they make a meaningful difference to their graduates' employment and career success. This outcome, essentially framed as the return on investment of personal and public investment, underpins higher education institutions' claims as attractive options for prospective students (Bennett et al. 2019; Bridgstock and Jackson 2019). The employability agenda (Matherly and Tillman 2015) has prompted moves toward institutional cultures of shared responsibility – by academics and support staff alike – for student employability and career success (Smith et al. 2018).

As a result, higher education institution (HEI) career and employability services are evolving from bounded, stand-alone services toward being members of 'connected communities', pursuing projects in 'coordinated collaboration' with a wide range of internal and external stakeholders (Dey and Cruzvergara 2014; Bridgstock and Tippet 2019) such as faculty, alumni and engagement units, ICT and university systems and employer networks. This has required a shift in career and employability service priorities from the traditional intensive individual career counselling and guidance, toward efforts to work at greater scale with cohorts, such as contributing to the curriculum or delivering large-scale career education programmes and services that work alongside it (Bridgstock, Grant-Iramu and McAlpine 2019; Brown et al. 2019). The shift in orientation of career and employability services requires practitioners and researchers to consider how technology is driving change in university career services and

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how technology impacts on their professional practice. Our chapter has explored these strands and starts from a position that incites career services in HEIs to approach innovation from a more critical perspective.

Technology

EdTech IT platforms have been adopted by career services to streamline appointment and event bookings, collect data and provide career and employability information resources such as web pages, videos and e-books. Over time, platforms have become more sophisticated and now provide career and employability assessments, customised learning plans, e-portfolios, industry mentoring and job vacancy functions. Several platforms now offer products employing artificial intelligence, such as automated resume reviews and video mock interviews or algorithmic matching of students with work experience and employment opportunities. There is a growing ecosystem of career and employability EdTech providers, with several dominant platforms offering comprehensive suites of products (CareerHub, Symplicity, Abintegro, InPlace) alongside numerous smaller niche providers focused on specific services, such as resume or job interview support. The career and employability EdTech ecosystem can be viewed as an example of wider conversations around the emergence of the 'digital university' (Peters and Jandrić 2018).

This chapter will bring together conversations about the development of the digital university (Kaplan 2021) with conversations in the field of career guidance about the development of digital tools. Discussions about the use of digital tools in career guidance have drawn attention to the potential of career work to be enhanced by digital tools (Hooley 2012; Hooley, Shepherd and Dodd 2015; Kettunen 2015; Moore and Czerwinska 2019) but also the need to think critically about the consequences of digital delivery (Buchanan 2017; Green 2017; Hooley and Staunton 2020; Staunton 2020). A recent report on the professional practice of HEI careers services in the United Kingdom noted the impact of digital technology, particularly in the aftermath of the COVID-19 pandemic (Thambar, Neary and Ananthram 2021). Following on from Hooley and Staunton (2020), we will explore the need to move beyond merely analysing the effectiveness of using digital technology to enhance delivery (Moore and Czerwinska 2019) toward considering digital technology from a broader sociological perspective.

In particular, we will look to challenge the view that EdTech is just a natural development of education which carries no significant challenges. Though EdTech can be useful, we need to think carefully about how we understand it. As Henderson, Selwyn and Aston (2017) have argued, the typical rhetoric of the digital university is normally that technology 'disrupts' education and creates 'new' forms of learning. Henderson et al. (2017) argue that this is often far from the case when we consider the experiences of students using digital technology, often what is billed as enhancement is more commonplace reproduction of existing practices in a digital form. We need to be careful to consider what claims are being made about the impact of digital technology and if this is more than mere rhetoric. As well as needing to be critical about the impact of EdTech we need to be aware that the digital university creates new models. Rather than simply being a natural progression, EdTech brings with it a change in logic and ideology. As Mejias (2013) argues, technology has in-built ways of thinking that we are required to adopt in order to make use of them. For example, Facebook dictates a view of what social relationships are and users have to follow Facebook's logic to interact on their platform. The same can be said for the professionally oriented social media platform LinkedIn (Benson, Morgan and Filippaios 2014). Both at the levels of ideas and structures, EdTech challenges and changes what HE provisions looks like. Finally, EdTech often operates as platforms (Srnicek 2017) which brings different users (students, academics, employers, etc.) together and creates a space to build other services upon with the ultimate aim of creating an ecosystem which creates profit. Komljenovic (2021) characterised EdTech platforms as 'digital rentiers', to whom universities pay monetary rent and students pay data rent.

Product

The chapter considers four technology solutions which offer career development solutions for higher education students. Through analyses of the literature on digital technology in careers services (Hooley 2012; Hooley, Shepherd and Dodd 2015; Kettunen 2015; Buchanan 2017; Green 2017; Moore and Czerwinska 2019; Hooley and Staunton 2020; Staunton 2020), we have established a typology of products and services offered to HEI career employability services offered in Australia and the United Kingdom. This typology includes four broad categories of career services EdTech:

- replacement or enhancement of administrative functions (e.g., booking career counselling appoints, webinar and seminar registrations)
- video interview practicing solutions
- application review tools (e.g., resume or cover letter reviewing)
- virtual internship solutions (including VR work exploration).

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The four EdTech products were purposively selected (Gerring 2007) to represent each of these categories: CareerHub (careerhub.co.uk), Interview Stream (interviewstream.com), VMock (vmock.com) and Forage (theforage.com). As a result, this chapter covers a representative breadth of elements of EdTech for careers services.

To understand how these different EdTech interventions operate within HEIs and change modes of interaction with students and university communities, we will analyse the promotional materials of each product in order to consider the service and product offered and how it is situated in the careers service EdTech ecosystem.

Method

In seeking career development–oriented solutions which purport to aid or in some cases replace the delivery of career services in universities, we seek to shed light on the nature of the contemporary dynamic between technology and higher education in the context of careers and employability support. However, we note that this is very time bound and dependent on solutions available at present which may change through innovation, so in this work we also seek to concern ourselves with the relations between technology solutions and texts through examination of the discourses that are at play in the promotional materials of products and services that align with our identified typologies. Therefore, by using discourse analysis methods and undertaking a close reading (MacLure 2003) of the promotional materials of career service oriented digital technology solutions.

We will examine the materials' visual and discursive presentation to better understand how the EdTech industry represents the delivery of career development within universities. We do this by adopting a 'visual grammar' analytical framework to systematically analyse each set of documents describing a product or service for career and employability services in HEIs (Koh 2016). This mobilisation of a visual methodology enabled us to conduct a multimodal analysis, for example, looking further than just in textual analysis (Kress and van Leeuwen 2006; Koh 2016) which recognised the impact of the visual in the marketing and presentation of digital technology to career services.

We used a slightly amended version of the specifically designed analytical framework for the analysis of the solution following Koh (2016), who applied visual, aesthetic and semiotic analysis to online tutoring advertisements. In particular, we will analyse the semiotic content of illustrations, videos, typographic and design elements and other textual and aesthetic content.

Essentially we draw on Koh's (2016) analysis framework and amended his questions, which resulted in the following four interrogations for the promotional material of the four technology solutions:

- How is the reader viewer positioned?
- How is the reader/viewer affected emotionally by the text?
- How are the 'career development digital technologies' represented?
- What emotions are invoked? That is, what is 'emotionality of texts'?

In the close work with the marketing materials of the career development–oriented digital tools the framework was activated. Observations against each of the amended Koh (2016) framework items for all of the products and services were noted and discussed in the research team. Each of the three authors analysed one of the products or services to enhance inter-rater reliability (Miles and Huberman 1994) all authors analysed one of the products and compared and contrasted their findings before the analyses were completed.

Data Collection

We collected data by reviewing the websites of four EdTech companies that offer products that support university careers services: CareerHub careers services platform, Forage virtual internships, Interview Stream video interview software and VMock artificial intelligence resume reviewing.

CareerHub

CareerHub offers a suite of products designed to assist university careers services in managing a range of core services. Features include job advertisements, event promotion and booking, career counselling appointment booking, resources and email newsletters, among other things. CareerHub can be named and branded to match university requirements and student records can be integrated with university student management databases.

Forage

Forage is a platform providing 'virtual work experience' programmes from graduate employers. In virtual work experience programmes, students complete 'authentic' work tasks typically performed in that employer's graduate programmes, such as research and data analysis, report or email writing or preparing financial statements or legal briefs. There is no direct feedback from the employer, though students can compare their work with

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exemplars provided by the employer. Programmes are offered at no cost to student. Forage's business model is to charge employers to create programmes as part of their graduate recruitment strategies.

Interview Stream

Interview Stream is a platform for online job interviews, with recruiters as their primary target market. They also offer a product called Interview Prep, which offers mock video interviews to students as practice for the real thing. Interview Stream does not itself apply any feedback for students, either from human coaches or artificial intelligence technology. It does provide a function with which careers service staff can review students' recorded videos and offer feedback on their performance.

VMock

VMock is a platform which uses artificial intelligence to provide feedback on students' resumes. Vmock 'reads' students' resumes and provides feedback on their language, presentation and the relevance of their stated skills and competencies to roles in their intended profession. Information used to help optimise students' resumes is extracted from job advertisements and other online databases.

Analysis

From our close reading of the text and aesthetic design of each platform's promotional website, we identified three shared themes in how career services EdTech is positioned and promoted to HEI careers services. Firstly, we found that career services platforms promise to enhance, rather than replace, existing careers services. There is no rhetoric suggesting that the platforms can replace career practitioners, but rather the platforms will make the work of the practitioner more efficient, more effective or more equitable. However, the second theme that we found suggested that EdTech platforms engage in 'negging' as a marketing tactic. Negging is known as a tactic of 'pick up artists' who compliment a woman in a way which both shows admiration and interest but also is negative and demeaning. In the context of this study, negging is a marketing tactic that plays on the insecurities or anxieties of careers services with regard to their lack of resources and influence or expectations of influence and impact, in turn making the product, presented as the solution to these worries, more attractive. The third theme is that the platforms align themselves with fundamental ontological positions common to HEI careers and

Table 23.1. *Analysis of selected career service platforms*

	Enhancement	Negging	Ontology of career
CareerHub	Career programmes are better managed	Your service is inefficient and time poor which is why your career programmes aren't working	Career is a product which is quality controlled by careers services
Forage	Work experience becomes accessible	You are socially disadvantaged compared to your well-connected peers	Career should be about your talent and not your connections
Interview Stream	Mock interviews are more professional and authentic	You are out of date in relation to modern recruitment	Career transition is about getting key techniques right
VMock	Enhance your CV/ LinkedIn profile	You need to understand the reality of if your CV fits that jobs you are applying to	Career is a dream destination which you can accelerate towards

employability. Table 23.1 outlines the enhancements promised by each platform, a summary of their negging techniques and the underlying ontology of careers that the platform aligns itself with.

Enhancement and Negging

The marketing materials of the products were constructed in a way so as to confirm the needs of the higher education services, rather than disrupt them. However, this was achieved with a familiar and helpful message that recognised the constraints career services typically work within, while also playing on the concern that these constraints create. There were multiple text instances where they projected upon the career service worker that they were experiencing difficulty with these practices which the product could alleviate.

- 'Start Preparing Your Students for Success with our FREE TRIAL Interview Prep.'
- 'Forage for Universities gives every institution the opportunity to deliver exceptional virtual work experiences programmes to students for free.'

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Projecting a familiarity with the difficulty the career service staff may have faced both aligns the product and service on the reader's side but also reinforces the negative emotion of the readers feeling towards the problem. By undermining the career service's confidence in their professionalism, the marketing device is deployed to make the service more attractive. An example is in the Forage materials where the product's up to date, elite work experience is set against the older, less specific knowledge of career practitioners in services (Bimrose and Brown 2019).

- 'At Forage, our virtual work experience programmes give students the opportunity to learn career skills from Fortune 500 companies.'
- VMock takes a similar approach, highlighting the currency and comprehensiveness of their algorithm: 'Instant benchmarking and scoring for targeted guidance. User profiles are evaluated on 100+ parameters including language, skills/competencies, and presentation.' (VMOCk)

Interview Stream leverages the limited resources of careers services with a promise to make the process of offering mock interviews more efficient and letting the careers professional focus their attention on feedback to the student:

- 'Since students' mock interviews are recorded, professors and career advisers can focus on coaching nonverbal cues and polishing their answers.' (Interview Prep)

Each of the four products analysed rarely present in explicit terms what the products do. Rather, the promotions characterise the problem they solve and project a need upon the career service reader. Following on from Hooley (2018), we can argue that the issue here is not so much the expansion of technology and automation but who controls this and to what end. The 'negging' that we have discussed here can prove a dual process of soothing fears of technology whilst presenting particular solutions to particular problems. Professionals should be wary of this sort of solutionism and how it can interact with their professional practice.

Ontological Re-definitions and Representations of Career

Each of the products frame the engagement of digital technology with career development services in contextually specific ways which align with the place of career services within higher education. As the products do not promise to disrupt current career services, they also do not question some of the underlying representations of how career development operates within a society. The products seem to reinforce a number of different assumptions about how career development and individual careers work in the world and tend not to trouble taken-for-granted understandings of how the world works. For example, CareerHub employs a significant focus on career outcomes as managed products which can be secured through better processes (which CareerHub can provide). This reflects discourses related to 'New Public Management' (Vigoda 2003) and how public services can become measurable, controllable and quality assured. Similarly, Forage and Interview Stream both highlight the agencies that students can exert as central to their career success, while VMock centres career ambition and promises acceleration towards success through strategic action.

These ontological positions create a dual challenge to the practitioner. Firstly, we need to consider if career is best understood as an individual outcome where students can heroically overcome obstacles they face or if this in fact represents a form of responsabilisation where students are made to become responsible for outcomes beyond their control (Forrier, de Cuyper and Akkermans 2018). This echoes wider concerns in education (Torrance 2018) that neoliberal ideology serves to make the individual the central vehicle of success. Secondly, we see how career becomes constructed as something which is a matter of individual progress and success. Critically, we can see this as tied to modernist understandings of the world where career, and the good life in general, becomes about growth. Gee (2017), in particular, has argued how this represents a particular understanding of the notion of career as linked to progress which powerfully excludes understandings of life and career that do no centre around success and advancement, such as belonging to a community and caring for others or the world around you.

This focus onontology draws attention to the contested nature of career. Is career an individual or a social responsibility? Is it about advancing and acquiring or about being socially connected and responsible for the world around you? What is significant about the technologies that we discuss is partly that the discourses we have analysed construct these ideas in a particular way but also that the nature of technology is that it is not ontologically flexible. As Mejias (2013) has argued about social media, social media networks take on an ontology of relationship and connectedness. Similarly, those using CareerHub must approach career development as something which is managed, an assumption that is hardwired into the technology. Similarly, Vmock or Forage requires users to focus on particular assumptions about students' agency. This is not to say that these

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platforms are entirely inflexible or that careers practitioners have no agency or discretion in their adoption. Nonetheless, EdTech carries with it an asymmetry where the user must adopt the ways of working which are defined by the technology rather than being a tool to the ends that professionals set.

Conclusion and Implications for Future Practice

As we have described, careers services EdTech promises to enhance, rather than replace, the work of career development practitioners. However, we have also noted that they do so in part by playing on anxieties and insecurities that careers services have about their resourcing, influence and impact and tend to perpetuate rather than challenge common ontological assumptions about twenty-first-century careers.

The paucity of support material freely available online, and the consistent narrative of ease of use, do not assuage concerns identified by Moore and Czerwinska (2019) about appropriate access to and proficient use of these tools by career practitioners (Moore 2017), other university staff, employers and students. The spectre of the white elephant of digital tools looms large and is presented in this context as a hyper-modern elegant solution to problems encountered by practitioners, students and employers. This is especially true for the rapid adoption or expansion of digital technology in the aftermath of the COVID-19 pandemic (Thambar, Neary and Ananthram 2021).

Recent changes such as using big data, engaging with external EdTech firms and automating aspects of delivery are not just practical changes driven by a desire to innovate delivery but are representative of how power structures operate both externally and internally to universities. This should give us concern that EdTech's involvement in careers services does not offer straightforward benefit for staff or students. As we have noted before, it is easy to overlook that digital technologies are often created for profit and so the models and schemes that EdTech companies employ are in turn affected by this remit (Mejias 2013; Van Dijck 2013; Komljenovic 2021). As we have discussed above, these strategies often involve presenting ontological conclusions about the identities of professionals and students as well as the nature of career itself. This means that career services are not merely picking up a product off a shelf but ended up entwined in the ontological conclusions that EdTech are engaging in. This does not necessitate HE professionals refusing to use them or looking to remove technology from their practice but all of the above discussion shows the need for critically informed conversations about the place and value of EdTech in HE career work. As Kaplan (2021) notes, there is a danger that practice can become hyperactive and just changing for the sake of becoming more digital. We have aimed to analyse and critique the relationship between university career services and EdTech in order to develop new insights into the relationship between technology and career development. This can also serve to problematise wider concerns such as the place of EdTech in the nature and purposes of higher education. Our analysis has allowed us to see changes in HEI career development delivery from a sociological perspective, considering the potential of career services delivery to be enhanced and challenged by digital tools, rather than just by embracing them without deep engagement with their implications on career development relationships and pedagogic interactions (Hooley and Staunton 2020). We exhort careers professionals to activate their own agency in their interaction with digital tools by consciously selecting, adapting and integrating EdTech into their practice.

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CHAPTER 24

About Training Educators to Become Drivers for Change

Emma O'Brien and Ileana Hamburg

To date, digital learning has been largely considered an inferior in terms of academic quality. In many cases, the online environment has been perceived as a commercial endeavour which conflicts the values of HE as one in which is for societal good (Serdyukov 2017; Al-Mansoori and Koc 2019).

Consequently, HEIs have outsourced the provision of large-scale digital learning programmes to external companies in a distributed, two-tiered model of education. These are seen as contrasting rather than integrated models. As a result, digital pedagogies, literacies and skills are not considered a core part of the academic role. Academics often consider these skills as ones which dilute their discipline. In many cases, digital education has been identified as a threat which jeopardises long-established academic roles. However, despite the wide availability of 'free' education such as MOOCs and the fear that such technologies would replace educators, such concerns have not emerged in reality (Lewen and Lundie 2016). Although MOOCs provide freely available content, they often do not provide a holistic approach to education that embodies not only the cognitive elements but also the social and emotional elements of learning which are emerging as fundamental to a successful twenty-first-century learning environment (Kaplan and Haenlein 2016; Sunar et al. 2016; Gregori et al. 2018). The absence of such elements can be isolating for students, something which was clearly experienced by learners in a digital environment during the COVID-19 pandemic.

