Editorial

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Internationalisation and digital transformation in HEIs: The impact of education 4.0 on teaching, learning and assessment

Ellie Koseda
University of Sunderland, Sunderland, UK

Ivan K. Cohen
Richmond, The American University in London, UK

Bryan McIntosh and **Jasmine Cooper**
Brunel University, London, UK

Abstract
There is a particular emphasis on embracing digital transformation to re-define how Higher Education Institutions (HEIs) impact the lives of individuals through educational means. This includes the ability to adapt and respond according to outlined graduate attributes, staff, and the wider community for continual success in 21st century learning and work. Ideally, HEI development ultimately inculcates transformation as a university vision and post-covid catalyst for digital innovation. Lastly, the pathway to transformation assumes futuristic, pre-conceived scenarios through pre-planning to inform proposed developmental change by foreseeing digital competition for target year 2030. This entails utilising effective change agents, and key stakeholders to meet and sustain objectives accordingly.

Keywords
Digital transformation, education 4.0, Internalisation, higher education

Introduction

Recent years have seen a trend for embracing digital transformation in Higher Education. This is compelling Higher Education Institutions (HEIs) to re-define how they impact the lives of individuals (de Wit and Altbach 2021; LATR 2020). This includes the ability to adapt and respond to

Corresponding author:
Bryan McIntosh, Business School, Brunel University, Kingston lane, London UB8 3PH, UK.
Email: bryan.mcintosh@brunel.ac.uk

outlined graduate attributes, the potential impact on faculty and staff, as well as the wider community. This is necessary (crucial) for continued success in 21st century learning and work. Ideally, HEI development ultimately inculcates transformation as a university vision and post-covid catalyst for digital innovation (Holmes and Corbett 2022). The pathway to transformation assumes futuristic, pre-conceived scenarios through pre-planning to inform proposed developmental change by foreseeing digital competition for target year 2030 (LATR 2020; Killick 2018). This entails utilising effective change agents, and key stakeholders to meet and sustain objectives accordingly (Fossland and Sandvoll 2021; Blackledge 2021).

Materials and methods

This work contains a systematic review of the scientific literature published to date Internationalisation and Digital Transformation in HEIs. Regarding the evaluation of the quality of the articles, academic accepted practices have been applied. The authors follow standard guidelines for the study of the composition, use, and interpretation of what a test aims to measure and proposes five sources of validity of evidence: content, response processes, internal structure, relationship with other variables, and the consequences of testing.

Information sources

The bibliographic search was carried out in three phases: an initial search to obtain an overview of the current situation, a system that applies inclusion–exclusion criteria, and a manual search to evaluate the results obtained. The search was conducted in January 2023 in the Web of Science (WoS) database, including all articles published from 2000 to 2020 (inclusive). This database was selected to perform the search because (a) it is among the databases that allows for a more efficient and adequate search coverage [Reference]; (b) it provides a better quality of indexing and of bibliographic records in terms of accuracy, control and granularity of information compared to other databases [Reference]; (c) the results are highly correlated with those of other search engines (e.g. Embase and Google Scholar) [Reference]; (d) it is controlled by a human team specialising in the selection of its content (i.e. it is not fully automated); and (e) it has experienced a constant increase in scientific publications [Creswell, 2008].

Eligibility criteria

Although no protocol was written or registered prior to the research, the inclusion and exclusion criteria for articles and instruments were previously defined. The search was conducted according to these criteria.

Inclusion criteria. The inclusion criteria for the studies are made up of the following points: (a) published in peer-reviewed journals, (b) presented as full articles or short communications, (c) containing empirical and quantifiable results on psychometric properties (i.e. not only narrative descriptions), (d) containing cross-sectional or longitudinal designs, (e) written in any language (in order to collect as many instruments as possible, as well as to reduce the 'Tower of Babel' effect) [reference], and (f) published from 2000 to 2022.

