Digital Transformation and Empowering Technologies in Higher Education

Tuesday 19th February 2019
Discussion Paper

Introduction

Digital transformation is pervasive and can be understood as the "changes that digital technology causes or influences in all aspects of human life"[1]. This focus on change is intrinsic – digital transformation is not just about technology[2], nor is it synonymous with innovation[3] (although it can be a source) – it carries a certain inevitability, which has been described as "not a matter of *if*, but a question of *when* and *how?*"[4]. This brings it into the leadership domain, as with digital transformation affecting all aspects of an organisation or business, leadership to envision and drive the change is essential[5]. Digital transformation is not a destination, but a 'journey'[6], whereby emerging technologies will necessitate a constant evolution of ways of working, systems and processes across the system, with the aim of adding value to the users.

Higher Education and its leadership, like every other sector, must consider the digital transformation agenda to survive and thrive. Higher education has been subject to increasing marketisation globally and is highly competitive, signalled by the increasing emphasis and interest in the global rankings of higher education institutions (HEIs). HEIs compete for talent (students and staff), funding and prestige. As higher education is recognised as playing a key role in building national competitiveness[7] and in contributing to a more equal and cohesive society,[8] there is strong interest from a wide range of stakeholders in its impact. The world of work is changing, as it outlined in the Irish government's *Future Jobs Initiative*[9]. HEIs must be aware of the evolving needs of employers and facilitate flexible learning pathways, so that citizens can access educational opportunities and develop relevant skills to tackle current and future global challenges, throughout their lives. Digital technologies can be critical enablers

of education, opening new avenues for learning and transforming the learning experience. Opportunities also exist to improve and enhance the entire student experience lifecycle, from initial application to membership of an alumni community. Capturing and analysing data across this lifecycle can elicit new insights on student profiles, student retention and graduate outcomes, among other areas. This raises important legal and ethical questions about the responsible use of technology and sharing of data, as well as how HEIs can provide leadership in this regard.

And, the student too is changing. The iPhone child is now over 10 years old, yet the behavioural effects resulting from continuous engagement with digital technologies are still to be fully understood[10]. Technology changes the way children and young adults think and learn, including the ways in which they process information, their attention span, decision-making and memory[11]. It also affects the way they socialise and interact with others, which can have huge impacts on their mental and emotional well-being.[12] This raises many new questions and issues for higher education leaders and policy makers to consider.

The HEA Future-Focus Forum will address some of these key questions and trends, in the context of helping to shape immediate and future policy challenges and choices for Ireland. The aim is to inform the development of a *Higher Education Digital Transformation Framework* for Ireland. This discussion paper outlines the international and national policy contexts and highlights some key considerations for higher education in a digital age.

International policy context

The Digital Agenda for Europe[13] is one of seven flagship initiatives under the Europe 2020 strategy. There are wide ranging programmes underway, from Building a European Data Economy to investing in Information and Communications Technology (ICT) Research and Development. Under the EU's European Education Area initiative, a *Digital Education Action Plan*[14] has been developed, which includes 11 actions to support technology-use and digital competence development from primary to third level education. Actions are grouped into three main areas, namely: making better use of digital technology for teaching and learning; developing digital competences and skills; and, improving education through better data analysis and foresight. Specifically:

- *Action 3* focuses on the development of a common technical approach for issuing digitally-signed qualifications to ensure that certificates from one Member State can be understood and correctly interpreted in any other. This will enable employers and education providers to authenticate and validate certificates and other qualifications from across Europe, with a consistent approach to documenting learning outcomes, thereby supporting student and employee mobility.
- *Action 4* mandates the development of an EU-wide online hub for HEIs to support them in using digital technologies to: improve the quality and relevance of learning and teaching; facilitate internationalisation; and support greater cooperation and exchange of best practices between HEIs across Europe. The platform will act as a hub for existing European, national and regional platforms dealing with online learning, blended/virtual mobility, online campuses and exchange of best practice. Work on developing this platform will commence in early 2019.
- *Action 5* addresses the critical need to develop Open Science skills among students, academics and researchers in HEIs. Open Science is a key policy objective for the European Union and features prominently in plans for Horizon Europe, the next framework programme for Research and Innovation. Projects will commence in 2019 and will provide training to undergraduate students on: FAIR and open data management; open access; analysis, use and reuse of data; publishing and dissemination; citizen science, among other areas.
- *Actions 9-11* will provide forward looking analysis on skills needs and skills shortages for the future, through artificial intelligence and analytics pilot projects. Research will also be undertaken on the impact and potential of digital technologies from primary to third level education. This will provide more robust evidence and insights to inform future policy.