Subsequently, there has never been such an urgent need for critical educators (Luarillard 2013; Morris and Strommel 2019). Educators need to consider their role in supporting their students to develop personally and professionally as well as academically. They need to seek opportunities for their students to apply their learning in a variety of authentic contexts by extending learning beyond the four walls of the institution. The role of educators in a digital environment is to hack technologies (Fyfe 2011) to 'make learning possible' in an inclusive manner; academically, socially and affectively (Ramsden 2003) so they can reach further. In their role, they need to act as critical inquirers, questioning the current approach to digital learning and their institutional systems. They need to consider how to transform these to consider skills beyond the academic persona and nurture independent graduates who thrive in uncertain situations cognitively, socially and emotionally (Teräs et al. 2020). In the current pandemic, only those that are innovative and can identify new ways to meet the needs of a new society will be successful. Therefore, for HE to succeed, we need to redefine the role of HE teachers as a driver for change and innovation.

The COVID-19 pandemic represents a unique opportunity for educators to transform disruptions in education into innovative and inclusive ones. The pandemic has resulted in universities and colleges transitioning to digital learning for extended periods of time. However, the focus on 'social distancing' or 'physical distancing' reduced interpersonal as well as community contact and remains one of the main concerns of both students and educators. (Weeden and Cornwell 2020). Furthermore, reliance on technology highlighted that not all students have equal access to infrastructure or the skills/literacies required to navigate digital spaces optimally (Beaunoyer et al. 2020).

Digital inequalities have always existed, however, they were exasperated during the COVID crisis and the sustained impact provides the potential to deepen digital inequalities (D'Orville 2020). Although EU policy is littered with references to inclusive approaches to education (EU 2016), this topic has not received significant attention. For example, the European Commission states that 'Education is the foundation for personal fulfilment, employability, and active and responsible citizenship . . .. Education is at the heart of the European way of life, strengthening social market economy and democracy with freedom, diversity, human rights and social justice' (EU 2020). The UN's fourth sustainable development goal is to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations 2015).

However, many education systems assume that everyone has the same learning needs, a uniform student profile of those who come to education with a similar academic grounding. Digital technologies have afforded educators significant opportunities to develop educational environments that are inclusive of a variety of learning needs, personal circumstances and professional and societal demands. Despite the availability of enablers such

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as technology to facilitate inclusive educational practices, HE has largely remained unchanged in this context.

When technology has been adopted as a solution it has lacked criticality, without consideration that in some cases, digital education can exclude as well as include individuals. Both inclusion and digital education needs teaching staff that critically evaluate these models. This can be difficult as digital education is often considered complex and time consuming, requiring a significant different skill set than traditional teaching (EU 2020). The adoption of digital learning in a manner that replicates conventional models increases complexity even further. For example, continuing to recognise the educator as the sole source of knowledge and content has led to an overemphasis on academics as digital content creators and has increased pressure during the sudden move to digital learning and teaching. As a result, HE teachers have had to juggle content creation and assessment with pastoral support and the development of digital and transferable skills, with the former often overlooked at the expense of the student learning experience.

An open approach to digital education is required that encourages educators to share practices and incorporates multiple voices, working with students as creators and active partners in education. This can alleviate the complexity associated with digital learning by reducing the burden associated with the HE educator as the sole content creator. This advocates the need for open global innovation partnerships in education. Furthermore, it requires educators to adopt a critical mindset to redefine education to consider

- Who is education for in a post-COVID society?
- What is the purpose of education in a post-COVID society?
- How can we innovate our educational system so education is fit for its purpose?
- What is the role of the educator and the student?

Therefore, a necessary element in post–COVID-19 education is to actively engage people, networks, projects, research and public discussions to promote critically and reflectively informed praxis. We need to apply and develop critical applied research methodologies and create design principles for democratic and emancipatory digitalisation of education.

As outlined in Chapter 1, this requires pedagogical innovation (Kaplan 2020), and so modelling transformative pedagogical approaches in faculty development programmes and encouraging faculty to identify how their discipline shapes society and equity is key. Such programmes should encourage HE educators to explore how they can provide an environment that supports diverse learning and empowers all learners to participate and take the lead in their own learning journey. Furthermore, these programmes need to inspire educators to engage in innovative practice and digital transformation to shape new learning environments.

Preparing HE Educators for Digital Transformation

Prior to the pandemic only one-third of HE educators had experience teaching online, within months that statistic significantly changed. Academics have signified COVID 'as a key turning point' for education (EU 2020). Therefore, we need to translate the unplanned, chaotic response to a sustainable, long-term approach to digital learning and teaching that meets the needs of all stakeholders (EU 2020).

No universal agreement exists regarding the challenges facing education in the twenty-first century, but, taking into consideration that online learning during the pandemic was mostly asynchronous and self-paced without social interactions, some global objectives of innovative disruptions that facilitate socialisation and interaction in a digital society are key: for example, customising education to adapt to the individual needs of learners and educating society members who are also professionals and have the social and technical skills to fully participate in all elements of society.

Therefore, digital equity is a necessity in a sustainable model of education (De Giusti 2020). Digital skills need to be embedded within curricula in all disciplines and levels of education, not just ICT and engineering programmes.

This requires educators to 'rethink the age-old assumptions about higher education' (Christensen et al. 2008). We need to explore how to create a culture of transformation and disruptive education using a ground-up approach, by changing the higher educators mindset to one of growth, risk-taking and encouraging innovation though the development of an entrepreneurial mindset (Pucciarelli and Kaplan 2016).

During the abrupt shift from in-person to online learning, students and educators were concerned with the lack of engagement beyond content and course material. Educators must redefine engagement from one concerned with passive activities such as attendance and reading material to active approaches. Engagement is multifaceted (affective, cognitive, social) and takes place at different levels (institutional, programme, module and peer) (Richardson and Newby 2006). HE teachers must rethink their role

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as nurturers who provide students with opportunities and support authentic social community-building and engagement methods beyond that of learning material and attendance. COVID-19 has become an opportunity to improve learning long term, rather than trying to manage disruption; this can be further developed into a model for sustainable innovation in HEIs (Rashid and Yadav 2020).

Such innovation needs to be underpinned by improved educational programme quality. However, rather than replacing elements of the existing model, we need to reconsider quality in a much more complex and inclusive context, considering society as a whole rather than solely the existing educational models. Research has illustrated that the success of digital learning technologies (and digital transformation in general) is not concerned with the use technology itself but on how these technologies have been applied. For digital learning, this is regarding the pedagogical use of such technologies in partnership with students (De Giusti 2020). In Chapter 1, Kaplan illustrates that rather than replicating existing models in online education, it is important to encourage educators to consider the digital ecosystem so they are aware of the interconnected elements of digital teaching and learning, in particular, digital literacies, pedagogies, partnership, leadership and well-being. The DigCompEdu Framework (Redecker 2017) illustrates the various dimensions associated with becoming a digital educator and while considering different levels of competency, with innovation being the highest level. However, the framework starts with understanding technology rather than considering the purpose of learning, the needs of the learners/stakeholders and suitable pedagogical approaches. If we place too much focus on technical skills and the use of such to substitute elements of the existing model of education rather than redefine it, learners and teachers will experience poor quality learning leading to low retention rates as is often experienced in digital learning (Sunar et al. 2016; Gregori et al. 2018).

This was evident during the COVID crisis. Intensive faculty development took place to develop expertise in specific digital technologies (EU 2020). However, few explored the use of technology for transformation and involved participants making individual incremental changes in their own practice by substituting elements of their teaching using technology. Although academic staff worked tirelessly to continue learning and teaching, many educators and learners have had poor experiences of digital learning during the pandemic due to the focus on technology over pedagogy (Kaplan 2021).

Therefore, we need to consider how the current pandemic has redefined the role of the educators and education (World Economic Forum 2020).

Many universities are focusing on surviving this temporary shift to digital education, rather than building sustainable ways to promote community within social distancing that can outlast COVID-19.

Instead of hoping for a return to normal, educators should use the opportunity to develop disruptive innovations and utilise these to engage and partner with students to redefine education (Hamburg 2020).

Approaches to Innovation and Digital Transformation in HE

When we consider digital innovation in HE, it has been largely incremental with most research on innovation in HE related to innovations in teaching and learning. However, despite widespread recognition that pedagogical theories such as those of Dewey, Freire and Vygotsky developed in the early to mid-1900 are still relevant, they have yet to become mainstream (Serdyukov 2017).

These pedagogical approaches are also identified as key to the successful adoption of digital learning. However, the concern is that where digital innovation has occurred it has been technocentric. For example, the Virtual Learning Environment (VLE) has been the most transformative technology introduced into HE. However, the VLE is largely teacher driven, in significant contrast to student-centred pedagogies necessary to ensure learner success in a digital environment. Currently, it is not pedagogy, education or students leading the way in digital learning innovation, it is technology (Teräs et al. 2020). The majority of digital innovations and transformation occurs in business and are adopted by HE (Serdyukov 2017; O Sullivan 2018). This is partly because HE has not considered what they want from digital transformation and are followers rather than leaders, often replicating traditional outdated, educational systems and models using digital technologies. Knowing what you want from digital transformation is key: 'We cannot challenge technology to serve the needs of education until we know what we want from it.' (Laurillard 2013).

For years, education has been imposed upon students with little consultation, decisions are made for students regarding their learning and what is best for them (O Sullivan 2018). In recent times, student partnership and co-creation has started to make its way into discussions; however, this has been slow to translate into practice and often is tokenistic with representation on various committees but little influence in terms of decision making (Bovill et al. 2011). We need to place both students and educators at the centre of our innovation processes (Serdyukov 2017).

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Innovation requires interdisciplinary networks which academia is largely uncomfortable with (Jakovljevic 2018). Although HE teachers research and innovate within their discipline, this often does not transfer to their practice of teaching or innovating within their HEI. The main barriers to innovation are largely bottom up (Brennan et al. 2014): in particular, mistrust, lack of collegiality, lack of awareness of potential of innovations, inflexibility, skills deficits (particularly in ICT), negative attitudes towards change, difficulty in dealing with uncertainty (MacKeogh and Fox 2009; Lašáková et al. 2017). Furthermore, many experienced academics find it difficult to change a practice they have perceived as successful for many years (Lašáková et al. 2017). These barriers are fuelled by a culture that rewards individual performance, has rigid systems and values disciplinary knowledge (Tierney and Langford 2016).

Lašáková et al. 2017 highlight that innovation requires push and pull factors. Push factors are external drivers such as digital learning technologies, the current uncertain environment that staff are experiencing due to COVID-19 and a changing society. However, pull factors need to be considered, innovation thrives in a culture that nurtures openness, collegiality, interdisciplinary and democracy. Therefore, institutional systems must be adapted to facilitate change by rewarding collaboration and the provision of professional development that provides safe space to reflect, innovate, take measured risks and learn from these. (Lašáková et al. 2017). HEI also needs to develop structures that encourage innovators to influence change at higher levels of the organisation and receive recognition for this. The next section explores how we can design professional development to encourage HE faculty to become change agents.

Faculty Development: Nurturing Educators as Change Agents

To date, the provision of HE faculty development in digital transformation is largely focused on the use of digital technologies to substitute teaching methods in their existing teaching practices 'without consideration for the social, ethical and epistimiatic assumptions underpinning such changes' (Lewin and Lundi 2016).

In recent years, faculty professional development (PD) has largely been prioritised to encourage HE educators to enhance the quality of their learning and teaching approaches in an effort to further develop the profile of teaching. (High Level Group on the Modernisation of Higher Education 2013). However, PD can take on a wider role as one of empowering educators to act as change agents for innovation and redefine quality. Innovation requires creativity, risk taking, openness, experimentation and a culture of learning (Brewer and Tierney 2012; Tian et al. 2018). Earlier, we discussed some of the barriers to innovation, in particular, dealing with uncertainty and accepting change. Therefore, we need to create positive attitudes towards change and uncertainty (Lašáková et al. 2017). We need teacher agency.

Mercer (2012) and Manyukhina and Wyse (2019) disaggregate agency into two elements; the sense of agency and exercising agency. That is, people can believe they are capable of change but sometimes will not act. So it is not enough to build self-confidence and belief that educators can act, we also need to provide opportunities for them to identify when they can act. In the design of Faculty PD, we need to nurture cognitive, emotional and motivational development so educators:

- believe they have the skills and aptitude to act
- recognise opportunities to act
- are provided with opportunities to act
- are encouraged to self-regulate

In addition, Mercer (2012) highlights that agency is influenced by interpersonal and historical experiences which can influence future agency, it is multifaceted and dynamic and for it to be successful requires a long-term orientation. However, Brevik et al. (2019) highlighted that educators find it difficult to conceptualise a long-term view of education and identify how they can influence such change. Therefore, organisational learning and distributed leadership is key in facilitating agency (Cloonan 2014). A culture of learning, or organisational learning is also central for innovation and change (Tian et al. 2017) However, for organisational learning to occur, individual learning must be adapted and applied throughout the organisation. Furthermore, evidence-based risk, openness and trust must be nurtured; for true transformation and disruption, we need change agents to be proactive in identifying future plans and leading change. Within HEIs, individual learning occurs incrementally within individual disciplines and practices but is slow to translate into organisational learning or innovation.

This section outlines a conceptual model for faculty development that leverages a hybrid of Mesirow's theory of transformative learning, heutagogy and organisational learning theory. The objective is to nurture educators as change agents and develop the belief that they can exercise agency in a proactive manner. We encourage educators to question the philosophical underpinnings of their teaching and learning in a digital age and their role in such.

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The rationale for basing the faculty development model on a hybrid of three theoretical constructs is grounded in existing literature. Mesirow's transformative learning theory illustrates the importance of disorientating circumstances to encourage change or transformation and a ten-phase model of critical reflection (Mesirow 2009). Learners are encouraged to critically reflect and explore which are key elements of innovation. However, the individual is reliant on experiencing a dilemma and does not adopt a proactive approach to change. Furthermore, as learners progress through the cycle, the focus is on reintegration and not applying change or transformation beyond the context in which it took place. In addition, Mesirow's transformative learning is at the individual level, innovative culture requires interdisciplinary learning to extend to the group and organisational level. Therefore, our model incorporates heutagogy. Heutagogy is a collaborative approach to learning which is based on a living curriculum in which the learner identifies a perceived or future need. It recognises the need for interdisciplinarity and sharing. Heutagogy is based on the principle that learning is not linear and encourages individuals to adapt and apply their learning to a wider context as they develop learner capability (Blaschke and Hase 2016). It should be noted that heutagogy and transformative learning theory overlap and can be seen as an extension of each other. Heutagogy occurs at the group level; so, for a learning culture and innovation to extend its impact, this needs to be extended to the organisational level and beyond.

Therefore, we have mapped these phases to organisational learning theory and incorporated Senge's systems thinking to encourage the application of learning at the organisational level recognising the impact of group and individual learning on the wider organisational and educational system in general (Senge 1990). In addition, Jones and MacPherson (2006) argue that learning needs to take place inter-organisationally to leverage from external expertise. Table 24.1 illustrates the theoretical framework for the conceptual model.

In the context of innovation for digital transformation, this is particularly significant, as educators need to influence the development of digital learning technologies so they align to pedagogical and educational values rather than being driven by technology. Table 24.2 illustrates how faculty development was applied in practice. Meizirow's transformational learning theory was adapted to encourage transformation at a broader level to organisational and societal contexts and three additional phases (phases 11–13) Each of these map to the ability of the faculty PD programme to instil confidence in faculty members' sense of agency.

Table 24.1. *Training educators as drivers of change: Theoretical framework*

Transformative learning (Mesirow 2006)	Heutagogy (Blaschke and Hase 2016)	The learning organisation (Senge 1990)	Organisational learning (Jones and Macpherson 2006)	Agency (Mercer 2012)
Dilemma	Learning is based on a perceived need based on change or predicted change	Personal mastery	Individual	Sense of agency
Self-examination	Self-reflection and meta cognition	Mental models	Individual	Sense of agency
Assessment of assumptions (wider impact)	Double loop learning	Mental models/ systems thinking	Individual	Sense of agency
Shared discontent	Collaborative learning	Shared Vison/ team learning	Group	Exercising agency
Exploration of new roles	Collaborative learning	Team learning	Group	Exercising agency
Plan of action	Collaborative learning	Team learning	Group	Exercising agency
Develop new skills	Learner determined/ learner centred	Team learning	Group	Exercising agency
Experiment/ explore			Individual	Exercising agency
Self confidence	Self-reflection	Individual	Individual	Exercising agency
Future orientation	Double loop learning, predicting change	Individual	Individual	Sense of agency
Building capability	Capability and self-confidence to apply in unfamiliar circumstances	Systems thinking	Organisational	Exercising agency
Wider transformation	Capability and self-confidence to apply in unfamiliar circumstances		Inter organisational	Exercising agency

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Table 24.2. *Training educators as drivers of change: Framework implementation*

Adapted transformative learning phases (Mesirow 2009)	Formal and practice-based learning	Informal learning (self and peer reflection)
Dilemma	Questioning the current educational system: digital pedagogies and redefining the philosophies of digital pedagogies	Purpose of education: For who, for what? How does it happen? How will it evolve?
Self-examination	Where do staff and students belong in the current system: DigCompEdu	What is the role of the educator and student in a digital age, how do we define these and prepare educators and students?
Assessment of assumptions (wider impact)	What are our assumptions and how can we make changes in the current system to become more inclusive: universal design for learning	How does my teaching experience, preferences, values and previous ICT use influence how I teach and use digital technologies? Who does this exclude and what is my desired changes in terms of pedagogical innovation?
Shared discontent	Connecting to others and sharing a vision: open education practices.	Who else shares this vision in the programme? How can I collaborate with them to include other voices, build relationships and co-create with students.
Exploration of new roles	Exploring and developing relationships: relational pedagogy	Who is affected by this change and how can we co create with them? In the redefined roles, how does technology empower these roles? How can we ensure people are not excluded?
Plan of action	Making change: practice based	What is our action plan?
Develop new skills	Making change: practice based	What skills do stakeholders need to support them in the change/action plan?
Experiment/ Explore	Making change: practice based	What technologies will we use? How can we hack these technologies to make them fit for purpose (pedagogically, inclusively)?