Exclusion criteria. On the other hand, research that presented at least one of the following exclusion criteria was discarded: (a) contains synthesis studies (i.e. systematic reviews or meta-analyses),

instrument manuals or narrative articles of instrument characteristics, (b) contains only qualitative research designs, and (c) published after 2022.

Search strategy

All available methods to obtain empirical answers have been included so as to maximize the coverage of the results. The following terms were included: test, measure, questionnaire, scale and instrument. The combinations of terms used were: 'internationalisation and digitalisation', 'Internationalisation and Digital Transformation', 'Internationalisation and Digital Transformation in HEIs', and 'Internationalisation and Digital Transformation in HEIs: Impact'. Only those article-type studies were selected. In the selection process, the title, abstract and keywords of the studies identified in the search were reviewed with the aforementioned criteria. This was carried out by only one of the authors.

Data collection

The data to be extracted from each of the instruments were also defined in advance, ensuring that the information was extracted in a uniform manner. The selected documents were then recorded in a Microsoft Excel spreadsheet to check for duplicate records. 100 papers, articles, and books were reviewed.

Approaches to Internationalisation and TLA (Teaching, Learning, and Assessment)

Identifying risks related to technical difficulties or inadequacies with respect to online and blended course delivery plays an important role (specific to various public institutions in question), particularly for the student experience in terms of capacity/intake and international channels leading to wider educational access.

Crucially, teaching, learning and assessment (TLA) practices need to accommodate the future arrival of **Education 4.0** (*4th industrial revolution*) and **internationalisation** (Cowan 2006; Biggs and Tang 2011; LATR 2020; Blackledge 2021; de Wit and Altbach 2021).

Education 4.0 refers to a technique of learning connected with the fourth industrial revolution. 4.0 is related to the industrial revolution, 4th-5th industrial revolution and the impact on teaching practices (21st century learning). The idea is to forecast future events or potential changes within the industry in the form of reflective and predictive practices to aid the digital transformation process. It focuses on transforming the future of education through advanced technology and automation, which increasingly affects everyone's daily life. This includes 'smart' technology, artificial intelligence, robotics, and, more recently, AI. (Joshi 2022) He argues that

Universities must prepare their students for a world in which cyber-physical systems are ubiquitous across all industries if they are to continue to produce successful graduates. This entails incorporating technology into the curriculum, altering the learning process entirely, and leveraging technology to enhance the university experience.

Internationalisation can be defined simply as the action or process of making something international. The driving force behind most internationalisation is economic. For any company – including HEIs – it is a critical strategic element relating to increasing involvement in international markets. It can help companies which seek horizontal and vertical integration across national borders. At the same time it can help countries with development, both economically, technically,

socially, and politically. This is as true for HEIs as it is for manufacturing, commerce and the financial sector. The underlying theory explaining internationalisation is Ricardo's 'law of comparative advantage', although it can also be seen as a way of a company leveraging economies of scale and of scope.

At its most basic HEI internationalisation begins with an HEI acquiring a student body from a range of other countries, or by having an international body of faculty involved in both teaching and research. This can be further enhanced by various forms of partnership between HEIs in different countries, ranging from faculty and student exchanges to programme integration. Whichever from internationalisation takes the HEIs all benefit from seeing how things are handled overseas, often adopting what they consider as best practice. At its worst, if all HEIs were to do this they would each lose their individual comparative advantage, which is often what makes an overseas HEI an attractive proposition for both students and faculty. For example, why would a student from country A seek to study in country B if there was no difference in approach or culture (or even language) between those two countries? It is perhaps fortunate that while HEIs are often taking on best practice from overseas it has not gone so far as to completely diminish individual and national characteristics.

It is important to recognise the impact of Education 4.0 in furthering the drive to internationalisation in HE. Even two decades ago HEIs would still rely on the 'printed word' in reputable publications to promote their programmes, advertise internationally for faculty, etc. This has now been superseded by the use of digital advertising on individual HEI websites, social media, and via the digital footprint of previously print-only publications. The increased accessibility which results also serves to make it easier for students, faculty, and HEIs to compare their product and the manner in which it is offered to similar, competitor HEIs.