These initiatives enable engagement from EU Member States at the national and regional levels, where much work is already happening. *The European Higher Education Area in 2018*[15] report provides an overview of the situation regarding national strategies and policies on the

use of new technologies in teaching and learning across the European Higher Education Area, summarised in Figure 1[16] below. It indicates that most systems (38 of 50) have such a strategy or policies in place: Three countries have a strategy on the use of new technologies in teaching and learning for higher education (Italy, Germany, Netherlands). Eighteen systems have broader national strategies, which include technologies in higher education. Of these, three broad approaches are evident: a first group of countries (including Belarus, Hungary, Slovakia) have adopted strategies for the digitalisation of education addressing the different levels and sectors of the education system; a second group (including Bulgaria, Croatia, Portugal) integrate the use of new technologies in specific education strategies; A third group (including

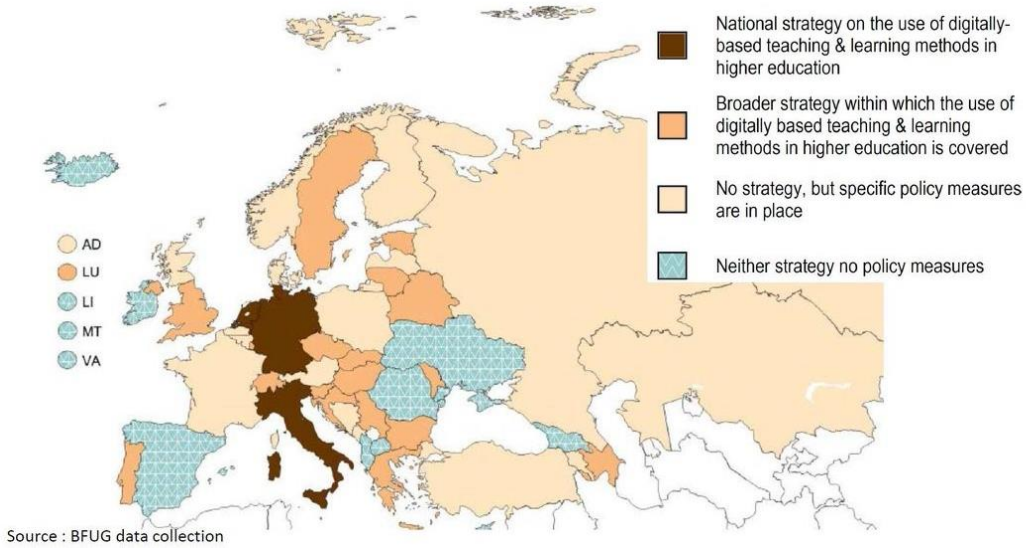


Figure 1 National Strategies on the use of new technologies in teaching and learning in higher education 2016/2017.

Luxembourg, Sweden, United Kingdom) have adopted digital society strategies which discuss broader strategic considerations. Seventeen systems do not have a strategy, but some policy measures exist to encourage progress. Twelve countries have neither strategies nor policies in this area – Ireland has been included in this group in the study. Of the 38 countries that had strategies in place at the time of the review, the three main areas identified in the study for allocation of additional funding to support digital transformation in higher education were: digital infrastructure; the development of skills of higher education staff to use digitally-based methods in their teaching; and, improving student's digital skills.

Case Study: Norway

A recent example from Norway, which post-dates the above study, is the development of a *Digitalisation strategy for the higher education sector*: 2017-2021[17]. This strategy recognises that for digitalisation to be leveraged to its full potential to bring about change, it must be elevated to a strategic level nationally and in institutions, with relevant governance and management structures put in place to support the embedding of technology into all academic and administrative activities in HEIs. It is recognised that the Norwegian Ministry of Education and Research needs to provide an overall strategic direction for the higher education sector in relation to digitalisation, "by providing clear expectations and vision, by clarifying the distribution of tasks and responsibilities and by initiating joint measures and initiatives"[18]. It intends to operationalise its overall strategy through a series of sub-strategies, focusing on research, education, infrastructure, administrative solutions, and information