Table 24.2. (*cont.*)

Adapted transformative learning phases (Mesirow 2009)	Formal and practice-based learning	Informal learning (self and peer reflection)
Self confidence	Evidencing change: evidencing impact	Gathering evidence of the impact . . . lessons to be learned
Future orientation	Future impact	Was my approach effective and how can I adapt? What expected changes do we expect in society, technology and how can we respond to these?
Building capability	Elevating impact	What problems do we experience at the institutional level that we can support with our learning? Do we need to adapt institutional systems to enable digital transformation organisationally?
		How can I share results and identify other change agents? How can we collectively encourage change at other levels?
Wider transformation	Elevating impact	Can I apply my learning to other contexts, disciplines or practice to transform the wider contexts?

In the application of the faculty development programme, various digital pedagogies were applied in practice to model how such approaches can be adopted, such as negotiated curricula, relational pedagogy using collaborative spaces, universal design for learning, communities of inquiry, e-tivities and e-moderating and practice-based and authentic assessment.

Conclusion and Recommendations

For a continued culture of digital innovation and change, faculty development needs to model transformative approaches to learning in practice by using digital technologies as highlighted in Chapter 1. Furthermore, such

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programmes must instil a confidence that educators are capable and can exercise agency. Through such an approach, educators realise that technology is simply a medium/enabler/space (Kaplan 2021) and it is within their power to 'hack' such technologies to innovate their practice and they can provide wider institutional and sector impact by adopting a critical view.

Furthermore, PD needs to bridge individual, group, organisational and interorganisational learning to build a culture which is key to innovation. Within HE, individual, group and interorganisational learning takes place in terms of discipline-specific research and context. However, organisational learning, particularly within teaching and learning, is slow to take place due to lack of systems to reward interdisciplinary collaboration and systems thinking. This results in pockets of innovation with no significant impact.

This model explores how to model a faculty development programme that nurtures faculty's confidence and belief that they can make change through experimentation, collaboration and openness at all levels of the organisation. By questioning the philosophical underpinnings of education and technology and their role, it encourages them to identify individuals with similar visions, consider the wider systems perspective and leveraging from evidence-based risk taking and collaborative learning.

However, it is important to consider that transformative faculty development needs to be combined with the structural reform to reward interdisciplinary and collaborative learning. In addition, students representative of all demographics need to be part of educational reform and digital transformation. HE leaders need to consider rigid educational systems and models and how to adapt them to become more flexible to enable transformation to take place. Furthermore, due to the complexity of HE and the need for open participation, participative and distributed leadership models need to be considered.

Innovative disruptions caused by COVID-19 should encourage faculties, educators and students to think and act in new ways, providing opportunities for the changes needed by HE not only to survive but also to be innovation drivers.

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CHAPTER 25

About Instructors' Readiness to Teach Online

Shazia Aziz and Muhammad Asif Ikram Anjum

Many countries including those in the European Union have recently been striving to become influential knowledge-based economies in the world and transitioning to online teaching has been one of their focuses in this regard. As Kaplan (Chapter 1) states, 2012 had been declared the year of the MOOC. However, the outbreak of novel coronavirus towards the end of 2019 has triggered the process and necessitated it for all and sundry. Resultantly, all other nations around the globe have had to switch to online teaching unanticipatedly to preserve their educational system which might entail teaching of skills and competencies (Kaplan 2018) instead of transferring knowledge.

The developing countries had to face certain hurdles due to the urgency of the situation, coupled with a lack of preparedness in certain aspects. Pakistan is one of those countries where only two universities, namely, The Virtual University and Allama Iqbal Open University, were pursuing online teaching/learning since long while the other higher educational institutions were still committed to face-to-face teaching before the pandemic broke out. Moreover, degrees awarded by onsite academic institutions of higher education were perceived to be higher in status among academia, students, professionals and hiring companies than those awarded by the two universities offering online education.

The Milieu

The first case of COVID-19 in Pakistan was reported on 26 February 2020 (Ishaq et al. 2020) with the number of cases increasing on a daily basis. Around 15 March 2020, the whole higher education system had to go virtual with immediate effect in the middle of the semester due to a complete lockdown announced by the government in keeping with the WHO's guidelines. This resulted in a considerable level of unrest among the instructors as well as students who had to switch to a new mode

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without any proper planning and preparation. Towards the end of the same semester, the Higher Education Commission of Pakistan measured the universities' quality of online teaching and readiness in different aspects including technology readiness and teachers' readiness among others and found universities lacking in one component or the other (HEC 2020). The reason being that the transition was sudden and unplanned for.

Theoretical Underpinnings

While online modality poses many challenges such as the survival of some schools whose programmes are quickly being replaced with short term, low fee programmes by prestigious universities and those schools already having a low ranking (Kaplan and Haenlein 2016), it also brings teachers in a different sort of competitive situation due to the accessibility of online courses to a wider audience. Different researchers have proposed some sets of qualities and competencies required to be a good online teacher in this context. Kaplan and Haenlein (2016), for example, present a 5C framework to identify starting teachers in online contexts. The 5Cs are charisma, competence, constancy, compensation and contribution. Van Gorp et al. (2019) provide a checklist of competencies for online language teaching and rank teachers based on these into four categories that is, limited (those demonstrating limited to no ability of teaching language online), novice (demonstrating basic competencies and marginal performance), proficient (having the ability to handle all competencies independently) and expert (highly proficient and having varied OLT experience and the ability to train others) teachers.

However, a crisis-prompted transformation has different undercurrents. Gacs, Goertler and Spasova (2020) propound that quality expectations must be lowered in view of the different dynamics of crisis-prompted remote teaching as compared to well-designed online education, especially those related to testing, technology, accessibility, learning outcomes and copyright. However, it is essential to investigate the preparedness of faculty when they are teaching online for the second semester now. This chapter reports the findings of an analysis of the higher education instructors' online preparedness in October 2020, that is, seven months after this digital transformation was introduced.

The teacher-readiness questionnaire developed by Martin, Budhrani and Wang (2019) was adapted according to the context of the study. The survey was sent to 300 practitioners teaching at the tertiary level through email and they were requested to return the filled-in questionnaire. The convenient sampling technique was used for collection of the data. The data were analysed through SPSS using descriptive statistics and MANOVA. The findings highlight the extent of readiness of Pakistani ESL practitioners and the study offers recommendations to overcome the issues faced by the stakeholders regarding this readiness or lack thereof.

The pandemic-affected milieu demands educators to know 'how', more than knowing 'what', that is, the technicalities rather than the content (Lemoine and Richardson 2020). Without necessary guidance and training, the instructors used to teaching on site were overwhelmed by the sudden, unwarranted shift to the virtual world of teaching. Hence, their perceptions about their readiness are worth studying.

Instructors in an online context have a different role to play from those in a face-to-face context (Ko and Rossen 2017). Their priority is instructional space and time, virtual management techniques and the ability to engage students through virtual communication (Easton 2003). Hence, it is not necessary in all contexts that teachers' past experience is helpful in making them effective online teachers as claimed by Wray et al. (2008). Interviews of award-winning faculty members from around the United States conducted by Martin et al. (2019) revealed five different roles of successful online instructors: facilitator, course designer, content manager, subject matter expert and mentor, with the common tasks falling into two categories, that is, course design or teaching.

Online Teaching Competencies

Course Design

As Varvel (2007) defines it, course design constitutes planning instruction, activities and assessments aligning with objectives and its major focus areas are breaking information into modules, planning discussions and case studies and inclusion of materials like text, audio, video and simulations.

Course Communication

Facilitating discussions is a key skill in online teaching. Faculty should be able to employ a variety of engaging communication methods with students like writing and/or audio (Varvel 2007) to give adequate and prompt feedback, communicate rules, netiquettes, course expectations, due dates, policies and the code of conduct, as well as information about accessibility, copyright and privacy (Ko and Rossen 2017).

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Time Management

Efficient time management is essential for teaching online effectively. Since online teaching requires redesigning of course objectives, content, activities and assessments (Varvel 2007); injecting questions promoting higher order thinking, directions for assignments and providing feedback; spending additional time helping weak students, catering queries pertaining to students' technical problems (Napier et al. 2011) and giving attention to details while maintaining records and grade books (Coppola et al. 2002), a good online teacher needs to have essential time-management skills (Varvel 2007). This is more important for first timers or those teaching anew, as in Pakistan.

Technical Competence

Technical competencies constitute technical knowledge (the 'how' of using software, knowledge of synchronous and asynchronous tools, learning management systems, operating systems and Web browsers) and proficiency in technology use, the ability to troubleshoot issues related to technology and the ability to help learners efficiently (Varvel 2007). Technical readiness differs in different contexts because these competencies differ among faculty from different cultures, contexts, organisations and countries (Martin, Budhrani and Wang 2019) and it is still an under-researched area.

Faculty Readiness to Teach Online

Faculty readiness to teach online is a condition of faculty preparedness for teaching online (Martin, Budhrani and Wang 2019). This study focuses on the attitude of faculty regarding how important they consider online teaching is and to what extent they consider themselves prepared for and able to teach online confidently.

Attitude (Importance)

Keeping in mind the different dynamics of online teaching, faculty need to change their attitudes towards technology and the competencies required for teaching online as teachers' positive attitudes towards online teaching result in more positive learning outcomes in students (Volery 2000).

Ability (Confidence)

Instructor ability is the instructor's beliefs about their teaching competence, effectiveness and use of instructional strategies (Lee and Tsai 2010) which advance with professional development training meant for faculty (Northcote et al. 2015).

The extant literature has explored the impact of certain factors on the ability, perceptions and motivations of online teaching. The factors include gender and experience of teaching online among others. Aydin (2005) found gender having no impact on faculty's perception of online teaching skills. However, Briggs (2005) found both genders having different perceptions of the importance of online competencies. Other studies, however, have found gender-based differences in course design (Chase 2002) and motivations to teach online (Shea 2007). Female faculty were found to explore more relational approaches to teaching online than men did (Campbell and Varnhagen 2002).

Backed by more experience and practice in online teaching, teachers feel enhanced self-confidence. On the other hand, the faculty having less experience in the online modality have to struggle in order to communicate, lack the knowledge of how to make their online pedagogy effective, lack the chances to observe online teaching before getting involved in it or to experiment with the online teaching technologies and don't have ample time to learn about online teaching (Shea 2007). This was even more relevant in the face of the sudden transformation prompted by the pandemic. Moreover, faculty having greater online teaching experience have also been found having greater perceived ability to accomplish pedagogical competencies online (Carrol, Sanmamed and Sellés 2013). Since our respondents were instructors having no or minimal experience teaching online, we excluded the questions regarding experience of teaching online as a variable. Hence, this study will help the stakeholders decide what measures need to be taken and what facilities and training need to be provided to help instructors to be efficient online instructors in contexts where faculty had zero to minimal exposure to the online modality of teaching.

Methods

Research Design

The current study is descriptive in nature; a survey was used as a tool to explore faculty readiness for teaching online at the post-graduate level because surveys are commonly and widely used for collecting information about attitudes of people which seem otherwise difficult to measure using observational techniques.

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Table 25.1. *Demographic characteristics: Faculty*

	Variables	**Frequency**
Rank	Associate professor	10 (5.8%)
	Assistant professor	80 (47.1%)
	Instructor/lecturer	80 (47.1%)
Delivery method	Asynchronous	90 (52.9%)
	Synchronous	45 (26.4%)
	Hybrid	35 (20.7%)
Level	Undergraduate	99 (58.2%)
	Graduate	71 (41.8%)
Years teaching	0–5 years	55 (32.4%)
	6–10 years	48 (28.2%)
	11–15 years	39 (22.9%)
	More than 15	28 (16.5%)

Source: Adapted from Martin, Budhrani and Wang (2019)

Data Collection

The data for the current study were collected through Google form, as it empowers the respondent with the freedom of information's accessibility. The survey was administered to 300 instructors out of whom 170 instructors responded to the survey. Out of them, 136 (80 per cent) were female and 34 (20 per cent) were male instructors. The mean age of the respondents was 36 years with a standard deviation of 6.71 years. The demographic characteristics of the instructors are presented in Table 25.1.

Findings

The means and standard deviation of each item are computed through descriptive statistics.

Attitude and Ability

In the course design subscale, the importance of the ability to create instructional videos and manage grades online were rated as the highest ranked items by the instructors for attitude with mean scores M = 4.36, M = 4.28 and for ability, the mean scores were M = 4.25 and M = 4.18

respectively. In the course communication subscale, providing feedback on assignments and responding to student questions promptly outweighed the rest of the items for attitude with mean score M= 4.52 and M = 4.40 and for ability, the mean scores were M = 4.53 and M = 4.34 respectively. In the time management subscale, scheduling time to design the course prior to delivery and using features in learning management system in order to manage time were significantly more prominent than other items for attitude with mean scores M = 4.20, M = 3.93 and for ability, the mean scores were M = 3.88 and M = 3.79 respectively. In the technical competence subscale, sharing open educational resources and accessing online help desk/resources for assistance (M = 4.37) secured the highest score for attitude with mean scores M = 4.40, M = 4.37, and for ability, the mean scores were M = 4.70 and M = 4.50 respectively.

Analysis

Demographic analysis with respect to attitude and ability of instructors to teach online was conducted using multivariate analysis of variance through SPSS.

Gender

The results of the analysis revealed that unlike male instructors, female instructors had a higher attitude towards the importance of course design, course communication and technical competence which can be seen from the statistical results for course design, that is, $F(1,137) = 7.19$, $p = .002$, $\eta 2 = .06$; course communication, $F(1, 137) = 13.19$, $p = .004$, $\eta 2 = .07$ and technical competence, that is, $F(1,137) = 8.09$, $p = .009$, $\eta 2 = .05$.

Pairwise Analysis of Teaching Experience and the Ability of Course Design, Course Communication, Time Management and Technical Competence

The findings revealed that instructors with 0–5 years of teaching experience feel less confident in two subscales: course design, with M = 3.89; SD = 0.31, and course communication, with M = 3.79; SD = 0.38, as compared to instructors with greater teaching experience. The findings also revealed that instructors with 0–5 years of teaching experience find themselves more confident in two subscales: time management, with M = 4.79; SD = 0.88, and technical competence, with M = 4.49; SD = 0.52 as compared to instructors having more teaching experience. This implies that even the experience of face-to-face teaching equips the instructors with greater confidence in teaching online, too.

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Delivery Method

Findings of the multivariate analysis of variance revealed that delivery method had a significant correlation with the instructors' attitude about technical competence, $F(3,142) = 4.12$, $p = .005$, partial $\eta 2 = .04$. Further analysis through pairwise comparison shows that instructors teaching asynchronous courses ($M = 3.78$; $SD = 0.17$) were found technically less competent than instructors teaching hybrid courses ($M = 4.41$; $SD = 0.35$). Statistical findings also revealed a significant difference in instructor's ability in course design, $F(3,142) = 3.37$, $p =.037$, partial $\eta 2 = .06$. It was further found that instructors teaching through asynchronous method ($M = 3.42$; $SD = 0.94$) feel themselves lagging behind as compared to those using synchronous courses ($M = 4.01$; $SD = 0.30$) and hybrid courses ($M = 4.15$; $SD = 0.21$).

Discussion, Conclusion and Recommendations

Out of the several competencies of course design, the ability to create online videos and manage grades online outweighed the rest of the competencies of instructors. According to Prilop, Weber and Kleinknecht (2020), modern teachers should be able to develop instructional videos and manage grades online by adapting their methodology according to the needs of their students if they want to survive in the pandemic-triggered era. In the present scenario, it is recommended that course design should enforce teachers' capabilities to design instructional videos to maximise the learning of their students. The teachers' assessment-related responsibilities can be lessened by empowering them through trainings for managing grades online.

As far as course communication is concerned, it was found that responding to student questions and providing feedback were highly rated among instructors, which is in line with the previous research that posits that responding and addressing students' questions in a timely manner is highly desired in online learning environments (Martin, Wang and Sadaf 2018). This practice can help in minimising the learning efforts of the learners by promptly addressing their confusion, leading to students' enhanced confidence and success in academic assessments.

Scheduling time to design the course prior to delivery and using features in learning management systems to manage time were highly rated competencies among instructors from the time management module. According to Martin, Budhrani and Wang (2019), faculty members teaching online are expected to have the course designed before the start of the semester. To facilitate the online learning process, educational organisations have started investing in learning management systems which ensure higher level of interaction between the teacher and the students by offering multiple facilitation strategies to manage time. Those that already had one are working on expanding their functionalities.

In the area of technical competence, instructors rated sharing open educational resources and accessing an online help desk for assistance as the highest. According to Gay (2016), faculty's competence and performance in technological skills ensure the success in an online learning environment which is duly supported by Wright's (2014) study where faculty showed a positive association with their technical skills and high levels of self-efficacy.

Women's empowerment has led to a greater presence of women in all the fields of life and it's not strange that women use more technology-oriented skills in their instruction than men. The findings of the present study are in line with Briggs' (2005) study which revealed difference between genders in their technological skills. Our study also revealed that women are more concerned about time management than men, which may be due to domestic responsibilities and having families to look after which is considered more of the female members' responsibility than the male in the society under study.

The findings also revealed that Pakistani instructors found themselves least confident in teaching online, which may be due to the unexpected and sudden pandemic-triggered situation because confidence comes through exposure and continuous interaction. These findings are in line with the study conducted by Martin, Budhrani and Wang (2019) which revealed that faculty with little to no online teaching experience have lower perceptions of their ability in online teaching. Without formal, online pedagogical training, the instructors mostly rely on their personal experiences and intuitions. To overcome this issue and make the instructors confident, teachers' training programmes and refresher courses should be arranged on a regular basis that includes modules for training from planning to pedagogy to assessment in online milieus. The training needs to ensure that this change is accompanied with growth and development and that going digital makes sense as explained in Chapter 1 of this book. This will empower the instructors to face any crises-triggered environment.

Online higher education is a reality and a new norm. The sooner the higher education institutions realise it, the better for them. They need to embrace this transformation proactively and nimbly in order to survive amidst global competition as Kaplan (2021) posits. One of its important

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elements, that is, teaching, should be a focus of all institutions. Faculty attitudes and their abilities to teach online have a significant impact on how they tackle the online teaching scenario. Their attitudes can be improved by provision of help desk facilities in every department and institution. Availability of and easy access to online help desk services (Gay 2016) for pedagogical and technical support and time-management strategies (Downing and Dyment 2013) are therefore recommended. Moreover, in contexts where faculty is overwhelmed due to the sudden change and unprepared for transformation, peer mentoring can be initiated at places where each 'limited' or 'novice' online instructor can be paired with a 'proficient' or 'expert' online instructor so that they can have one-to-one counselling and support whenever needed from planning to assessment stages. Institutions regulating tertiary educational institutions like the Higher Education Commission can expedite their response for continuous learning for faculty which will help improve student learning in turn. Moreover, universities themselves can collaborate with universities already teaching in online or hybrid modalities, like the Virtual University and Allama Iqbal Open University, to provide training in online teaching to their limited and novice instructors.