While much of the underlying impetus for internationalisation is economic, there are other, slightly lesser aspects which drive it. These include both political and social. When driven by a desire for social justice **internationalisation** extends the transformative power of university education to the communities the institution serves (Killick 2018). This involves achieving educational outcomes for the benefit of all in accordance with the ***Access and Participation Plan 2020-2025*** (including the corroboration of pedagogical theorem and key performance targets). International directives through the Bologna process and *European Higher Education Area 1999* (EHEA) have been significant drivers for facilitating the transferability and transparency between education systems (Biggs and Tang 2011). Therefore, the development of intercultural practice should be embedded into programme curriculum design for TLA across relevant programmes. Degree programmes and their individual modules – including modes of teaching learning and assessment – need to be modified to include key global and international aspects and contexts (Nguyen et al. 2020; Biggs and Tang 2011). Without direct intervention on established programmes, bread-and-butter modules remain inadequate for 90% of the student demographic at an institution primarily catering to the international segment (Sérandour et al. 2016; Killick 2018). Institutional adjustments also need to consider internationalisation on macro, meso, and micro levels for national strategic cultures in HE (Knight 2004; EU 2019; LATR 2020).

The espousal of institutional optimisation for digital and economic change by intertwining online experience with the students consider wider learning in addition to determining true participation, and graduate succession rates, that is, defining what really constitutes social inclusion and the measures involved. Collectively being able to represent degrees of social inclusion is imperative in addition to the number of enrolled students from less represented backgrounds. Inevitably having a direct impact on the institution's plan, if both national and regional shifts are not considered as well as several caveats which concern the process of assessment (Biggs and Tang 2011).

Academics and HEIs had to respond to the sudden impact of the COVID-19 pandemic without time to research and evaluate alternatives in order to identify optimal methods of online delivery of teaching and assessment. This has caused considerable disruption to established methods of securing the provision of a positive learning experience within the context of campus-based teaching. However, this disruption also provides an opportunity to develop evidence-based insights into what might work well for learners with online and hybrid T&L. Considering the critical factors and challenges that have shaped and impacted the international students' learning experience contributes to the development of a knowledge base that could inform future TLA practices, both online and via hybrid delivery. These factors range from traditional and well documented T&L concepts – pace and format of delivery and online assessment methods – to technical issues, including appropriate internet connection (bandwidth), personal/psychological challenges and social inclusion. By developing further the otherwise less-than-perfect traditional T&L concepts, this would support the international/wider participation of students with otherwise diminished opportunities to develop socially in an online learning setting.

Digital transformation and Education 4.0 in HEIs can and should lay the foundations for developing knowledge and evidence-based approaches to online and hybrid teaching and learning. Despite resource-constraints, this can work in post-pandemic era online and hybrid learning environments, catering for a generation more acclimated to online learning through portable (and other digital) devices.

Global education architecture and international HE trends

An analysis of current trends in HE involves reviewing academic quality and utilising resources more effectively in respect of the diversification of learning. HEIs need to outline strategies for social inclusion via a sequential process alongside the social dimension of education to factor in the current expansion of student diversity (Weller 2019; Veidemane, Kaiser and Craciun 2021; LATR, 2020) in order to meet key economic indicators set through the sustainable development goals, ***SDG (4),*** 'quality education – to ensure inclusive and equitable quality education and provide lifelong learning opportunities for all', ***SDG (10)*** 'reduced inequalities' pathway progress requiring the global education architecture to focus on foundational learning to hold institutional accountable for achieving them (Beeharry 2021; GlobalGoals 2022; Sianes et al. 2022; Chaka, 2022). The multifaceted nature of HE learning infrastructure validates development and accelerating the uptake of digital technologies such as education 4.0 driving the new educational paradigm (Oliveria and de Souza 2021; LATR 2020).