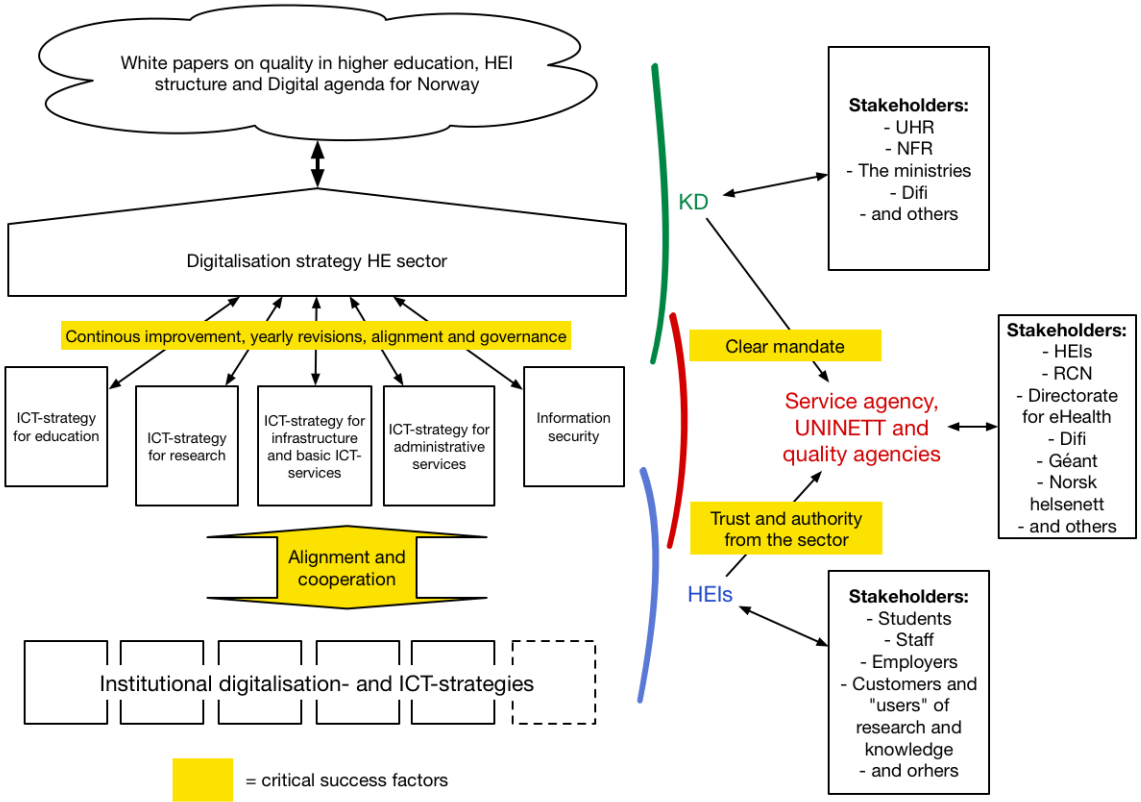


Figure 2: The relationship between governing documents, management levels and stakeholders (Norway)

security, prepared by a working group comprising representatives of the higher education sector. Figure 2 provides an overview of the foreseen relationships.

The Norwegian government wants to ensure that the higher education sector is equipped to face the digital challenges of the future, such as managing open research data. Another goal

is to enhance coordination among different ICT service providers and the HEIs, to generate efficiencies across the system and to ensure that the necessary, compatible and interoperable digital infrastructures to support the administrative, academic and research functions of HEIs are in place. Shared services will be developed, when deemed more cost-effective and/or when they will result in better services. A new service agency (established in 2018) will be responsible for tactical and operational administration of ICT and digitalisation at the sectoral level and for implementing and following up the strategies and policies established by the Ministry of Education and Research, and sectoral initiatives. This agency will work with UNINETT[19] (the HEAnet equivalent) and the HEIs on the development of shared services; the Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education[20] also plays a role in supporting digitalisation of education and research within Norwegian HEIs.

National Policy Context

In Ireland, the government published Phase 1 of a National Digital Strategy for Ireland in 2013: *Doing More with Digital*,[21] which focused on supporting citizens and small businesses to get online. A public consultation on the development of a new National Digital Strategy launched in October 2018[22] - this strategy will map out how Ireland can positively embrace digital advances for the benefit of every citizen, business, and community. It will also focus on educating and empowering Irish citizens to use digital to improve their lives. Ireland's *National Skills Strategy 2025* affirms the government's vision for Ireland to be renowned as a place "where the talent of our people thrives…through the effective use of technology to support talent and skills provision, to grow enterprise and to enhance the lives of all within society" [23]. The development of these skills needs to start early in the education continuum, as reflected in the *Digital Strategy for Schools: 2015-2020*[24], which focuses on integrating ICT into teaching, learning and assessment practices in schools. The *Future Jobs Ireland Initiative*[25] emphasises a philosophy of lifelong learning - a high level working group will undertake a training gap analysis of future needs, which will be coupled with a programme of investment in educational institutions to host the training interventions identified.