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CHAPTER 26

About Precarious Faculty and Their Digital Disruption

Lisa Allen

'A century ago, activists sacrificed their lives for universal rights such as a minimum wage, a forty hour work week, sick days, vacation times, and due process protections' (Kezar, DePaola and Scott 2019, p. 151). Today, in Canadian higher education institutions, administrators have been circling around many of those labour rights that were fought for by our parents, grandparents and ancestors. Like many other industries, profit or not, the higher education sector has experienced fundamental challenges over the past couple decades (Pucciarelli and Kaplan, 2016). By creating new contract-style positions within the higher education system, universities and colleges are circumventing many of the labour rights that are considered the norm in Canada, such as a forty-hour work week, vacation time and due process protections. This chapter offers a brief literature review of precarious academic work in Canada and outlines the ways in which the 2020 pandemic has disrupted the discourse around precarious faculty in higher education. This chapter begins with a background on the higher education landscape in North America. Then, this chapter explains the rise of precarious faculty in Canadian higher education institutions. This rise in precarious faculty has illuminated the personal and financial strain that precarious faculty face as a result of their employment. Finally, this chapter reviews the tensions that existed leading up to the pandemic, as well as the disruptions that resulted from the pandemic.

Higher Education in North America: A Background

Bauder (2006) explains that, increasingly, higher education in North America is seeing an increase in the casualisation of academic labour. Due to reductions in operating budgets, a quest for efficiency and the increasing corporatisation of academic institutions, there has emerged a strong need for 'flexible' and diverse labour practices (Bauder 2006). Precarious faculty positions are appealing to university departments

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because they represent a cheap and flexible labour pool for administrators who are often trying to stretch their budget (MacDonald 2013). Richard Sigurdson, former dean of arts at the University of Calgary, has gone on record in an article published in *University Affairs* stating that 'there is no secret here that [the increase in the reliance of sessional faculty in universities] is directly related to the decline in funding as well as the rise in enrolments' (MacDonald 2013). 'While few universities support a continuing large group of non-tenured full-time faculty, most rent part-time faculty in ever-increasing numbers, creating a category of what we now call contingent faculty' (Lombardi 2013, p. 67). Kezar, DePaola and Scott (2019) call this class of faculty in higher education the 'Gig Academy': 'we select the term "Gig Academy" as a way to encompass this cluster of mutations that long-term restructuring toward cheap and disposable labour in higher education has wrought and to signal its relation to changes in the broader knowledge economy' (p. 20). This gig academy, as Kezar, DePaola and Scott write about in their book with the same name, is a result of neoliberal trends that live within the academy and is a play on the 'gig economy' term that also comes with a large body of research.

Traditionally, academic roles are broken up into three main categories of responsibilities: teaching, research and service. Newson and Polster (2019) argue that by replacing retired tenure-track positions with contract teachers, university administrators have created a new institutional administrative strategy. They're now able to look at academic labour in its individual components: teaching, research and service. Administrators are able to hire people to undertake each individual component of work – instead of the traditional integration of all three. 'Teaching resources could thus be re-packaged and re-distributed, providing university administrators from year to year with greater budgetary and curricular flexibility to reduce commitments to some areas and add them to others' (Newson and Polster 2019, p. 3). It is this disassembling and redistributing of academic work that has impacted the way that universities operate and how the people within the organisations work and how the people experience their work.

The Rise of Precarious Faculty in Canadian Higher Education

Not many decades ago, university-level teaching in North America and many other Western societies was typically done by full-time faculty members holding tenure track positions with professional levels of remuneration and benefits, continuing employment and progressive career trajectories. In the contemporary university, it has become an accepted practice, if not a matter of policy, for the majority of undergraduate teaching to be done by academic workers holding part-time contracts. (Newson and Polster 2019, p. 1)

While tenure-track positions were the norm for the generation of professors now approaching retirement, the share of higher education teaching done by people who are not tenured or on the tenure track has increased rapidly over the last quarter century (Dobby and Robinson 2008; Manning 2013; Murray 2019).

Canadian higher education institutions are seeing a large number of courses being taught by contingent or precarious instructors on their campuses (Charfauros and Tierney 1999; Rajagopaul 2002; Dobbie and Robinson 2008; Bauer 2011; Jones et al. 2012; Vander Kloet, et al. 2017; Pasma and Shaker, 2018; Kezar, DePaola and Scott 2019; Shahjahan 2019). One of the most dramatic changes to Canada's higher education institutions (research and teaching universities, colleges and institutes) over the last quarter century has been the shift in the nature of academic work away from permanent full-time tenure-stream positions towards insecure, contract positions.

Brownlee (2015) argued that there's no real way for us to really pin down how many precarious faculty are out there. This lack of part-time and temporary faculty data is confirmed by researchers before Brownlee: Rajagopal (2002), Bauder (2006) and Bauer (2011), to name a few. In 2015, Brownlee attempted to account for the number of precarious academic faculty at higher education institutions in the province of Ontario, Canada. However, due to the lack of statistical information available (both from Statistics Canada and the individual institutions [including faculty associations] themselves), Brownlee (2015) was unable to definitively determine the real number of precarious faculty working in the Ontario post-secondary system (Brownlee 2015). In Brownlee's (2015) quest to understand specific institutional plans (in Ontario) for dealing with the increase in precarious faculty, Brownlee found that institutions didn't have plans (or at the very least, failed to share any institutional plans), around managing the increasing need to employ precarious faculty at their respective institutions. Brownlee (2015) suggests that the reluctance to share plans is likely motivated by political considerations in addition to the nature of university data management. Brownlee (2015) also questions the proportion of tenure-stream faculty positions to contingent faculty positions as new faculty positions are created and predicts that casualisation will continue to dominate university hiring practices in Canadian universities.

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Brownlee's (2015) results are concerning. Canadian higher education institutions are aware of their increasing dependence on precarious faculty in their operations; yet, they're failing to account, track and include those faculty in any serious way in their institutional plans. Kezar, DePaola and Scott (2019) argue that excluding contract workers from official figures allows some universities to maintain their institutional ignorance about the number and demographics of the contingent workforce in their organisation. If the university doesn't know about the composition of their faculty, how can they support them properly? Kezar, DePaola and Scott (2019) also suggest that higher education institutions don't collect data on their precarious faculty on purpose: 'adjunct faculty are often misclassified in order to strategically reduce the employer's obligation to them' (p. 161).

Pasma and Shaker (2018) picked up on where Brownlee (2015) left off. To write their report on contract faculty in Canada published through the Canadian Centre for Policy Alternatives titled, ContractU: Contract Faculty Appointments at Canadian Universities, they submitted a freedom of information (FoI) request to all public universities across the country. Their FoI response included information from 86 per cent of all publicly funded universities in Canada. Pasma and Shaker (2018) acknowledge that there are some limitations in the data they collected but this is the first Canada-wide report of its kind. This is the first (and only report) published that presents comprehensive Canada-wide data on precarious faculty in publicly funded universities.

Because higher education in Canada is under the jurisdiction of the provinces, it's important to note that the proportion of precarious faculty in higher education in Canada varies by province. Quebec relies on contract faculty more than any other province; Ontario and British Columbia are above the national average; Manitoba, Nova Scotia and Newfoundland and Labrador stand in the middle; Saskatchewan and New Brunswick are significantly below the national average and Prince Edward Island and Alberta have the lowest rates of contract faculty appointments (Pasma and Shaker 2018).

In the province of Ontario, the province that houses the highest number of higher education institutions in Canada, there is an emerging trend to rely on contract or part-time faculty while enrolments continue to increase (Ontario Confederation of University Faculty Associations [OCUFA] 2009). It is estimated that, 'the number of courses taught by contract faculty at Ontario universities has nearly doubled – increasing by 97 percent – between 2000–01 and 2013–14' (OCUFA 2015). In September 2015, the CBC's Michael Enright even hosted an episode on

The Sunday Edition that focused on Ira Basen's (2015) documentary 'Class Struggle'. In the episode, Enright referred to contract faculty as a 'huge army of part-time teachers, who are highly qualified and poorly paid' and noted that 'today more than half of Canadian undergraduates are taught by these very precarious workers, not by the big-name – and well-paid – academics that universities like to feature in their recruiting ads' (Basen 2015). The title of the episode for that podcast: 'Academia's Dirty Little Secret'. Pasma and Shaker (2018) confirm this phenomenon in their paper: 'more than half of faculty appointments in Canada are contract appointments. In 2016–2017, 38,681 faculty appointments, or 53.60 percent, were contract appointments, compared to 33,490 tenured and tenure-track appointments' (p. 17).

The Canadian Association of University Teachers (CAUT), founded in 1951, is a national voice for academic staff working in Canadian universities and colleges. Representing roughly 70,000 teachers, librarians, researchers, general staff and other academic professionals, CAUT claims to be 'an outspoken defender of academic freedom and works actively in the public interest to improve the quality and accessibility of post-secondary education in Canada' (Canadian Association of University Teachers [CAUT] n.d.a). CAUT, therefore, is a national association that identifies issues within academia in the Canadian context and aims to give a voice to those issues. One of the most pressing issues that CAUT has identified is what they label 'fairness for contract academic staff' – in fact, in addition to running a week-long campaign ('Fair Employment Week') in October to generate awareness of this issue, they also have an entire website devoted to this issue (CAUT n.d.b). On this page, their statement reads: 'More and more academic work is being performed by people hired on a per course or limited term basis. These positions are often poorly paid, have little or no benefits, no job security and no academic freedom. This has serious implications not only for contract academic staff, but for students, their regular academic staff colleagues and universities and colleges as a whole. CAUT opposes the increasing casualisation of academic work and campaigns for the equal treatment of all academic staff no matter what their employment status is.' (CAUT n.d.b)

This issue – as identified by CAUT, among others – is significant for both the individual contract faculty workers and for the larger university. CAUT argues that contract faculty 'are denied the opportunity to participate in all aspects of academic work – teaching, research and service to the community. They can't fully exercise their academic freedom because of the possibility of not being renewed (CAUT n.d.b). While it's obvious that

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these issues centre on contract faculty members, they extend beyond 'being an issue only for contract faculty' and affect the larger university community, including permanent tenured/tenure-track faculty, staff, senior administration and students. The fact that more and more faculty are employed on a temporary or precarious basis is not insignificant. CAUT reports that 'about one third of all academic staff in post-secondary institutions in Canada struggle to find decent work' (CAUT n.d.b). This is significant not just because it affects the individual faculty member as well as the students they work with, 'it is clear the insecurity and prevalence of this type of employment is having an impact on workers and on the quality of education students receive' (Pasma and Shaker 2018, p. 9).

Universities are like ecosystems. What happens in one area of the ecosystem has an effect on all the other areas – issues ripple through the ecosystem affecting more than just their small area. The same can be argued of the issues that contract faculty are facing in the larger university ecosystem: the issues extend to permanent tenured/tenure-track faculty, staff, senior administration and students. Contract faculty are part of the university web. Therefore, if there are 'issues' surrounding contract faculty, as CAUT and others identify there to be – then this should be an issue for all of academia, not just the contract faculty who are directly experiencing the issues.

The Personal and Financial Strain of Precarious Academic Work

While no job is secure or guaranteed, precarious faculty seem to feel the personal and financial strain in particular ways. Kezar, DePaola and Scott (2019) call this 'concealed anguish' and explain that 'with little or no job security [precarious faculty] are typically hired semester-to-semester or year-to-year, often within weeks or days of the semester's beginning, so they have very little ability to predict their work scheduled, obligations, and even income' (p. 43). Field and Jones (2016) found that the majority of precarious faculty respondents (66 per cent) from their study reported that they experienced considerable personal strain due to short-term contractual employment. This is not to say that tenure-stream faculty, or any other labour category in higher education don't experience personal strain but rather that precarious faculty overwhelmingly report that they do experience personal strain. From the comments collected by Field and Jones (2016), most of the personal strain experienced seems to be related to job security, financial security and wage levels, working conditions and opportunities for advancement within the institution.

Pay is one of the prominent issues when it comes to personal strain. In 'Sessionals, Up Close' published in *University Affairs*, MacDonald (2013) explains that there is a diverse scale when it comes to sessional pay. She states that pay is always a central issue for sessional faculty at Canadian post-secondary institutions. Precarious faculty are usually compensated a flat rate per course they're contracted to teach. In a CBC Radio segment, Sean Parkinson, Secretary for the Federation of Post-Secondary Educators, explained that there is a huge discrepancy in the pay that contingent faculty receive (Quinn 2019). Parkinson notes that many of the post-secondary institutions in British Columbia pay approximately $6,000 to $6,500 per course to their precarious faculty – but this is not uniform across the province. Some institutions pay as low as $3,000 per course, and others – Vancouver Community College and Langara College – pay faculty on the same scale as faculty who hold regular positions at the institution (Quinn 2019). This issue of pay presents precarious faculty with added emotional labour. Having to constantly calculate one's finances every term is an additional cognitive load that precarious faculty must add to their (already busy) workdays. At the start of every academic term, precarious faculty find themselves crunching the numbers to ensure that they'll be able to cover their bills over the next few months. This emotional labour that comes with the territory of precarious work can act as a barrier to successful working conditions in higher education.

In addition to issues surrounding pay and benefits, financial strain for precarious faculty also exists in the form of disconnection or lack of a sense of belonging to the departments in which they work. Being paid to teach, and only teach, precarious faculty often feel isolated in their work. Shahjahan (2019) refers to this isolation and feeling 'out of place' as shame. And, as Shahjahan explains, shame comes with feelings of self-hatred, negative self-evaluations, defensiveness, denial, deflections, dehumanisation, doubt and difference. Shahjahan attributes this shame to the hetero-normativity of academic culture that manifests and triggers the performativity of social exclusion. Since there exists a certain heteronormativity in higher education – the legacy of 'masculinity' and 'whiteness' is still prevalent in post-secondary culture. What's more, as Ahmed (2004) and Probyn (2004) explain, this 'shame' that is felt by precarious faculty is detrimental to their bodies. Feelings of shame 'can make us physically and emotionally sick where our mind and body can shut down' (Shahjahan 2019, p. 4). Feelings of shame, therefore, take both a physical and mental toll on precarious faculty. It is unfortunate that individual faculty internalise the effects of a neoliberal higher education system that make it

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structurally unfair to precarious faculty (Gill 2017). This shame, which precarious faculty often embody, leads to physical, psychosomatic and psychological consequences for these faculty and can lead to burnout. Therefore, this is a concern not only to the precarious faculty themselves but also to the departments and institutions in which these faculty work. Universities, after all, are people organisations; people – faculty, staff and students – make the university run. In fact, Kezar, DePaola and Scott (2019) argued that 'the higher education enterprise, at its core, is a relational and people-driven enterprise' (p. 3). Because the majority of the faculty on any post-secondary campus are precarious and because this disconnection from their departments can cause physical and emotional harm to these faculty, this is clearly a serious issue that needs to be addressed by the institutions.

Disruptions and Tensions across Canada

It's common for precarious faculty to not be fully compensated (if at all) for the preparation they put into developing and preparing for the courses they teach before the term begins (MacDonald 2013). However, some argue that it's fair for precarious faculty to make far less than their tenure and tenure-track colleagues since a sessional worker typically doesn't have the research and service expectations that come with the tenure and tenure-track (MacDonald 2013). This very argument was posed by CBC radio host Stephen Quinn to Sean Parkinson of the Federation of Post-Secondary Educators in a radio segment that discussed pay equity amongst post-secondary faculty in British Columbia during 'Fair Employment Week'. Parkinson's response to this argument was that most of the work that's being done by faculty – tenured or not – is teaching (Quinn 2019). Parkinson explained that the notion that precarious faculty are only teaching and not doing any kind of service or research work is a misnomer. Precarious faculty are still performing some service work and are still performing research even though they're not being paid to do these elements (Quinn 2019). Additionally, some argue that, sessional work was never intended to be a full-time living. But, whether or not that was the intention, today's reality illustrates that Canadian post-secondary institutions cannot run without precarious faculty. Canadian universities are now dependent on sessional instructors' services (MacDonald 2013).

Rhoades (2020) argues that collective bargaining agreements 'define formal terms of employment that express larger systems of power and embedded conceptions of educational quality' (p. 332). Therefore, reviewing tension-filled collective bargaining from post-secondary faculty associations is an effective way to investigate the power structures and struggles within higher education. Recently, job action has been a hot topic in the media for contract faculty employed at higher education institutions in the province of Ontario. In both 2015 and 2018, contract faculty at York University went on strike. In 2018, the strike – by roughly 3,000 contract faculty and teaching assistants – cited 'issues such as job security, the ability for contract faculty to achieve tenured positions and protecting funding for teaching assistants as some of their concerns' (Jones 2018). 'The striking workers coordinated their job actions so that the impact of their strikes would coalesce across these two university campuses [York University and the University of Toronto] – among the largest in the country' (Newson and Polster 2019, p. 1). The heated job action at York University sparked both provincial and national dialogue around contract faculty in higher education institutions in mainstream media. Popular publications and news outlets like *Maclean's Magazine*, *CBC* and *The Globe and Mail* all reported (sometimes multiple) stories on the labour dispute in 2018. The issue has even become a somewhat central issue in the political discourse in Ontario: 'according to a new poll commissioned by the Ontario Confederation of University Faculty Associations (OCUFA), 68 per cent of Ontarians oppose universities hiring more contract faculty on short-term contracts instead of full-time professors with better pay and access to benefits' (OCUFA 2018) and, with an election just around the corner, 'potential voters for all political parties disagree with the current hiring approach, including 74 per cent of Liberal supporters, 73 per cent of NDP supporters, and 58 per cent of PC supporters' (OCUFA 2018). With the job action at York University in Ontario having just settled recently (for now), one can only speculate if the public conversation around contract faculty in higher education institutions in Ontario and Canada will remain a 'hot topic' in the media after social distancing measures and the intensity of the pandemic fades.