Digital transformation and education 4.0 in HEIs

At the very crux of any institutional development plan is the technology-integrated framework 'TEDO', and other pedagogical mechanisms as a proponent for digital transformation in education (QAA 2020; Oliveira and de SOUZA 2021; Ögeyik 2022; Prideaux 2003; Anderson and Krathwohl 2001). Digital processes and approaches are customised to foresee the digital shift (Norton et al. 2020; LATR 2020). The role of educators changes drastically from the traditional 'sage on the stage' to being perceived as learning guides (Crawford and Jenkins 2016).[1]

To tailor curriculum design to new learning profiles due to generational shifts requires practitioners to orchestrate learning, and curate appropriate learning resources from a variety of sources to maintain a progressive stance in delivery (Crawford and Jenkins 2016; Meguid and Collins 2017; Weller 2019; QAA 2020; LATR 2020). Critical weaknesses will be evident across programmes

within selective modules which oppose the creation of digital environments that can accommodate integrated solutions (UTS 2020; Crawford and Jenkins 2016). At surface level, a digital taxonomy of student experience encompasses the following: passive digital engagement, supportive digital engagement, and augmented/enhanced protocols (either interactive or immersive components) – (QAA 2020; LATR 2020; Nguyen et al. 2020; AdvanceHE 2014). On the one hand, adapting academic formats regardless of standardisation attempts to personalise the learning experience needs to be balanced on the other, with transformative plans to meld the presence and needs of the individual learner (QAA 2020; LATR 2020; AdvanceHE 2014). Transformed learning spaces, coherent and connected as part of a compelling overall experience through engagement, but ensuring account is taken of the risks related to stimulating larger scale classes, both online and F2F. (Biggs and Tang 2011; LATR 2020; Crawford and Jenkins 2016).

Conclusion

Key challenges of digital transformation include digital poverty, digital access, the digital maturity of the institution before and after implementation, and the fact that strategies have not reached mainstream deployment (Ofcom 2022; United Nations 2021; Statista 2021; LATR 2020). Anticipating the decline of resources and funding during the preparation for internationalisation and the movement of students in conjunction with blended learning modes varying quite widely across HEIs without a modelled structure to accurately replicate, even with micro-adjustments (LATR, 2020; AdvanceHE 2014).

As suggested, revisiting pre-existing, teaching, learning and assessment regimes for modification may be necessary, where appropriate. Perhaps digitising material in combination with alternative assessment approaches to carry the development of Education 4.0 and technological efficiency through incremental application (Race 2007: 244; Biggs and Tang 2011). Technological evolution could provide a solution for accommodating higher intake and international extension with the right deployment of upskilling techniques (AdvanceHE 2014). Finally, the staff mindset is also interlinked with upskilling due to the unease of incorporating new methods to enhance current teaching, conduct observations, and welcome reflective practices (Brookfield 2017; Wain 2017 SCHÖN 1983; SCHÖN 1987).

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ORCID iD

Bryan McIntosh https://orcid.org/0000-0002-4872-170X

Note

1. In many ways this can be seen as a return to older, more traditional models of University teaching and learning, whereby students were said to “read for a degree”.

References

AdvanceHe (2014) 'Flexible Pedagogies: Technology Enhanced Learning' [PDF] Available at: Flexible pedagogies: technology-enhanced learning | AdvanceHE (advance-he.ac.uk) (Accessed on: 18th November 2022).

Anderson LW and Krathwohl DR (eds) (2001) *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman.

Beeharry G (2021) 'The pathway to progress on SDG 4 requires the global education architecture to focus on foundational learning and to hold ourselves accountable for achieving it', *International Journal of Educational Development*, 82, p. 102375.