The *National Strategy for Higher Education to 2030*[26] sets out the high-level system objectives. While digital transformation is not foregrounded in the strategy, it is implicit in the delivery of some objectives and noted in related strategies. The *International Education*

Strategy for Ireland: 2016-2020, for example, signals that the internationalisation of curricula across Irish HEIs "will be enabled by the enhancement of digital capacity of the sector", including the development of staff capacity for delivering technology-enhanced learning[27].

The National Forum for the Enhancement of Teaching and Learning in Higher Education[28] (herein referred to as the National Forum) has been leading the way in progressing work on the teaching and learning dimensions, with key initiatives detailed in a recent report on "*Building Digital Capacity in Irish Higher Education 2013-18*"[29]. Some notable achievements include: the development of a *Roadmap for Digital Learning in Higher Education: 2015-2017*, which called for "a co-ordinated, multi-level approach to foster digital literacy, skills and confidence among students at all levels of education"[30] and included four over-arching recommendations; the All Aboard *Digital Skills Framework*[31]*;* and a *Review of Ireland's higher education technological infrastructure*[32] As found in *A Review of the Existing Higher Education Policy Landscape for Digital Teaching and Learning in Ireland*[33] there is still further scope for improvement in the policy context – the content analysis conducted as part of the review indicated that HEI policies often fail to reflect the language of digital teaching and learning. It is recommended that policies are developed in consultation with those that will implement them in practice to ensure consistent and efficient implementation. A step-by-step *Guide to Developing Enabling Policies for Digital Teaching and Learning*[34] has recently been published by the National Forum to assist HEIs with this process.

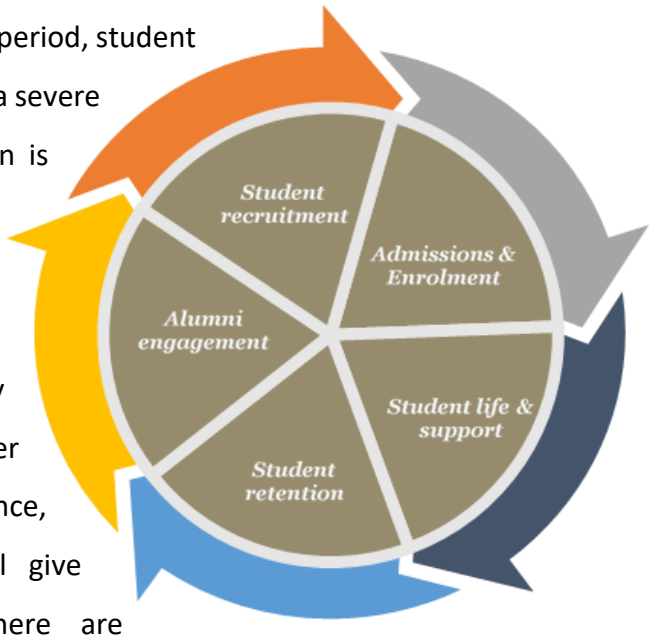
Individual HEIs have signalled further digital transformation initiatives in the Performance Compacts, submitted as part of the HEA's Strategic Dialogue Process. Additionally, several projects awarded funding under the HEA's 2018 Innovation and Transformation Fund call, will be enabled through digital technologies, including projects focused on flexible and online learning, student retention, and student support[35].

These various initiatives will be considered during the development of a *Higher Education Digital Transformation Framework* in Ireland. Championing a national approach to developing a digitally transformed higher education sector is a strategic theme of the HEA *Strategic Plan 2018-2022*. It is envisaged that the Framework will "bring together and advance the work already started in the sector including: identifying infrastructure deficits and the need for targeted investment; opportunities for shared services and platforms to progress the digital agenda nationally (e.g. HEAnet, EduCampus); improving online learning and blended models

of delivery; how to better use the data we currently have to improve student success; and, how to achieve open access to higher education and research publications and data" [36].