In 2020, the arrival of COVID-19 and the pandemic intensified the academic employment tensions in Canada. Post-secondary institutions are feeling the economic impact of the pandemic; the global travel restrictions that manifested in the spring of 2020 inhibited the arrival of new international students on campus and forced many of the traditional face-to-face courses to move to online delivery. As Kaplan describes in Chapter 1 of this book, the arrival of COVID-19 has accelerated academia's digital transformation out of necessity, rather than intentional pedagogy. The pandemic has required higher education institutions in Canada to react

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and adapt, just as most organisations in every industry have been required to react and adapt. In April 2020, a series of 'prominent scholars' (such as Judith Butler, Zadie Smith, Donna Haraway and Naomi Klein) threatened to boycott colleges that don't support precarious faculty at their institutions during the pandemic (Zahneis 2020). According to Zahneis' article published in *The Chronicle of Higher Education*: 'more than 70 scholars are among the initial signatories to an academic-solidarity statement that promises not to accept invitations – for speaking engagements, conferences, and workshops – at institutions that do not include non-tenure-track faculty and graduate workers in extensions of fixed-term contracts' (Zahneis 2020).

This action by these 'prominent scholars' brings awareness to academic precarity in higher education. What's more, this threat shines a light on the ethical allocation of academic work in times where academic work is evolving and changing once again. In the province of British Columbia, Godbout (2020) reported in the *Prince George Citizen* that the University of Northern British Columbia (UNBC) is facing a 'rocky road' as the university prepared for the start of the fall 2020 term. Leading up to 2020, UNBC was already embroiled in a faculty strike around pay and benefits and now, thanks to a region with a declining population, UNBC is facing some serious budget cuts, which will most certainly affect precarious academic faculty: 'UNBC has cut $3.4 million in expenses and 21 jobs in its 2020–21 budget while also passing on another two per cent increase in student tuition' (Godbout 2020). Post-secondary institutions, as they prepare for the fall semester will continue to slash departmental budgets across Canada; this will, in turn, put the careers of precarious faculty (and non-precarious faculty, alike) in jeopardy.

Conclusion

This chapter began by reviewing the changing landscape of higher education in Canada, looking specifically at the rise of precarious faculty and noting the significance of precarious faculty in the higher education systems in Canada. Then, this chapter reviewed the personal and financial strain that precarious academic workers face. Finally, this chapter reviewed the disruptions and tensions that exist across Canada. Like many issues in society, the pandemic has illuminated the inequities that exist in Canadian higher education institutions. However, perhaps the voice of prominent high profile research scholars like Judith Butler, Zadie Smith, Donna Haraway and Naomi Klein will raise awareness of the structural issues that perpetuate job instability and strain that currently come with the territory of precarious academic work. As the 2020 pandemic fades into history, it will be interesting to see if the illuminating discourse on precarious faculty in Canadian higher education institutions will continue or whether it will fade into history along with the pandemic.

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PART VII

Futuristic and Ultramodern Higher Education

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CHAPTER 27

Learning Analytics Enriched by Emotions

Veronica Liesaputra and Claudia Ott

How emotions influence students' learning and achievement has been an important field of study in education and psychology (Pekrun and Linnenbrink-Garcia 2012). Although positive emotions strongly correlate to positive learning experience, not all negative emotions cause negative learning. Instances of confusion and frustration while learning actually have a positive impact on the students' learning performance. However, extended confusion and frustration correlate to negative learning outcomes (Liu et al. 2013). Thus, educational technology (EdTech) is focusing more and more on the emotional and social aspects that influence the learning process.

The augmentation of traditional data sets used for learning analytics (LA), such as assessment marks, engagement measures or timeliness of assignment submission, with the students' ever-changing emotional states is believed not only to result in a more multifaceted and accurate snapshot of students' learning but also to assist the provision of high quality, real time feedback that can trigger self-reflection and a more reliable identification of at-risk students early in a course when other learning metrics are still sparse (Liu et al. 2018). As pointed out by Kaplan in Chapter 1, with a decrease in the resources available to support teachers, this innovation is necessary to cope with increasing student numbers in both online and face-to-face learning settings.

In this literature review we (a) introduce the current application of emotion analytics in various settings, (b) elaborate visualisation approaches used to convey the results of the emotion analytics to the students and the teachers and (c) discuss ethical and privacy issues of using emotion analytics. Through this review, we hope to highlight the importance of involving students as co-designers and main stakeholders for LA applications (Sarmiento et al. 2020).

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Automatic Emotion Recognition

The ability to recognise learners' emotions is essential to the development of learning environments that can support students' emotion regulation and enhance their learning experiences (Montero and Suhonen 2014). People's affective state may be collected either through explicit subjective reports of feelings or through implicit observations of people's voices, faces and language and physiological signals. Although self-reporting emotion collection, through reflective diary or questionnaires, is simple, low cost and non-intrusive, it has drawbacks such as lack of honesty from participants, misinterpretations of the questions and selective reporting of only the extremes (Matlovic et al. 2016). This highlights the importance of having a tool that can automatically (and instantaneously) detect learners' emotions through implicit observations of their appearance, behaviour, speech and products that they have produced.

What Is Emotion?

Emotions are fundamental to human life but scientists struggle to reach consensus on the constructs underlying emotional phenomena and experience. The difference lies in whether emotions are characterised as discrete entities or an independent dimension.

Basic Emotion

Although people experience a multitude of emotions, the discrete entity school of thought proposes that some human emotions are more fundamental than others. These basic emotions can then be combined to form a more complex emotion. According to Ekman (1984), the six basic emotions that people recognise are happiness, sadness, anger, fear, disgust and surprise. However, later studies by Jack et al. (2014) found that there are only four emotions that humans can recognise irrespective of socio-cultural influences: happiness, sadness, anger and fear. Other emotions, such as disgust, excitement and shock, elicit the same facial response as one of those four emotions.

Dimensional Emotion

In this theory, psychologists posit that every human emotion is fundamentally the same. They only have different hedonic/pleasantness/valence level and arousal/activity level (Barrett and Russell 2015). All human emotion can be found in a circumplex controlled by hedonic in the horizontal dimension and arousal in the vertical dimension. For instance, happiness and sadness are located on the opposite side of the hedonic axis but both are in the middle of the arousal axis, while fear and anger are both located near the middle of the hedonic axis and near the top of the arousal axis.

By collating teacher's observations and students' self-reporting emotion data, many researchers found that the commonly reported emotions in academic settings are enjoyment, relaxation, anger, frustration, boredom, hopeful, hopeless, joy, relief, anxiety, pride, gratitude, contentment, shame, sadness, disappointment, engagement/flow, surprise, confusion and curiosity (Kort et al. 2001; Pekrun and Linnenbrink-Garcia 2012). There are a variety of emotions and the sequence of changes between emotions is not rigid and linear. Thus, these researchers consider the dimensional model to be better at capturing the myriad of emotions experienced by learners.

Furthermore, someone's emotional reaction towards a situation varies depending on the culture, ethnicity, gender, knowledge and experiences of the person (Goetz et al. 2014). In some cases, emotions experienced by an individual widely differ from the emotions experienced by people with similar backgrounds. Therefore, it is important to take into account the situation's context when analysing someone's emotions.

Emotion Aware Systems

Human emotions can be identified by psychological observations, behavioural patterns, physiological signals or a combination of them (Feng and Chaspari 2020; Deng and Ren 2021). In this section, we outline some examples of emotion aware systems that can automatically recognise students' emotions.

Psychological

This involves data that is acquired through self-reporting, questionnaires, interviews and stimulated recall measurements. Latent Dirichlet alocation can be applied to automatically summarise the topics and keywords that were mentioned in students' feedback (Unankard and Nadee 2020). While sentiment analysis (positive, neutral or negative valence) on students' feedback could help the instructors to understand the overall students' feeling about their teaching materials and which components need to be improved.

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Behavioural

Patterns are collected through implicit observations of the students' facial expressions, tone of voice, body postures, hand gestures, mouse and keyboard interactions, log files and documents produced by the students (blogs, reflective diary, discussion forums, etc.). Cameras and microphones are required to capture students' face, body and voice. Joint probabilistic models utilised to identify students' emotions (boredom, confusion, delight, engagement and frustrations) through their facial expressions were able to detect when students are distracted during class times (Bosch et al. 2016).

Physiological

Learners are required to wear sensors on their body to capture their biometric signals such as brain activity (EEG), heart rate (ECG), blood pressure, galvanic skin response and eye movements. Applying a machine learning algorithm on the signals acquired from portable EEG devices enabled teachers to know when students were feeling excited or frustrated after they had received feedback from an intelligent tutor system (Inventado et al. 2011), thus enabling teachers to personalise their feedback for each student.

Multi-modal

The psychological and behavioural data is less intrusive but more prone to deception (Matlovic et al. 2016). Students may try to deliberately conceal their true emotions by not answering the questions truthfully or by changing their behaviour. To tackle this issue, researchers used data from various sources to accurately detect human emotions, even in a noisy environment or in a state of confusion (Deng and Ren 2021). For instance, 'Collaborative Learning Environment Chatbots' use both camera and self-reporting emoji to capture students' emotions of involved, enthusiastic, active, confused, lost and abandoning (David et al. 2019). It informed the teachers whether it is better for the students to work on the current activity individually or collaboratively.

Emotion Detection Challenges

Depending on the types of data used and the techniques used to process them, the accuracy for detecting the four basic emotions varies from 70 per cent to 94 per cent (Feng and Chaspari 2020; Deng and Ren 2021). However, automatic emotion detection during a complex learning situation is still an open research problem. Apart from technical challenges, such as noise, data imbalance, resource consumption and disconnect between lab and real-life conditions (Feng and Chaspari 2020; Deng and Ren 2021). In this section, we have identified the two main issues that we have to solve.

Discrete Values

Current machine learning or deep learning classification systems can only handle a small number of discrete values. When the number of possible categories grows to hundreds, the classifiers become computationally inefficient and their accuracy decreases (Lin et al. 2020). Thus, in most emotion detection systems, emotions are modelled as several discrete categories which includes the basic emotions and a few other emotions which are considered to be pertinent to the application such as anxiety, flow or curiosity. Even when emotions are modelled following the dimensional emotion theory, the values on each dimension are discrete, such as low or high for arousal axis, and positive, neutral or negative for valence axis. However, students experience multitudes of emotions over time for varying lengths of time. Those emotions have relations to each other and the sequences of how those emotions are experienced have significant impact on the learning (Liu et al. 2013). Therefore, some researchers are creating work-arounds to model the relationship between classified categories over periods of time (Ghaleb et al. 2019) and learn the sequences of emotions (Ocumpaugh et al. 2020), but further research is required to create a robust emotion detection system.

Limited Datasets

For each emotion that we would like to identify, current AI classifiers require a large number of labelled examples of that emotion from various different people in various different settings. Although gathering a large number of instances of an emotion is not an issue, being able to get multiple annotators to consistently label every instance with the identified emotion is difficult (Feng and Chaspari 2020; Deng and Ren 2021). For starters, the manual labelling process requires a lot of time and labour. Moreover, people from different cultures, ethnicities and languages expressed and perceived emotions in different ways. Thus, inter-annotator agreement cannot be guaranteed. Researchers in this area have tried to devise a semi-automatic annotating system or use transfer learning to alleviate this issue (Canales et al. 2019).

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There is currently no single system that can predict human emotions with near perfect accuracy. Nevertheless, empirical observations on some of the emotions-enriched LA used in academic settings show that these systems may improve students' learning over non-emotionally adaptive learning technologies (D'mello and Graesser 2013).

Affect-Aware Dashboards

Results from LA processes are most commonly visualised in form of LA dashboards (LADs) and can be grouped in teacher-facing and student-facing dashboards. Either way, a LAD can be defined as a visual display that can provide both students and educators with insights into the learning process and ways to support the learning (Schwendimann et al. 2017).

Learning Analytic Dashboards and Their Shortcomings

In an early study, Verbert et al. (2013) proposed a process model distinguishing four stages of the LA process: (1) *Awareness* by visualising data, (2) *Reflection* by asking questions and assessing the presented data regarding their relevance and usefulness, (3) *Sense-making* by answering the questions from the reflection stage and creating new insights and (4) *Impact* as the end goal to induce meaning and trigger change in behaviour. The authors reviewed fifteen LADs and found that LADs are mainly teacher-facing and that LAD evaluation studies focus on usability and usefulness rather than actual impact.

In a more recent review, Schwendimann et al. (2017) inspected fifty-five LADS. Although LAD main users were still teachers, they identified a trend towards more student-facing dashboards. The majority of LAD applications used 'logs' – traces of computer-mediated student activity (85 per cent) followed by learning artefacts (29 per cent) and information gathered directly from the LAD user (13 per cent). Evaluations in authentic educational settings were rare and were again heavily focused on perceptions of usability, usefulness and user satisfaction. The authors conclude that LAD research is 'still young' given the considerable amount of exploratory and proof-of-concept studies and a lack of studies investigating the long-term impact of LADs.

Picking up on the research gap, there is a call for a better connection between LAD design and learning science. For example, Sedrakyan et al. (2020) proposes that LADs need to take the regulatory mechanisms of the learning process into account, namely, the stages of planning (goals), monitoring (progress) and adapting (future strategies) as described for self-regulated learning. Therefore, LADs should (1) allow learners to observe and improve their learning process, (2) enable teachers to improve their instructional design based on learners' need and (3) provide targeted constructive feedback for students that foster mastery goals as opposed to performance goals.

Examples of Affect-Aware Learning Analytic Dashboards

Given those findings, it is not surprising that reports on affect-aware LAD are rather rare. Emotion analytics is based on data which is not readily available. Whereas log data of students' activities, progress and results in the form of internal marks and final grades are naturally occurring, the collection of emotion data requires additional effort and poses unique challenges.

Addressing the lack of empirical studies, Sedrakyan et al. (2017) performed a user study (105 participants) on a student-facing LAD, called 'AffectVis', to find the best way to present students' emotions of frustrated, confused, bored, happy and motivated. Four visualisations were trialled including a timeline showing the evolution of emotions over time, and scatter-plots where students would see how their emotions are mapped against other students in the class. Even though students showed particular interest in seeing their own emotions in comparison with their peers, they were not always able to interpret the information correctly. Consequently, the authors conclude that simpler visualisation techniques are potentially more usable.

'EMODash' (Ez-zaouia et al. 2020) is an example of a teacher-facing dashboard. The learner's emotions were detected automatically based on their facial expressions and reviewed retrospectively by the teachers when preparing a written feedback report. Besides tutors' interactions, the content of the feedback reports written by tutors was analysed and a usability questionnaire was administered. Similar to Sedrakyan et al. (2017), it was found that the participants favoured quickly glance-able visualisations. Most importantly, the tutors incorporated more formative feedback and used more affective language than without EMODash. Hence, the authors concluded that affect-aware dashboards have the potential to improve learning outcomes by improved feedback and tutors' increased self-reflection and adjustments of their teaching practice.

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A student-facing dashboard based on students' self-reported emotions as well as observed emotions by teachers enabled students to track their emotions over time and compare them with the class average (Ruiz et al. 2016). Although the majority of students agreed that the visualisations help them to reflect on their emotions, very few students used the visualisations without explicit encouragement.

Design and Evaluation Guidelines

Reflecting on the three studies, we have to conclude that research of emotion-aware implementations of LADs have similar shortcomings as their non-emotion aware counterparts: lacking a theoretical basis of how the emotion analysis will support the learning process with limited attempts to measure the effectiveness on the four stages of awareness, reflection, sense-making and most importantly impact when interacting with a LAD.

LADs should be designed to catalyse change in the cognitive, behavioural and emotional competencies. Learning science needs to motivate design decisions, and the dashboard needs to be seamlessly integrated into the learning activities and online environment (Jivet et al. 2017). As the use of comparison with peers may not have the same effect on all users it should be used with caution.

Furthermore, it is important that LAD design is grounded in data visualisation theories to make informed decisions about suitable visualisation techniques in regard to the nature of the data (e.g., discontinuous or continuous, number of dimensions), associated tasks (e.g., overview, zoom or filter) and the visualisation objectives (e.g., comparison, relationship, trend over time). The latter two are driven by questions of relevance to the goals, required level of details, target audience and the presentation medium (Sedrakyan et al. 2019).

Evaluation of LADs should focus primarily on the goals of the dashboard and secondarily on the impact on learners' affect and motivation and the usability of the tool. Existing validated instruments should be used for evaluation (Jivet et al. 2017).

An important aspect is the assessment of learners' understanding and agreement with the data presented to build trust and confidence in the LA tools – an aspect influencing ethical considerations as discussed in the next section.

Ethical and Privacy Considerations

Reflections of the ethical issues of online data collection and analysis by Boyd and Crawford (2012) resulted in the warning that 'it is problematic for researchers to justify their actions as ethical simply because the data are accessible'. With the rise of LA, ethical considerations are becoming more pressing, but what are the guiding principles and how to safeguard their implementation? More importantly, what are students' views on the risks and benefits of LA and are those shared with academic staff?

Student and Staff Perspectives

The 'absence of the student voice in the decision-making about LA' motivated a focus group study with forty-one students conducted by Roberts et al. (2016) to explore students' knowledge, attitudes and concerns. The authors uncovered a lack of knowledge regarding LA applications as well as what types of data are collected. Students saw potential in LA to provide more personalised learning but offered conflicting views when comparisons with their peers were discussed. Likewise, the compulsory use of LA dashboards raised some concern as students were worried about an unintended negative impact on their motivation, self-image and emotions when not doing well. Further concerns included involuntary reliance on LA applications, a potential for inequality when students receive different information and a potential for bias by staff members that may affect students' future study opportunities. Most importantly, students were concerned about breaches of their privacy and highlighted a need for informed consent for the use of their data and the importance of opt-out options.

These themes were echoed in a large-scale survey conducted by West et al. (2020). Responses from over 2,000 students across 6 Australian universities were collected and augmented with survey responses from 276 staff members across 21 institutions (Luzeckyj et al. 2020). It was found that besides a general awareness of data collection for the use of LA there was no shared understanding of the term 'learning analytics' nor what data was used. Consequently, perspectives on useful applications of LA differed. Staff tended to put more weight on their interests such as identifying students at risk or tracking students' activities; whereas students valued applications supporting their learning – to monitor their own progress or to help them to identify additional services and material. As students and academics did not have a clear grasp of the data underpinning

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LA and its use, it is not surprising that both groups raised concerns about missing transparency.

Privacy Calculus and Building Trust

The notion of transparency is also focal point of a publication by Slade et al. (2019). It was found that students are willing to share their personal data in exchange with real or perceived benefits – a concept also discussed as 'privacy calculus' describing the cost and benefit trade-off of information disclosure, for example (Culnan and Armstrong 1999). Only when the scope, purpose and implications of the data collection and the potential benefits are clearly understood, students are empowered to assess the risk (cost) against the exchange value (benefit).