Biggs JB and Tang CS (2011) *Teaching for quality learning at university: what the student does*. 4th edition. Maidenhead, England New York, NY: McGraw-Hill, Society for Research into Higher Education & Open University Press (SRHE and Open University Press imprint).

Blackledge J (2021) 'Thoughts on the Future of Higher Education in the UK: A Personal View with a Historical Context', *Education Sciences*, 11(9), p. 474.

Brookfield SD (2017) *Becoming a critically reflected teacher* San Francisco, CA: Jossey Bass.

Chaka C (2022) 'Is Education 4.0 a Sufficient Innovative, and Disruptive Educational Trend to Promote Sustainable Open Education for Higher Education Institutions? A Review of Literature Trends', *Frontiers in Education*, 7, p. 824976.

Cowan J (2006) *On Becoming an Innovative University Teacher, Reflection in Action*, 2nd edition.Buckingham: Open University Press.

Crawford R and Jenkins L (2016) '*Blended learning and team teaching: Adapting pedagogy in response to the changing digital tertiary environment*', Australasian Journal of Educational Technology [Preprint].

Creswell JW (2008) *Educational Research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River: Pearson.

De Wit H and Altbach PG (2021) 'Internationalization in higher education: global trends and recommendations for its future', *Policy Reviews in Higher Education*, 5(1), pp. 28–46.

EU (2019) project report on inter-cultural learning across EU nations. project 2016-19 Available at: https://equiip.eu/ (Accessed on: 1st November 2022).

Joshi Naveen (2022) "Understanding Education 4.0: The Machine Learning-Driven Future Of Learning" Forbes (May 31) (Available at Understanding Education 4.0: The Machine Learning-Driven Future Of Learning (forbes.com); last accessed 3rd May 2023).

Fossland T and Sandvoll R (2021) 'Drivers for educational change? Educational leaders' perceptions of academic developers as change agents', *International Journal for Academic Development*, pp. 1–14.

Holmes P and Corbett J (Eds.) (2022) *Critical Intercultural Pedagogy for Difficult Times: Conflict, Crisis, and Creativity* (1st ed.).

Killick D (2018) *Developing intercultural practice: academic development in a multicultural and globalizing world*. London; New York: Routledge Taylor & Francis Group (The staff and educational development series).

Knight J. 'Internationalization remodeled: definition, approaches, and rationales', Journal of Studies in International Education 8(1) 2004 pp.5–31.

LATR (2020) 'Learning and Teaching Reimagined: A New Dawn For Higher Education?' [PDF]. Available at: Learning and teaching reimagined: a new dawn for higher education? | Jisc (Accessed on: 18th November 2022).

Meguid EA and Collins M (2017) 'Students & rsquo; perceptions of lecturing approaches: traditional versus interactive teaching', *Advances in Medical Education and Practice*, Volume 8, pp. 229–241.

Nguyen Andy, Hong Yvonne and Gardner Lesley A., "A Taxonomy of Digital Learning Activities for Digital Inclusion" (2020) In Proceedings of the 28th European Conference on Information Systems (ECIS), An Online AIS Conference, June 15-17, 2020.

Ofcom (2022) 'Digital Exclusion: A Review of Ofcom's research on digital exclusion among adults in the UK' Available at: Digital exclusion: a review of Ofcom's research on digital exclusion among adults in the UK (Accessed on: 18th November 2022).

Ögeyik MC (2022) 'Using Bloom's Digital Taxonomy as a framework to evaluate webcast learning experience in the context of Covid-19 pandemic', *Education and Information Technologies* [Preprint].

Oliveira K.K. de S and de SOUZA R.A.C. (2021) 'Digital Transformation towards Education 4.0', *Informatics in Education* [Preprint].

Prideaux D (2003) 'ABC of learning and teaching in medicine: Curriculum design', *BMJ*, 326(7383), pp. 268–270.

QAA (2020) 'Building a Taxonomy For Digital Learning' QAA [PDF] Available at: Building a Taxonomy for Digital Learning (qaa.ac.uk) (Accessed on: 18th November 2022).