Higher education in a digital age

HEIs are under increasing pressure to reduce costs, while improving outcomes for students. In Ireland, overall state funding for higher education decreased by 38% between 2009-2016, following a period of economic crisis. In the same period, student numbers rose by approximately 34,000[37], placing a severe squeeze on HEI's budgets. Digital transformation is one means of helping HEIs to manage costs, from saving staff time, to reducing physical storage requirements[38]. PWC (2018) indicates that HEIs that "are able to harness the potential of data by analysing it intelligently and using it to deliver outcomes, such as improved academic performance, employability rates or student retention, will give themselves a considerable advantage"[39]. There are opportunities at all stages of the student experience lifecycle to streamline processes and generate efficiencies.



Student recruitment, admissions and enrolment: HEIs are competing globally for students, with full-time International students comprising 12.5% of the full-time student population in Ireland in 2018[40]. As PWC (2018) noted in a recent report "Students have become customers who bring their own digital world expectations with them" to their higher education experience – they are "more savvy, better connected and more vocal than ever. Many have preconceived ideas of how universities will engage directly with them and what outcomes they can expect in return for their investment" [41].

The student experience and future employability are key concerns for students, and HEIs may need to consider how they can differentiate themselves from online providers and other HEIs to attract high calibre students, in accordance with their mission and strengths. Research is one potential differentiator for HEIs in future, where "they can stay ahead of [online providers of] open source content by enriching their curriculum with the latest research findings and

outcomes"[42]. Having a clear digital marketing strategy can be very beneficial. Students are seeking information across multiple devices and channels, with social media found to be particularly influential among prospective international students – 83% of those surveyed indicated that they used social media to research universities[43]. Web presence continues to be important and it must be made easy for prospective students to find information about courses and content, particularly on mobile devices, which are increasingly used by students to carry out their research[44].

Once students have confirmed their choice of HEI, streamlining the admissions processes to avoid paper-based applications and acceptance, can reduce delays, frustration and costs[45]. An emerging trend is the use of artificial intelligence to support students as they settle into their new environments – Newman (2017)[46] highlights the example of Australia's Deaken University, which used IBM Watson to create a virtual student advisory service that was available 24 hours a day, seven days a week. This virtual service responded to more than 30,000 questions in the first semester, enabling student advisors to prioritise more advanced queries.

Teaching and learning: While the use of digital technologies to support teaching and learning is already prevalent in HEIs in Ireland and around the world, from Massive Open Online Courses (MOOCs), to blended learning courses to the flipped classroom, there may still be further opportunities to maximise their potential. PWC contends that: "Getting the most out of learning platforms such as Blackboard, Canvas or Moodle requires a significant investment of a university's time – an investment that is only made when teaching [as opposed to research] is recognised as a valued activity"[47]. They highlight the risk that learning platforms may simply become repositories where lecture notes are stored, instead of realising greater benefits for students or providing data for analytics, which can feed into student retention and success. Brown's (2015) experience is of slow progress in "changing the culture in which the academic community understand how to use the data that we have available and their willingness to engage with what has been provided, taking ownership of teaching and how much it matters"[48]. Orr et al (2018) describe the significant benefits that can be gained from this investment of time by the academic community:

> "Better use of digital tools in learning environments can offer personalised education options according to diverse prior knowledge and personal needs, tailored curricula

> and learning units, as well as providing better individual guidance during study progress"[49].

This move towards personalised learning is a key trend enabled by digital transformation and can be a game-changer for students with different learning styles, special needs and students who prefer to learn at their own pace[50]. For example, adaptive learning technologies collect information about student behaviour as they're answering questions, and subsequently use this information to provide instant feedback and adjust the learning experience accordingly[51.] Sal Khan, founder of the online learning platform Khan Academy, believes that the future of education is in this space, where learners can proceed at their own pace and really master the concepts they're grappling with:

> "The structure of the workforce is fundamentally changing because of automation, AI, and those technologies…so the world we're going into must be a mastery-based world, where students have to be able to have the agency to fill in those knowledge gaps as necessary… It's going to be a continuous process"[52].

Bates (2015) suggests going even further than this competency-based approach (where the content to be learned is essentially the same and where a 'level' is set for mastery) to increase the level of flexibility and personalisation available to the learner. He gives the example of virtual personal learning environments as another area of growth, which "offer self-regulated learning by the learner, where the student can build up a lifetime repository of learning experiences"[53], and other options such as offering multiple modes of delivery for different learners, according to their needs and preferences.