A risk, inherent to emotion analysis, is that the data collected are inaccurate and consequently analysis results are not trustworthy. In a study by Wang et al. (2020), combining interview and survey results of over 300 students, participants showed a high level of distrust regarding the accuracy of affect data resulting from affect-aware technology such as on-body sensors. It was pointed out that many confounding factors, not related to learning activities, may impact the validity of the data. In consequence, the authors urge designers of affect-aware LA (1) to allow students to confirm their affect data as well as to provide more contextual information and (2) to share those data only in anonymised and aggregated format to mitigate students' privacy concerns.

To increase acceptance and trust in LA tools, Sarmiento et al. (2020) used co-design workshops to involve students in the development of an LA tool with these strategies: (1) explicitly addressing power dynamics by inviting students to challenge the views and assumptions of the facilitators, (2) keeping the problem space open for re-framing based on students' ideas and (3) developing psychological safety which was facilitated by an ice-breaker activity and shifted students from being hesitant to enjoy working together.

Ethical Guidelines

Based on the general ethical and legal principles such as human dignity, privacy, security and justice, Germany's Data Ethics Commission of the Federal Government (2018) derived the following data ethics principles as general standards for data governance which we will discuss in the light of LA applications:

Interest-Oriented Transparency
As the lack of knowledge about LA in general and data collected in particular amongst staff and students was found to be alarming, it is vital that all parties involved are accurately informed about the educational goals and impacts, the scope of the data collection, the nature of the analysis and the use of the results. Without a shared understanding regarding those aspects the risks and benefits can be hardly assessed and informed consent cannot be guaranteed.

Foresighted Responsibility
To gauge the potential impact of collecting, processing and forwarding LA data on students, it is important to involve students in the design and implementation process of LA tools. We propose a user-centric perspective where students are the main stakeholders in the process and are involved in all phases of the development. Such involvement would ensure that interactive elements allowing for personalised views or functionality (e.g., comparisons with peers) are present and options to opt-out are considered. As already highlighted, the conduct of empirical studies in authentic learning and teaching settings is mandatory to study the acceptance and impact of LA applications.

Respect for the Rights of the Parties Involved
Following the principle that 'parties who have been involved in the generation of data – whether as data subjects or in a different role – may have rights in relation to such data, and these rights must be respected', students are entitled to be fully informed about the nature and scope of the data collection. Informed consent should be sought on a regular basis, especially when the data sources and the purpose of collection are altered. Students must be able to request access to the data and appeal for rectification or erasure to balance the power between the parties.

Fit-for-Purpose Data Quality
The rectification aspect is particularly important in the context of affective LA, as the accuracy of the data and resulting analysis need be negotiable by the students to build trust and improve affective LA systems ensuring that the data is of high quality and fit for the relevant purpose.

Data Use and Data Sharing for the Public Good
Adapting the principle that 'data can be duplicated and used in parallel by many different individuals for many different purposes, thereby furthering

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the public good' would lead to a call for students to get full access to their personal data and be in the position to apply their own individual analysis and visualisation. Although this seems to be a promising way to balance the power between parties, we are mindful that a specific educational goal and foresight into the impact needs to be explored first.

Risk-Adequate Level of Information Security

The standards of information security must be applied to ensure that data is protected against external attacks. Academic staff and administration must be held accountable for the storage and use of this data. It is imperative that the processes of anonymising data are well-established and that errors causing data to become personally identifiable are avoided to protect students' privacy.

Referring to the 'data minimisation principle' of the European Union's Data Protection Directive to mitigate the over-use of personal data without a specific purpose, McStay (2020) poses the question of degree to which emotion analysis is necessary and lawful for successful education. As affect-aware LA applications are especially vulnerable to inaccuracy, may have a negative long-term educational impact and can potentially lead to breaches in students' privacy, we urge educators to consider the risks and benefits of affect aware LA before embarking on new developments.

Conclusion

Learning is not merely an intellectual activity; students' emotions cannot only affect their achievement and personality development but also the social climate in the classroom (i.e., their classmates' emotions) (Pekrun and Linnenbrink-Garcia 2012). Thus, it is important to be able to immediately recognise and regulate it.

In this chapter, we have shown how the inclusion of automatic emotion-sensing in education can improve students learning experiences and performances. However, LA enriched by emotion systems are still in their early stages. Aside from the technical challenges in creating real-time and accurate emotional LA, there is also the challenge of making effective visualisations without running into the many ethical and legal issues associated with emotion analysis that are often overlooked by researchers.

With this literature review, we have suggested several ways that we can tackle these issues. However, the most important of all is the inclusion of all stakeholders (teachers, students, parents, departments, etc.) throughout the design process. This will ensure (1) that the analysis results are presented in a way that can actually help students improve their learning experiences and performance and (2) that the whole process is transparent, that is, all stakeholders know that their data has been collected, analysed and presented fairly and accurately.

Although the deployment and usage of emotion-enriched LA in education is limited at the moment, with the fast advances of computer technologies, the future of affect-aware education is near, we believe that our work creates a strong foundation for future approaches of collecting, analysing and presenting students' emotions.

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CHAPTER 28

Personal Analytics in the Science of Learning

Russell Butson and Kait O'Callahan

Few would question the vital role higher education should play in the rapidly changing technological, political and economic dimensions of today's connected, competitive, knowledge-driven world. Nevertheless, the process by which higher education institutions contribute has come under increasing pressure in recent years. While, on the surface, the steady growth of student registrations and graduations indicates that higher education institutions are functioning well, there are broader social voices concerned that a university education is no longer relevant to contemporary society (Summers 2017; Woodgate 2017). Neither Summer nor Woodgate claim that change hasn't occurred but that it is occurring too slowly.

One area where we have seen a change, albeit some would argue more in rhetoric than practice, is in the shift from a teacher-centric to a student-centric model, focused on learning and learners (Barr and Tagg 1995). It would seem reasonable to assume that this shift would be matched by changes in the practice of educational research. However, this does not seem to have been the case. Rather, there appears to be a history to the unchanging nature of educational research, where researchers are comfortable using a few methods (Hesse-Biber and Leavy 2011) and resist the exploration of others (Rios-Aguilar 2014). A series of recent reviews on higher education research methods (Kelly and Brailsford 2013; Scutt and Hobson 2013; Tight 2013; Wells et al. 2015) identified that higher education research is dominated by questionnaires and interviews. This is not to say that the data from these methods has no merit; on the contrary, questionnaires and interview-based research data can provide rich insights into participants' views, thoughts and perceptions. Where methods dependent on the 'asking of questions' fall short is firstly their reliance on memory for post-event recollections and, secondly, that they are measures of perceptions. Problems therefore occur when perceptions are equated with practice or behaviour; what you think you did may not

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actually be what you did. Self-reporting of events/actions through post-event recollections opens the door for a myriad of memory inaccuracies as a result of the passing of time (Arksey and Knight 1999; Cohen et al. 2011; Butson and Sim 2013) and the likelihood that participants will attribute opinion (personal interpretations and meanings) to events (Kellehear 1993). The upshot is the accumulation of knowledge on perceptions of learning at the expense of other approaches. A point not lost on Margaret Andrew's (2017) article in the *University World News*, which maintained universities likely to survive in the new era will be those that understand the importance of the whole person and the entire educational life cycle.

It is this shortfall that we wish to address in this chapter. We believe that recent advances in digital technologies have created new possibilities that have the potential to expand our understanding of whole person learning across entire educational life cycles. Until recently, capturing continuous naturally occurring activity or behavioural data was simply unrealistic. Advances in wearable sensor-based devices now allow us to gather relevant learning-related data across psychological, physiological and environmental dimensions with remarkable spatio-temporal precision. Given the unfolding explosion of wearable sensors, our purpose is to show how we can leverage these developments to strengthen and expand the science of learning.

In 1997, John Bruer (1997) published the article 'Education and the Brain: A Bridge Too Far'. In this work, he warns educators to be wary of claims by neuroscience regarding education. This position sparked tremendous debate at the time, a debate that appears to be resurfacing today with the increasing foray of neuroscience into education. However, it would be fair to say that the neuroscience debate is only one facet of a series of concerns over the rise of science-related fields within the educational research space. As a result, tensions over whether brain, mind or behaviour is the most appropriate locus for analyses of learning continues to surface. These tensions, in part, are likely to be a consequence of education's dependence on a broad set of disciplines: theology, philosophy, psychology, sociology and, more recently, computer and data science. It is inevitable that this degree of diversity will yield opposing positions as a result of the competing epistemological and methodological territories. For example, the behaviourist theory of learning as a corollary of reinforcement and repetition dominated throughout the early part of the twentieth century. The idea of learning as sequences of reinforcement and repetition started to lose ground with the rise of the cognitive movement in the 1950s. While also mechanistic in nature, the cognitive theories of Piaget and Bandura emphasised the role of mental processes to learning, such as information processing, memory and interpretation. It is important to note that both behaviourism and the cognitive movement were formed within a quantitative, scientific background. It was against this backdrop that a third perspective on learning emerged in the latter part of the twentieth century. This movement concentrated on the sociocultural and historical aspects in which learning occurred. It represented a more sociological approach to understanding human learning than the previous psychological theories. As a result, educational research has, for some years now, been dominated by a qualitative sensibility that has cultivated a degree of suspicion over science-orientated approaches to learning (Norris 2015; Bowers 2016).

Although not the only voice, Ellen Lagemann's book, *An Elusive Science: The Troubling History of Education Research*, reveals a research endeavour struggling for recognition that, for whatever reason, had, by the end of the twentieth century, become 'more interpretative than comprehensive' (Lagemann 2000). Like Lagemann, the educational methodologist Gary Thomas more recently echoed these sentiments by arguing that educational research has failed to provide reliable information on the practice of education. Going on to state that 'the answer to this failure lies not in formula-based attempts to do better and more systematically what has already disappointed. Rather, it lies in a shift in the way that inquiry into our subject is thought about; a shift in the way that the education research enterprise – our science – is conceived (Thomas 2012, p. 35).

This work is an attempt to demonstrate how a 'shift in the way of inquiry' is both conceived and practiced, with the purpose of realising what Thomas is alluding to as a new science. Central to this shift is the emergence of innovative technologies that have the potential to disrupt our entire understanding of how learning occurs and how it is researched. Essential to our conception of a new science is the growth of wearable sensors. These are devices capable of capturing and analysing continuous, naturally occurring data streams across psychological, physiological and environmental dimensions. From a learning perspective, the strength of these devices is their ability to render meaningful 'personal analytics' that can allow us as learners access to aspects of our physiology (body voice), habits, behaviours, mental states and moods.

Scenarios

What follows are two scenarios undertaken by the authors that illustrate the potential and applied value of sensor-based data generated from mobile

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or wearable devices configured to capture continuous naturally occurring real-world data. The scenarios we have included here reflect real studies that have either been completed or are in the final stages of completion. Each scenario depicts a contemporary area of inquiry illustrating how senor-based data can be deployed in applied research.

Scenario 1: Doctoral Stress

Stress has a long and worrying relationship with doctoral students (Danner et al. 1979; Offstein et al. 2004; Hill and Smith 2009). Not only does it affect a student's overall well-being (Haynes et al. 2012; Ross et al. 2012), but stress has also been shown to have an adverse impact on doctoral completion rates and retention (Kearns et al. 2008). Historically, stress-related research has tended to focus on the psychopathology of the individual. More recently, there has been a shift away from the personal markers of student stress and burnout to markers that underpin the interplay between the individual and the academic environment (Waghachavare et al. 2013; Meriläinen and Kuittinen 2014; Bélanger et al. 2015). A recent systematic review on the relationship between stress and the educational environment by Mackie and Bates (2019), while endorsing the importance of environmental factors, raised concerns over the methods currently deployed in researching the link between students and their academic context. They appeal to the work of Herrmann and Wichmann-Hansen's (2017) that proposes value in this area is going to come from a scrutiny of current methods and the development of more valid and reliable instruments. While Herrmann and Wichmann-Hansen do not state what they mean by valid and reliable instruments, we would argue that a more multimodal approach that includes physiological, psychological and environmental data would go some way to addressing their call for valid and reliable measures. As raised in the introduction, the tendency to concentrate undue attention on question asking means that much of our research on stress in higher education can be defined as perception based. This offers limited utility in regard to understanding what occurs in practice, creating confusion rather than clarity and direction. For example, the act of 'asking people questions' about previously experienced stressful events or states is likely to render a flawed judgement on reality given the susceptibility to responses prejudiced by the person's values, beliefs or post-event recollections. An obvious way to overcome these obstacles is to capture relevant environmental and behavioural data at the point stress is experienced.

This is where wearable devices offer a range of solutions capable of capturing stressful states and stress related contexts at the time they occur. For example, electrodermal activity (EDA) is the classic measure of psychophysiological sympathetic arousal that is typically associated with stress (Benedek and Kaernbach 2010). In stressful situations, the skin surface conductance, controlled by the sympathetic nervous system, changes as a consequence of increased sweat gland activity. This electrodermal activity is easily detectable by measuring the conductivity of the skin. While the values are extremely small (microsiemens – uS), the subsequent changes in skin conductance associated with the sympathetic nervous system have come to be regarded as a robust measure of stress (Lagopoulos 2007). Likewise, the development of small wearable auto-cameras (cameras configured to take a photo every thirty seconds) afford researchers access to a continuous visual point of view of a person's physical landscape. This offers researchers a glimpse into environmental and behavioural factors that were previously inaccessible. By matching a stress measure, such as EDA, with environment data generated from an auto-camera, we are able to generate a more accurate method of identifying stress and associated stressors. Two additional benefits of this approach are (1) the ability to identify stress reactions at the physiological as opposed the perceptual level – EDA devices can identify physiological stress action long before psychological awareness (consciousness) might occur – and (2) the ability to identify possible patterns over time and to ascertain the degree to which environmental factors can lead to chronic levels of stress. The power of these devices is their ability to capture continuous naturally occurring data. It is worth noting that while EDA has a long history as a stress measure, studies have largely occurred in clinical settings using simulated events. The capture and analysis of data over extended periods captured from authentic settings opens up an entirely new frontier.

An exploratory study was undertaken to assess the practicality and benefits of this approach. Four doctoral candidates volunteered to undertake the 24/7 twelve-week challenge. To gain a rich and detailed picture of the participants' stress levels and potential stressors, two distinct datasets were generated: dataset-1 gathered physiological stress data and dataset-2 captured contextual photographs. These datasets were merged in order to match photographs with EDA events of interest. Figure 28.1 provides three examples of EDA mark-up data with context information provided by photos.

While this study was exploratory in nature, it is clear that the novel physiological and environmental measures deployed had a profound

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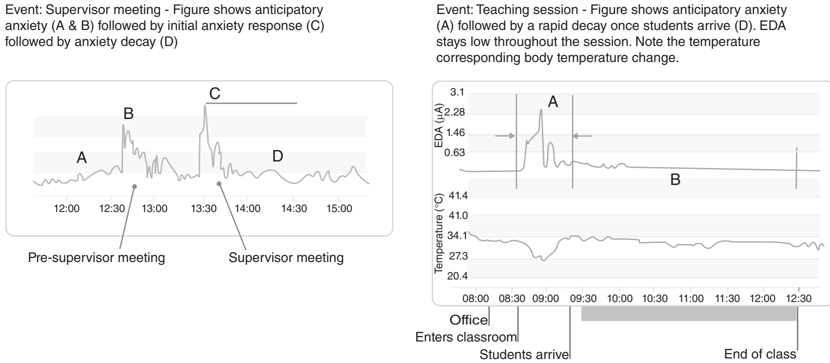

Figure 28.1 Elevated EDA signals with associated contexts: Auto-camera photographs

impact on the participants understanding of stress and stressful contexts. In particular, it raised a new tension for them as they grappled with the relevance and validity of the physiological data (body voice) offering an alternative reality to their conceptual or psychological understanding. A second point that surfaced early in discussions with participants was the lower-than-expected EDA activity. Prior to commencing the study, all four participants had expressed they were extremely stressed due to the demands of doctoral study. On reflection, participants felt this was a distortion and a likely consequence of adopting the construct of 'being stressed' as a condition of being a doctoral student.

From a methodological perspective, it became obvious early on in the data analysis that the process of developing sound evidence from data was greatly improved through addressing psychological, physiological and environmental dimensions. That is not to say these dimensions are or need to be triangulated, on the contrary. Instead, we found these dimensions rendered very different results raising the prominence of each as a different point of view on the topic under inquiry. The depth of insight gained from incorporating these dimensions has led us to believe the rise of wearable sensors will promote multimodal investigations cross psychological, physiological and environmental dimensions which will transform the way we undertake educational research.

Scenario 2: Student Fatigue

It is well-accepted that university students are likely to experience sub-optimal sleep resulting in various negative psychological and physiological consequences. While acute sleep deprivation is often experienced when students forsake sleep for study in the form of the 'all nighter' (Thacher 2008), partial chronic sleep deprivation, where the student obtains some, but not enough, adequate sleep (Hershner and Chervin 2014) may be even more concerning. This type of sleep deprivation in students, associated with early lectures, socialising and evening work, has been shown to negatively affect memory and learning (Kelly 2003; Ranasinghe et al. 2018; Andrade et al. 2019), as well as well-being (Wing et al. 2015; Scullin 2019). While sleep deprivation's negative effects on memory and learning are cause for concern, a student with low well-being is also more likely to drop out or defer from their course (Biasi et al. 2018; Suhlmann et al. 2018). A solution to student sleep deprivation is therefore of interest to educational providers and students alike. The obvious solution seems to be sleep education, but while sleep education has been shown to increase awareness of the importance of sleep, there is evidence that awareness alone has little impact on behavioural change (Wing et al. 2015; Scullin 2019).

Wearables may offer a solution to this problem. Traditionally, the dominant method for sleep research has been the use of self-reported measures such as questionnaires, diaries and interviews. Questionnaires such as the Pittsburgh Sleep Quality Index gets participants to comment on sleep patterns over the previous month (Buysse et al. 1989). While there is substantial reliance on participant perceptions and memory, it continues to be a common method of measuring sleep quality (Lund et al. 2010; Cvejic et al. 2018; Peach et al. 2018). Likewise, sleep diaries require participants to fill in details about their sleep over several nights, which is both a load on the participant and reliant on self-perceptions of sleep. Wearables, however, require almost no input from the participant and offer physiological measures of sleep duration and quality which are independent of self-perceptions and memory. Wearables also have the advantage of offering something personal to the wearer. By viewing their own physiological sleep data, students may begin to see sleep as something that they can control and optimise, rather than just a thing that happens when they close their eyes.