Race P. The lecturer's toolkit: a practical guide to assessment, learning and teaching. (Abingdon: Routledge, 2007) 3rd edition. p.244 'Working with international students'.

SCHÖN D (1983) *The Reflective Practitioner* (New York, Basic Books).

SCHÖN D (1987) *Educating the Reflective Practitioner* (San Francisco, Jossey-Bass).

Sérandour G, Illanes A, Maturana J, et al. (2016) 'Combination of logical conditions and arithmetic operations to assign a mark to a course based on multidimensional learning outcomes', *Assessment & Evaluation in Higher Education*, 41(8), pp. 1129–1143.

Sianes A, Vega-Muñoz A, Tirado-Valencia P, et al. (2022) 'Impact of the Sustainable Development Goals on the academic research agenda. A scientometric analysis', *PLOS ONE*. Edited by S. Ghinoi, 17(3), p. e0265409.

Statista (2021) 'Disconnected 2.9 Billion People Still Offline, Statista' Available at: Chart: Disconnected: 2.9 Billion People Still Offline | Statista (Accessed on: 18th November 2022).

TheGlobalGoals (2022) 'Goal 4: Quality Education'. *The Global Goals*. Available at: Goal 4: Quality education - The Global Goals (Accessed on: 18th November 2022).

United Nations (2021) 'With Almost Half od World's Population Still Offline, Digital Divide Risks Becoming 'New Face of Inequality', Deputy Secretary-General Warns General Assembly' United Nations. Available at: With Almost Half of World's Population Still Offline, Digital Divide Risks Becoming 'New Face of Inequality', Deputy Secretary-General Warns General Assembly | UN Press (Accessed on: 18th November 2022).

UTS (2020) ' Tooltime Taster: Select the right tool with the pedagogy wheel' Available at: *UT*S Tooltime taster: Select the right tool with the Padagogy Wheel - LX at UTS (Accessed on: 10th November 2022).

Veidemane A, Kaiser F and Craciun D (2021) 'Inclusive Higher Education Access for Underrepresented Groups: It Matters, But How Can Universities Measure It?', *Social Inclusion*, 9(3), pp. 44–57.

Wain A (2017) 'Learning through reflection', *British Journal of Midwifery*, 25(10), pp. 662–666.

Weller S. *Academic practice: developing as a professional in higher education*. London: Sage, 2019. Chapter 10 'Internationalising teaching in practice.

Ellie Koseda, Roehampton University: Ellie is a Senior Lecturer whose research concentrates on Artificial intelligence and digital technology in the learning process. She has published and her PhD looks at how neurological conditions relate to dementia.

Ivan Cohen is a Professor in Finance and Economics at Richmond University, the American International University based in London. With many years of teaching experience across a wide range of Economics and Finance modules, and having taught on both sides of the Atlantic he is able to offer a unique global approach to the study of economics.

Dr Bryan McIntosh, Brunel University: Bryan has worked in Central Government, the NHS, local Government, and at several academic institutions occupying several roles, he was previously a Reader in Organisational behaviour and Healthcare Management. Bryan is currently the Consultant Editor of the British Journal of Healthcare Management a Technical Adviser to the Shadow Health Minister (Scottish Parliament). He has over 120 publications and has been a Principal or a co-investigator on multiple research projects and grants.

Jasmine Cooper, Brunel University: Jasmine is the Director of Student Experience for the Business School as well as Senior Lecturer in Business Education Support. Part of her role is to oversee the guidance and tailored personal support that the Student Experience Team is offering for students who are experiencing difficulties during their studies. She is responsible for the coordination of the personal tutoring support delivered by all academic staff members to both undergraduates and post-graduate students. She continually develop new approaches to support students in their learning, aligned with the Business School's strategy. The Student Experience team is creating greater engagement by meeting expectations and improving the student experience.