The potential for digital technologies to enrich and extend the teaching and learning experience will continue to grow - while the exploration of all possibilities is beyond the scope of this paper, some other areas of interest include: supporting learners to reflect on their learning and share knowledge created through the curriculum; engaging students in digital scholarship; and use of participative and co-creative pedagogies, such as learning through game development[54].

HEIs need to be cognisant of these shifts and support students to develop 21st century skills, knowledge and attitudes, that will enable them to adapt in a rapidly changing, interconnected

world, where they may change careers multiple times within their lifetime and need to constantly upskill to realise their potential, personally and professionally.

Student retention and success: Improving retention and supporting student success is a key policy priority for the Irish government, as set out in the *National Plan for Equity of Access to Higher Education 2015-19*[55] and within the HEA *System Performance Framework 2018-2020*[56], which requires HEIs to have a student success strategy in place by 2020. Not only is supporting this a moral and economic imperative, but a recent report from Thomas et al (2017) suggests that:

> "Maximising student success is not simply a 'nice thing to do'. It is a key element of institutional competitiveness in a higher education world that is increasingly characterised by business principles, in which teaching quality, student satisfaction and the achievement of graduates are core to institutional success"[57].

Student and learning analytics – the use of data and models to predict student progress and performance, and the ability to act on that information[58] – provide key insights to support student retention and success and enable evidence-based policy decisions, at local and national levels. Thomas et al's study (2017) found that monitoring students' engagement and performance by combining data from multiple sources, including attendance records, data on participation in co-curricular activities, interaction with virtual learning environments, institutional survey data and module or course evaluations, and offering additional interventions where necessary, helped to improve retention and success[59]. Digitising and integrating student records/platforms so that this type of data can be made easily available, supports these types of interventions, as well as creating a seamless experience for students, throughout their educational journey. Extensive and effective planning, consultation and buy-in of staff and students is required to support this type of initiative.

Student life and support: While digitalisation brings many benefits to the overall student experience, it also raises new challenges. Students are increasingly spending more time online, rather than communicating face-to-face, with the ability to access online environments directly impacting on feelings of well-being. The OECD PISA survey (2015)[60] found that 54% of 15 year olds reported "feeling bad" if no internet connection is available, for example. Technology also exposes students to risks:

> "Young people as well as adults are vulnerable to cyber bullying and harassment, predatory behaviour or disturbing online content. Everyday exposure to digital data driven largely by inscrutable algorithms creates clear risks and requires more than ever critical thinking and the ability to engage positively and competently in the digital environment" [61].

Cyber security is one of these risks[62]. Use of online platforms, including social media, dating applications, among others, exposes young adults to privacy risks – columnist Duportail (2018) emailed Tinder requesting her personal data, and received back a file of over 800 pages, with information captured from all aspects of her life[63]. She highlights how personally embarrasing and damaging this information could be, should it enter the public domain. How can HEIs encourage students to make informed and responsible choices about handling their personal data?[64] How can HEIs better equip students with the skills to navigate in a digital world?

HEIs hold large amounts of sensitive data on student profiles and performance, among other areas. How can HEIs ensure that data they retain on students is kept secure? To what extent can, or should, HEIs share this data, given legal constraints e.g. GDPR? Are students aware of how their personal data is being used? These and other ethical issues in relation to digital transformation are key considerations for the future.

Alumni Engagement: As with student recruitment, digital tools are increasingly used to build Alumni networks and foster a sense of community. PWC (2018) advises that "Turning your customers into advocates for your university is one of the most powerful marketing tools available"[65]. Alumni stories are valuable marketing tools in this regard, helping to build institutional reputation through their personal success stories, often shared through online newsletters. New Alumni benefits have also been enabled by digital transformation – for example, the University of Wisconsin offers all members of its Alumni Association free online access to research databases and other library services, previously restricted to students and faculty on campus[66]. Within a shrinking funding environment, Alumni are also a valuable source of funds for HEIs to achieve their ambitions. Harvesting and analysing data on alumni relations strategies can garner rich insights and benefits for HEIs.

The way forward

Digital transformation has the potential to be a key enabler of change and may support improved performance across multiple domains in higher education in Ireland. Learning from international and national experience will be of great value in developing an overall vision and creating a coherent and supportive digital transformation framework for higher education. This HEA Future Focus Forum will provide the opportunity to stimulate disruptive thinking, and will openly discuss some of the emerging challenges and opportunities for Irish Higher education with key experts and stakeholders.

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