In response to this challenge, an exploratory case study was undertaken to investigate the relationships between sleep, student mood and performance, including the impact that access to biometric data had on students' sleep perceptions and practices. Fitbit Charge 3 devices were used to track the sleep quality and quantity of ten undergraduate medical imaging students over a period of one semester (five months). Fitbit offers a readily available commercial off-the-shelf product that was supported by a growing number of studies citing Fitbit's Charge 3 sleep data as valid for sleep

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research (Brooke et al. 2017; De Zambotti et al. 2018; Feehan et al. 2018; Lee et al. 2018; Svensson et al. 2019). While the results from this research were not intended to be generalisable, the study offered a fascinating insight into the sleep of this group of students.

Sleep was analysed in a holistic way by measuring multiple factors: sleep duration, sleep quality and social jet lag. Duration was defined as sleep length and consistency of sleep, while sleep quality was analysed using sleep stages (e.g., deep sleep, rapid eye movement sleep and light sleep). Social jet lag is a term used to describe the mismatch between an individual's biological clock and their social clock and evidenced by naturally later sleep in the weekends (Roenneberg et al. 2019). This was measured by analysing mid-sleep time differences between weekday and weekend sleep. The results showed a wide range of sleepers both in sleep quality (deep sleep, rapid eye movement sleep and light sleep) and sleep duration. Evidence of social jet lag was seen in six out of ten participants. As expected, sleep was shown to be experienced in an individual way and that sleep-time and wake-time reflected a tension that manifested in co-dependency rather than interdependency/complimentary.

Participants had never investigated their sleep before or sought education on the phenomenon, but all were interested in learning more once they saw their data. Through regular discussions with the researcher, participants gained insights into the significance of sleep and how to optimise sleep (e.g., sleep hygiene) as well as how to analyse their data. Before this study, all participants defined sleep quality solely by duration. By the end of the study, participants understood sleep cycles and sleep consistency and were well versed in analysing their own sleep patterns produced by their Fitbit. Having gained new knowledge and fresh perceptions, many students felt empowered to change their behaviours during the study to optimise their well-being and academic achievements. For some, going to bed earlier resulted in a better mood and a more productive day. However, others found that going to bed earlier did not result in improved sleep, and they found it better to set later but consistent bedtimes. One student who routinely studied all night before exams became convinced to change tack after they analysed their sleep data and began to understand the importance of sleep. This student then began to make notes of their exam performance and compared it with their sleep data in order to optimise their academic performance.

During analysis, it also became clear that participants shared characteristics with each other. For example, three students that experienced the poorest sleep also experienced the lowest mood. These three students experienced poor mood, poor sleep and poor performance overall. Likewise, the two students who reported the best mood also experienced the best sleep and average to good performance. While this study did not intend to prove causation, there was certainly evidence of a relationship between the factors sleep, mood and performance. However, there is a caveat. While some students felt they could use their data in an empowering manner and sought to change their sleep patterns, there were some who did not. These students were satisfied with just knowing their data and were not interested in proactive change even though their results indicated suboptimal sleep. It highlights the point that wearables and the data they produce, while informative, are not necessarily going to act as catalysts and augmenters of change. Notwithstanding, this study revealed that research centred on the individual can lead to in-depth enquiries where the participant gains can be considerable. For these students, access to biometric data lead to a deeper awareness of the importance of sleep, which, in some cases empowered the student to make positive changes.

Conclusion

We believe the capability of digital sensors to harvest continuous streams of naturally occurring personal data is going to have a profound impact on social science in the same way the telescope did for astronomy and the microscope for science. As with any creative disruption, the emphasis is on the progressive creation of new lenses, new ways to see, understand and practice. There is no doubt such an endeavour aims to disturb the status quo and there is no doubt it will be met with disapproval. Nevertheless, like so many technological changes, it is unstoppable. The current conceptions, methods and practices of educational research will be superseded by a more forensic orientated milieu. It could be argued that the advent of sensors recapitulates the shift that occurred within the legal system, where eyewitness testimony (self-reports) has given way to digital forensics (mining reality) as the principal measure of evidence. It epitomises the desire for measures that offer a more accurate picture of physical reality. The legal system has downgraded the significance of self-reports as a reliable form of evidence on the grounds that eyewitness testimony is inconsistent and all too often wrong (Buckhout 1974; Arkowitz and Lilienfeld 2010). Of course, the miscarriages of evidence within the legal system can have devastating effects ranging from incarceration to death. What defines evidence is therefore ruthlessly scrutinised in courtroom judgements. Educational research, on the other hand, does not generate significant

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consequences from miscarriages of evidence. This is not to say it does not occur but more that the consequences are not regarded as critical and therefore evidence is treated as 'soft', aiming to imply rather than warrant a particular judgement. Sensor-based research offers education a way to address a discipline often referred to as being ideologically biased and methodologically sloppy (Routledge 2017)

As higher education evolves, so too must its methods of investigation. With wearable devices becoming increasingly popular in society, particularly among younger generations, it is important to encourage/empower learners to become data literate as they explore and make-sense of the daily realities that come with unfettered access to sensor-based data. We believe our work represents a first step in the right direction toward making this possible in the science of learning.

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CHAPTER 29

The AI Economy and Higher Education

Liz Coulter-Smith

This chapter focuses on four leading AI economies: China, the EU, the United States and the United Kingdom. We are interested in how these economic AI plans impact higher education (HE). Universities are critical to the workforce and, therefore, the financial health of a country. Nevertheless, are they ready to contribute to this AI economy? Are our governments preparing for the futuristic and ultramodern approach being adopted in, for instance, China? What will be the consequences if higher education falls far behind in some and not others? Some governments are (and have) made numerous alliances with large multinational industries, including Google, Microsoft, Facebook, Amazon, Huawei, Baidu and Alibaba, amongst the most prominent. Later in this chapter, we will take a look at some of these partnerships and the future thinking and planning taking place. The strategic plans, and approach to partnerships, differ in depth, substance and persuasive style in the documentation we are relying on. Some of these differences will alter how our universities adapt, plan and develop the curriculum necessary for a robust AI economy.

Higher education has a critical role to play in this economic shift and is in fact at a 'crossroads of disruption' as Kaplan suggests (Kaplan 2021). Embracing the AI economy is broadly considered vital and transformational across all sectors of economic productivity and particularly as we recover from the COVID-19 crisis. This 'economic shift' cannot be understated as Chapter 1 clearly points out. However, if universities choose to react too slowly, or if governments 'over focus' on the spin, research, regulation and industry partnerships, they will jeopardise broader student employability and the significant human workforce those students represent. A more comprehensive approach to addressing the curriculum at the HE level is needed urgently. It is critical to be aware of these changes as both educators and citizens.

There is a rather steady stream of strategic documents being released, so the challenge of keeping up-to-date is a real one. Just as this goes to press,

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the EU draft on AI regulations has been leaked and several other strategic documents have also recently been published in the United Kingdom. The 'UK AI Council: AI Roadmap' (AI Council 2021) is, thankfully, closer to the US strategy and somewhat like the EU white paper, with more than a dozen recommendations relating to higher education, a section on skills and diversity and much less emphasis on financing initiatives.

For higher education, governmental approaches communicated about the AI economy and best practices may be less than homogeneous, confusing, contradictory and signal an overarching ethos often filled with marketing speak – this is why examining these strategies closely is so critical for HE and endlessly interesting.

AI and Machine Intelligence

A definition of artificial intelligence is challenging to answer precisely. However, a simple way to think about it is as a process of making a machine behave in ways 'that could be called intelligent if a human were so behaving' (McCarthy, Shannon and Minsky 1955). Artificial intelligence's discipline is generally considered to have begun in 1956 at a Dartmouth College conference (Nilsson 2009) but funded in 1955. Alan Turing's research on computing machinery and intelligence before, during and after WWII is also considered foundational to AI. His work critically fuelled the following decades, having proposed the question 'Can machines think?' (Turing 1950, p. 433). The simplicity of the algorithmic method implemented in the 'imitation game', where two neural networks compete with a third 'discriminator' network was an antecedent to generative adversarial networks (GANs) and deep learning (Goodfellow et al. 2014). Turing's research in algorithmic computation and intelligent machines has been foundational and the Dartmouth conference built on that work and coined the term 'artificial' but the origins of intelligence and machine learning (ML) lay with Turing. In terms of public awareness, AI and ML ebbed and flowed over the following fifty years, with many novel contributions, such as the work of Geoffrey Hinton (Rumelhart, Hinton and Williams 1985; LeCun, Bengio and Hinton 2015). But public awareness and its impact came decades later with the successes of the IBM Watson's Jeopardy Challenge (2011) (Shah 2011) and DeepMind's AlphaGo triumph (2016) (Bruder 2017). The advancements in AI and ML demonstrate the rapid growth of machine and deep learning, with only five years between them.

Disrupted Systems, Jobs, Upheavals and New Technologies

Future projections are always hazardous to make and this is especially so when involving emerging technologies. Comparisons are often made with the economic upheavals of the Industrial Revolution. That revolution brought employment, new technologies and eventually higher living standards. The disruptive period at the turn of the last century was an almost cataclysmic disruption to all aspects of life – and yes – serious abuses and ethical woes were common. However, that disruption brought about significant change, and I would hasten to add – for the better. A more recent example was just twenty years ago, at the time of the dot.com boom and just before, we can see a similar pattern, and 2001 is a much better example of what we can expect in the coming decades with AI. However, in higher education, there was a place that existed to adjust the curriculum rather easily. Computer science departments had to change, but the raw materials were already present. With AI and ML now, one could make the same argument, except that the need for using data and understanding how to manipulate it is entering every part of the higher education ecosystem. Below is the projected economic impact of the Internet in 2001 from the Brookings Internet study – substitute 'AI' in place of 'Internet' and the comparison is striking: the accumulating evidence in the eight sectors examined in the Brookings Internet study suggests the following:

- The potential of the Internet to enhance productivity growth over the next few years is real.
- The greatest impact may not be felt in e-commerce but rather in a wide range of 'old economy' arenas, including health care and government, because of changes to the way information flows.
- As a result of the Internet, there is considerable scope for management efficiencies in product development, supply-chain management and a variety of other aspects of business performance, encouraged by enhanced competition.
- Much of the benefit from the Internet is likely to show up in improved consumer convenience and expanded choices, rather than in higher productivity and lower prices (Litan and Rivlin 2001, pp. 313–317).

We are in another wave of enormous disruption as pointed out throughout this book. Also, the parallels are clearly evident between the early years of the adoption of the Internet and what we are currently experiencing with the AI economy. Agrawal et al. also make this point (Agrawal, Gans and

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Goldfarb 2019, p. 2). The mid-90s were pivotal as we witnessed the Internet and related communication technologies emerging outside of research in HE and then to the wider public. This economic revolution, the dot-com boom or bubble as it is now termed, peaked between 1999–2001 then crashed. However, the Internet-connected economy continued to create multiple ecosystems, ecosystems that are still expanding, disrupting and creating jobs today. In order to create jobs, investment has to be made. As with the dot-com boom, a long-term strategy was needed by universities to meet the demand for technologically skilled knowledge workers. Author points out that 'human-capital investment must be at the heart of any long-term strategy for producing skills that are complemented, rather than substituted, by technological change' (Coulter-Smith 2018, ch. 7). The question is this: Will universities and their governments make the necessary investment in this next revolution in order to build this 'human-capital' for the coming AI economy?

The Internet's impact created jobs, and a similar forward-moving change is happening again with AI. The COVID-19 crisis has accelerated not only online shopping by an estimated five to ten years (in the United Kingdom) and also catapulted online learning and teaching firmly into this century. The United Kingdom in particular has long lagged behind other countries where advances in online services is concerned. However, this next 'technological turn' offers us the ability to foster new methods of human to human interaction as well, it may be online and mediated by technology yet in HE and in terms of learning pedagogies the interactions are novel and deserve further investigation. During the COVID crisis, these differences have come to the fore and in many cases removed ethical barriers both physical and psychological, a renegotiation of what constitutes 'presentism' in the workplace, and new flexible working patterns will likely benefit human job satisfaction in the longer term. It is time to also adopt a crisis stance in our take up of AI and accelerate this 'turn' in higher education, but we need to act quickly in response to the environment we now find ourselves in.

The rate of embedding AI and related technologies in our lives is on warp-drive. AI has moved into our homes as millions of us live with Alexa, Siri and Google. Speech recognition has changed the lives of many. These technologies are also often frustrating. With these often-painful changes come a few negatives – loss of privacy, systems listening to us in our homes and unknowingly being tracked on and offline. There are trade-offs. So, how do these developments underscore the need to adapt the higher education curriculum? Are our institutions too big and slow to act and are our governments working to correct this?

The ability to adapt to one's environment is considered a core aspect of intelligence. We have seen what lacking this ability has done to established institutions on our high streets (particularly in the western world) during the COVID-19 crisis. Businesses that had previously adapted to an online data-driven market or had evolved in the past decade or two have survived. Those companies or industries that did not see change coming are gone – some seemingly overnight. The situation with higher education gives us another perfect storm. If there is continued slowness to act, the inability to adapt content quickly and a perpetuation of an arrogant attitude about preparedness for the coming AI economy, then, like the high street, there will be a painful transition to come. The EU commission has flagged the fact that AI can even facilitate this transition for universities (Centre for Strategy & Evaluation Services 2020, p. 33).

Higher education institutions may well experience the fate above should they fail to adapt quickly enough. To correct this, university leaders must take action (Goldfarb, Gans and Agrawal 2019, p. 6) and in a tangible way now. They must fast-track and embed the basics of using and manipulating data and algorithmic, computational and systems thinking at the minimum. Small changes are not going to be enough. Institutions fail – higher education institutions may be on the brink of that failure in many countries.

Trusting AI

Communicating to the public about the use of AI is crucial. EU documents refer to this as 'explainability and interpretability'. These terms also relate to issues around ethical governance in the EU and the problem of a person's 'right of explanation' should an algorithm's decision be disputed (Cath 2018, p. 2). The recent A-level debacle in the United Kingdom is a good demonstration of the problems governments and institutions face without adequate advance public awareness (Elbanna and Engesmo 2020).

The nature and potential of AI and ML and how they can improve basic day-to-day processes, systems and quality of life generally do not receive the same attention as pseudo-science and novel media fear-based fiction does. The benefits are most evident for the public in the health sector, where the positive effects of algorithmic patterns using ML achieve better accuracy than humans. Wherever large amounts of data or patterns or calculations are made, ML and deep learning neural networks will prevail

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over humans due to accuracy and speed, as is demonstrated with precision diagnosis (Cath 2018, p. 2). Further benefits need to be communicated to the public regarding the efficiency of farming, sustainability in various systems and maintenance and public security.

The Competition: China, the EU, the UK and US Government Plans

So far, we have established the importance of speed to take up the AI economy and the crisis it could cause should we not act swiftly enough in HE. Also, the importance of keeping the public informed is a critical part of this mission. As with the introduction of the Internet, we will experience a tsunami of opportunity and disruption for businesses and higher education. In 'Accelerating Competitive Advantage with AI', PwC proposes an overview of the AI sector. Bias, jargon and hype characterise this document, but it states that the global AI market will be worth up to $15.7 trillion by 2030 (PwC 2017).

This next section will look at four reports or plans from China, the EU, the United Kingdom and the United States (OSTP 2016; Fa 2017; Hall and Pesenti 2018; European Commission 2020). These are remarkably different documents in their presentation, technical content and persuasiveness. An array of documents preceded both the UK and the US experience and are worth a closer examination but not in this chapter. The EU and China plans are concise and at a lower level, technically. The UK strategy seems fixated on the monetary amounts invested and a glossy marketing approach aimed at the general public. China seems to have a clear plan for physically building education through the development of smart campuses. Of the four plans, the United States and China offer more detail both technically and for higher education and AI. There are so many challenges, changes and shifting roles imminent in the workplace brought on by the AI transformation that, remarkably, the pace has yet to be reflected across the majority of higher education institutions in terms of adapting the curriculum across all disciplines. There are always exceptions, and this is a general observation.

Words matter, and they are especially revealing when it comes to government documents and their persuasive communication techniques. After noticing the high-frequency use of certain words and symbols in the UK document, a brief comparison of word frequency showed some glaring examples, and one stood out amongst the rest. The United Kingdom used the currency £ symbol sixty-eight times in its document. Compare this to the other three documents in Table 29.1.

Table 29.1. *Word frequency of currency signs in government AI documents*

Government	UK £	EU €	China RMB	US $
Word frequency	68	9	6	1

Table 29.2. *'Human' word frequency of currency signs in government AI documents*

Government	UK	EU	China	US
'Human' word frequency	1	33	36	171

After this surprising oddity, it followed that a check on many other words for frequency should be done.[1] The count may include references so could vary slightly. Words related to the topic at hand found that the words 'student/s' and education/higher occurred in single figures for the United Kingdom and EU and slightly higher double figures for China and the United States. The United Kingdom emphasised 'industry' four times as much as the EU and twice as much as the United States. Another difference was the use of the word 'business', featuring eighty-nine times in the UK document and less than ten times in the US, China and EU documents. And finally, the United States mentioned 'research' 229 times as compared to 116 for China, 38 for the United Kingdom and 21 for the EU. Another interesting divergent word usage (there are a few), was the use of the word 'human'. The word occurs 171 times in the US document (Table 29.2) and far exceeds the others.

As much as one can be an optimist generally about technology and AI in particular, it seems important to balance machines with the importance of humans and humanity at any stage of development.

China

China has been building strong enterprise links with universities for some time but there has been an escalation from about 2017. This was also the year that they published their AI development plan. China's ambitions are not small as they seek to view AI as a 'main driving force … upgrading

[1] Frequency table of selected words in strategic AI documents: UK China US and EU. https://bit.ly/3pxAR32.

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their economic transformation' (Fa 2017, p. 6). They also anticipate 'world-leading' levels by 2030 in several areas. Development of 'intelligent' education includes online intelligent platforms, AI improvement systems for education, cross integration of AI and mathematics, educational assistants, learner-centred environments and precision deployed education for lifelong education. The depth, breadth and clarity of this plan are worth closer inspection.

There are numerous partnerships as well. Facebook (FB) teamed up with Alibaba in 2018. This brought together AI and FB's PyTorch open-source machine learning library with Alibaba's machine learning cloud platform for AI. These are two technologies, cloud and ML, when combined with 5G will change the landscape of AI/ML (Shumin 2019). It is worth remembering that any competitiveness will rely on the ability to both gather and deploy data and drawing on a population of billions of citizens has its advantages. China may already be ahead in this arena.

Their advantage is, in part, due to the Huawei partnerships both in China and around the world in 5G and are coupled with Huawei's support of universities. For example, contributions of over 3 million euros to both the University of Amsterdam and Vrije Universiteit Amsterdam were made recently to further their clear advantage towards ML cloud platforms (Bothewell 2020). Often in the news, Huawei is leading in a number of critical areas key to the AI economy; and due to this, a number of universities have also disregarded the security concerns of their governments.

Along with these partnerships, and there are too many to discuss here, another area of interest is their ambitious construction of 'smart' campuses. We are talking here about completely new campuses, most of which are centres targeted as innovation centres involving AI, ML cloud and 5G among other new and developing technologies. These technologies all fit together to support this economy that will supercharge their ability to educate and train researchers.

China appears to be taking the lead with five AI innovation centres being built in Beijing, Binhai New Area of Tianjin, Hangzhou of East China's Zhejiang Province, Guangzhou of South China's Guangdong Province and Chengdu of Southwest China's Sichuan Province, each strategically positioned towards research in particular AI areas covering intelligent vehicles, manufacturing, enhancement of utilities, strategy and government policy advancements, financial services, efficient future technologies, medical, road infrastructure and environment.

At this scale and level of investment there are few countries that have so well coordinated their AI innovation plans. There are also national AI mass innovation centres and AI industrial parks being built. This has all been taking place for four years now and it appears they are well on their way to meeting most of their targets. It would be foolhardy to guess at the investment but it has to be in the hundreds of billions if not trillions.

United Kingdom

The ambition of the United Kingdom is to be a 'scientific superpower' and to 'create a world-class education system' (ITV 2021). One of the strengths of the UK strategy is to build upon Alan Turing's AI legacy discussed at the start of this chapter. The Alan Turing Institute has been given £43 million in funding and will be a national academic institute for artificial intelligence and data science (Hall and Pesenti 2018, p. 10). The United Kingdom published their *Industrial Strategy: Artificial Intelligence Sector Deal* in 2018 after a couple of prior white papers by the same authors. The 'Deal' is a glossy government plan that focuses on pledging (over sixty-eight times) financial support throughout – totalling just under a billion dollars over a number of years. But the plan yearns for clarity, ambition and detail in comparison to China's plan featuring education and smart campuses.

The UK plan lacks momentum and feels like a slick 'academic' strategic plan. As it states, it is an industrial strategy and does include the usual suspects as partners: Google, Amazon and others but misses out on joined-up ambition. The UK government consistently authors white papers using high profile academics, usually heads of computer science departments from research-focused universities. This tends towards bias and self-dealing to creep in and poses a conflict of interest to any recommendations made.

A healthy mix of authorities, experts, researchers and industries is needed in place of this often unilateral approach. And, as highlighted earlier, the overstating of government finances feels like an over-compensation for something else that is inadequate or missing. The main authors for all of the UK government AI strategy documents are the vice president, and now recently the president, of AI at Facebook, two government officials and a professor whose university has significantly benefitted from the recommendations' outcome. In fact, it is worth noting that the three main documents leading up to the UK strategic plan all involved the same celebrated academic and Facebook VC – and feature that pesky pound sign at an ever-higher rate. The EU, China and US government

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authorship appear to be more diverse, less biased and more aware of the needs of higher education training and universities' role generally.

AI partnerships with large corporations and universities are common in the United Kingdom. The University of Cambridge joined Microsoft in a machine learning initiative worth millions in 2018. The Microsoft Future Decoded 2019 conference announced this alliance. The conference also set out areas of work in the United Kingdom and the universities that they are supporting. Oxford University teamed up with Google just after the purchase of Deepmind in 2014 and with four PhD scholarships awarded in 2020 as part of an £8.47 million agreement from 2015 to 2020 (Reuters 2020).

The EU

There is a strength of cooperation evident in the EU white paper. It is recognised that the EU's ability to support innovation and research may not equal the ability to coordinate across so many countries and institutions. The EU document feels very rule-based and sometimes fragmented. But over the past few years, the EU has clearly and concisely covered higher education, digital and AI in a complete and detailed way in other documents.

EU strategic priorities also require universities to adopt a combination of 'disciplinary and interdisciplinary approaches' (Centre for Strategy & Evaluation Services 2020, p. 166). They state that this will be increased compared to the past two decades to 'ensure the interdisciplinary can be better recognised and rewarded in career development in appraisal systems'. Such an approach is crucial as we move into the AI economy and will be profound as students are educated within a system with this ethos. The number of strategic recommendations in the EU 2030 Vision document is commendable and extensive. The EU has committed to cooperation with other universities in Europe and has a healthy, outward-looking approach.

The EU commission has also recommended widening the range of universities able to gain access to competitive research funding to benefit universities across Europe. There is recognition around the concentration of the EU tending to locate funding to the top twenty universities and the often-resulting brain drain from those universities being detrimental to both higher education and the ambition of widening the agenda from Horizon 2020 and thereby strengthening the EU further within its countries and their regions. Since 2009, the EU has developed a strategic framework for cooperation in education and training (ET 2020; Lévesque et al. 2020). It highlighted the importance of creativity and innovation as being crucial to developing enterprises and competition.

As part of the awareness of the importance of retaining talent, the EU has also underscored the need to reform researchers' careers. They recognise that there will be fewer academic positions in the future, and preparation for employment outside of the academic sphere is critical. Also, related to higher education, the EU strategy states that researchers should be rewarded for both interdisciplinarity collaboration and research integrity and service to community leadership and impact. Alongside this diverse approach to training students after higher education is the awareness of virtual mobility and this recommendation preceded the COVID-19 crisis, so it has even more importance now.

United States

The first US AI report appeared in 2016 and was the first published governmental strategy (OSTP 2016). Then, in 2019, an updated version was published (US Government 2019). The initial report was produced by the Select Committee on Artificial Intelligence of the National Science & Technology Council. The participating bodies are in stark contrast to the often narrow authorship of the UK plan. The United States, China and EU have produced strategic plans that are more in keeping with the norms one would expect for such an important endeavour – the AI economy. The critical state of higher education in relation to AI is highlighted, stating that 'U.S. academic institutions are struggling to keep pace with the explosive growth in student interest and enrollment in AI' (US Government 2019, p. 37).

Strategic areas are broken into three sections. The first section includes manufacturing, logistics, finance, transportation, agriculture, marketing, communications, science and technology. The second section for 'improved educational opportunity and quality of life' includes education, medicine, law and personal services. Finally, the third area includes security and law enforcement and safety and prediction. These overarching areas are followed by a short synopsis of the state of AI. This section positions the United States in terms of their own research advancements and their own achievements. They also demonstrate the advancement of 'deep learning' in comparison to other countries' publications which shows, in 2015, China in the lead followed by the United States and others clumped at the bottom of the chart. Clearly, there is an ambition or

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race with China at play here. The number of patents is also included as a marker of research capacity. Overall, the document demonstrates a strongly competitive nature, very different from the other three documents. Overall, it lays out the facts and is more research driven with reference to technologies than the other three strategies. The US document drills into the details of the technologies more than the other documents do.

Conclusion

AI is a strategic tool that has the capacity to increase global economies. There is a great deal of consensus supporting this in this book and, although these developments may seem futuristic, they are in fact already finely embedded into our everyday lives whether we recognise this or not. For the sake of the ongoing higher education ecosystem this idea needs to quickly take hold. There are changes discussed throughout this book and touched on in this chapter that will cost little financially but require significant paradigm shifts in thinking. This chapter asserts that some governments have not done enough to include higher education and are not acting quickly enough to adjust and prepare the curriculum to reflect the changes already taking place. There is a need to map these skills on to all areas of higher education – not just the sciences but all of the humanities are essential. Society needs students who are well rounded and able to work with humans, machines, data and the tools used to manipulate that data. These are different patterns of systematic thinking that need to be addressed. A broad general awareness of what constitutes an algorithm and its functions is also critical. However, the most important skill will be learning algorithmic, creative and computational systems thinking. Governments and higher education leaders can make huge gains with minimal cost by using education to focus the 'minds' of students and empower and equip them to enter the coming AI economy.

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PART VIII

Higher Education in Motion

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CHAPTER 30

Higher Education in Motion
Its Transformation and Potential Disruption

Andreas Kaplan

In its twenty-nine chapters, this book has provided an overview of higher education's overall digital r(evolution), its induced and necessary changes in pedagogy, digitalisation's impact on students' networking and social activities, on the future of certification and diplomas, on careers and professionalisation, as well as futuristic and ultramodern higher education. This final chapter should be understood as a call for action for universities and other higher education institutions to recognise that it is time for some deep transformations to avoid running the risk of potential disruption with new players from Big- and Edtech entering the higher education market, or others such as corporate universities gaining in importance (Kaplan 2020, 2021).

Evolution? Or Revolution?

Change is definitely emerging on the horizon, with business angels and venture capitalists investing heavily in academia (Straumsheim 2015). Moreover, several of the best and brightest faculty members defect to the Edtech sector. These developments, among others, are all signs of higher education's standing at the crossroads of disruption (Kapan 2021). It is up to universities and other traditional higher education institutions to actively engage in the sector's evolution or else endure their own disruption by being passive observers of a revolution taking place before their eyes. In this book's introduction (Chapter 1), I quite bluntly predicted that universities would be inflexible and change-averse, pointing to their historical risk aversion. However, in light of current (r)evolutions, it actually might be the high-risk strategy *not* to embrace the sector's (digital) transformation, propelled yet not caused by the COVID pandemic.

Indeed, COVID-19 only accentuated and accelerated a trend that has been ongoing for some time. Particularly start-ups in the Edtech domain increasingly penetrated the higher education sector, augmenting and at

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times even replacing universities as aforementioned. We should not expect a potential revolution to occur with a big bang; similar to other sectors, digital transformation and disruption might occur progressively but surely. Looking at the music industry might help us to understand the potential step-wise dismantling of a sector that was certain of not being endangered by disruption: recall Napster having replaced CD producers and the like as content provider, while MySpace provided a platform for fans getting closer to their stars and crowdfunding sites such as Kickstarter partially took on the role of record labels' artists and repertoire (A&R) divisions.

Adaptation? Or Evaporation?

While universities are definitely considered teaching experts, and replacing them in this role will not be an easy endeavour, they will have to go the extra mile and make ample use of the latest digital tools and instructional formats available on the market in order to stay at the top of their pedagogical game and not run the risk of disruption. Introducing and using, for example, learning analytics and artificial intelligence to provide a customised approach to teaching and learning is just one of several examples of how universities will need to adapt to the digital age. Those that do not risk their evaporation face increased and strong competition (Kaplan and Haenlein 2016).

Not only do teaching formats change but so does teaching content. Digitalisation in general, and advances in artificial intelligence in particular, will have strong impacts on future job requirements. Employees will continually need to re- and upskill their knowledge and know-how in order to stay relevant in their fields. Instead of providing pure knowledge, universities will need to focus even more on the teaching and training of skills such as autonomous learning or adaptability to a variety of contexts and ever-changing realities. Moreover, society's digital transformation will lead to many humans being replaced by automation, machines and robots, likely resulting in unemployment and the resultant societal tensions. Such an evolution will demand students' mastery of ethics as well as skills per se. Moreover, such challenges will most likely necessitate an inter- and multidisciplinary approach to teaching, as solutions might not be found in one single academic domain (Gibbons et al. 1994).

Affection? Or Abstraction?

Students' best memories of their alma mater often include having created relevant networks and friendships. This develops students' attachment to their university, which is of the utmost importance, as students become alumni, potential executive education clients, brand advocates and/or donors. With (public) funding in constant decline, the promotion by and funding from former students will become more and more relevant in the years to come (Kaplan and Pucciarelli 2016; Pucciarelli and Kaplan 2016, 2019). While in the past, such student's affection toward their alma mater developed almost by definition, this might be less the case with students spending less time on campus and instead attending courses online in their living rooms. In order for universities not to become merely an abstract idea in students' minds, they will have to accept the idea that the fostering of relationships lies at the core of their business.

In some respects, however, it appears that universities go in the exact opposite direction, thereby losing out on valuable opportunities in forging strong links, loyalty and affection. In most cases, students and alumni are quite grateful for having obtained their dream job thanks to their university. Yet increasingly, higher education institutions outsource their career services to Edtech start-ups. If, in the future, students attribute obtaining their dream job to an Edtech platform instead of to their alma mater, to whom will they owe their appreciation? The outsourcing of such high-value services with high potential for the fostering of students' affection might not be the best idea. At the very least, universities must come up with ways to complement whatever services they outsource to third parties (Kaplan 2018).

Persistence? Or Intermittence?

While universities deliver accredited degrees, enabling the holder entry into the job market, and with job requirements evolving at the pace of mobile phone models, we can strongly doubt as to whether such early-life degrees will suffice for one's entire professional career. Instead of one-time early-life degrees, or intermittence, continuous and lifelong learning, or persistence appears to be in order (Selingo 2017). Such an evolution allows for alternative players to enter the game, providing new ways of certification such as nano- and micro degrees, likely depreciating current bachelor's and master's degrees' value.

To respond to a future of lifelong learning, universities will need to shift their focus on preparing students for their first jobs toward a model of accompanying them throughout their professional lives. Accordingly, tuition systems might be impacted thereby: Instead of a one-time fee for their undergraduate or graduate programme, students could pay on a

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subscription basis, similar to that of a fitness club, enabling them to annually enrol in a certain number of courses at their lifetime university. Other arrangements might be income-sharing agreements whereby former students pay a predefined percentage of their income for a certain period after graduation (The Economist 2018). Depending upon the duration of this period, the university would be incentivised to ensure their graduates have the necessary skills to quickly and optimally advance in their careers (simultaneously increasing their salaries). Again it's about persistence, not intermittence.

Applicability? Or Impracticability?

The highest validation of a university or any player in the higher education sector comes from the job market itself. However, many employers regret the impracticability and non-applicability of what students learn at university. Many companies consequently have launched their own corporate university, these having been on the scene for some time now. According to Prince and Beaver (2001), this increase is due to companies' ability to transmit to students the skills directly applicable to their jobs, while at the same time promoting their own corporate culture. For students, corporate universities constitute a viable alternative, as they guarantee a job upon completion. As such, corporate universities overcome two of the main critiques of traditional universities: high tuition and irrelevant or inapplicability of learned content.

A look at Google might demonstrate the disruptive power of such concomitant options. During COVID lockdown, the search engine giant launched its Career Certificates, that is, micro-degrees, to train people to become project managers, data analysts or UX designers. Lasting six months and costing a fraction of tuition at a traditional university, Google treats these micro-degrees as equivalent to any four-year university degree when hiring enrolees into open positions. In case Google is not your dream employer, the online juggernaut will even assist successful graduates with finding jobs at other companies, such as Best Buy, Walmart or Bank of America. If not yet enough competition, Google moreover provides 100,000 needs-based scholarships for their Career Certificates program (Shein 2020).

Affiliation? Or Isolation?

In Part VII of this book, we showed what futuristic and ultramodern higher education might look like. It is evident that these developments demand (high) investments in digital infrastructure, generating significant production costs, in turn inducing further expenses for regular updating/upgrading. It is doubtful whether universities will be able to come up with these funds (Kaplan 2017); therefore, it might be beneficial or even necessary to cooperate with Edtech (start-ups and big tech companies). Affiliation might therefore be the preferred option to isolation while higher education tries to conquer the online world on its own. Scott Galloway, for example, recently stated: 'Ultimately, universities are going to partner with companies to help them expand. I think that partnership will look something like MIT and Google partnering' (Walsh 2020).

Such affiliations will have to be carefully designed so as not to run the risk of universities being rendered redundant by their corporate partners. One way for universities to avoid redundancy might be to foster a strong sense of community with their students and other stakeholders. While it is possible, at least to a certain extent, to commodify academic content, thus replacing traditional universities to some degree, relationships are much harder to build. Community is therefore key in avoiding future disruption (or isolation for that matter) (Kaplan 2020, 2021).

This book's intention was to generate a constructive discussion among academics researching higher education, among universities' administrations, faculty members and administrative support staff, among investors and players in the Edtech field, as well as the interested public. Together with my more than sixty co-authors sharing their insights from around the world, whom I again want to thank for their great collaboration as well as inspiring and compelling contributions, I hope that we were up to the challenge of rendering our initial intention a reality.

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Editor's Biography

Professor Andreas Kaplan has more than a decade of leadership experience in the higher education sector. He currently served as rector and dean of ESCP Business School, Sorbonne Alliance, in Paris. Previously, he served as the School's provost and dean of Academic Affairs overseeing approximately 6,000 students and supervising nearly 30 degree programs ranging from undergraduate, master's and (executive) MBA, to the school's PhD programmes. Kaplan is the author of "Higher Education at the Crossroads of Disruption: The University of the 21st Century."

He completed most of his studies and engaged in his professional career alternating between France and Germany. A European at heart, he moreover has resided and worked in Austria, Italy, Portugal, Spain and the United Kingdom. He is board member of the German-French Economic Circle, part of the prestigious society of leadership fellows of St. George's House - Windsor Castle, as well as a founding member of the European Centre for Digital Competitiveness.

Professor Kaplan's research focuses on analysing the digital world, in particular the areas of artificial intelligence and social media. With several seminal articles and nearly 40,000 citations on Google Scholar, Professor Kaplan has been ranked among the top fifty business and management authors worldwide by John Wiley & Sons. Furthermore, a widely covered Stanford study classified Kaplan among the world's most-cited and impactful scientists. Kaplan has teaching experience in top-tier institutions, among them Harvard, Sciences Po Paris and Tsinghua University.

Regularly serving as keynote speaker and presenter at academic and non-academic conferences and events, Kaplan's work has been featured in various national and international press and media outlets such as the *California Management Review*, the *Financial Times*, the *Harvard Business Review France, La Tribune*, *La Repubblica*, *Süddeutsche Zeitung* and *die Zeit*. His advisory and consultant activities for a variety of corporations and organisations surround the aforementioned topics.

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Professor Kaplan earned his Habilitation at the Sorbonne and his Doctorate at the University of Cologne. He holds an MPA from the École Nationale d'Administration (ENA, Class of République), an MSc from ESCP Business School and a BSc from Ludwig Maximilian University of Munich. Additionally, Kaplan was visiting PhD at INSEAD and participated in the International Teachers Programme (ITP) at Northwestern University's Kellogg School of Management.

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