



The Future of Learning Technology in UK Higher Education

Introduction

At Microsoft it's essential that we understand how we can support innovative individuals, businesses and organisations to shape the future – and there is no more important area for innovation than Higher Education.

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“There’s natural tension between ‘students as consumers’ and the idea that ‘education is about creativity and collaboration’. The gap is bridged by good teaching.”

David White,
University of the Arts London

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Learning delivery in Higher Education Institutions (HEIs) is being reshaped before our eyes, thanks in part to advances in technology and the new pedagogical theories facilitated by that technology.

In order to understand more about the ever-evolving relationship between technology and learning, we spent time speaking with six of the UK’s leading learning technologists working within HEIs.

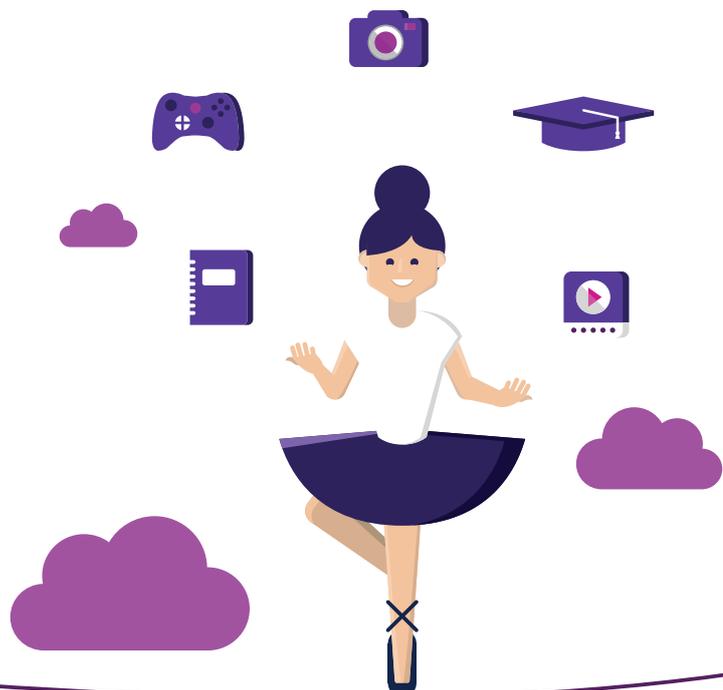
In a series of interviews exploring current practice, changing needs and key trends, we were able to establish how digital devices are being used in universities and how cutting-edge technology can continue to compliment a sector experiencing fresh emphasis on collaboration, creation and innovation.

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“As we become a more multicultural society it means we’re a more multi-educational society”

Prof Mike Sharples,
Open University

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Learning technology: Meet the experts

It's important to differentiate the role of a learning technologist from the functions fulfilled by a university's IT department. Although they may work closely, learning technology is not a simple application of computer science to education or vice versa.

Instead, learning technologists are actively involved in managing, researching, supporting and enabling learning with the use of technology. This requires a broad knowledge base encompassing teaching, training, theoretical pedagogy and technology.

The Association for Learning Technology (ALT), the UK's leading membership organisation in the area, identifies it as the "systematic application of a body of knowledge to the design, implementation and evaluation of learning resources."

Our interviewees were selected as leaders in the field of learning technology. Their research focuses on themes such as digital identity, participatory learning, online course development and open educational practices, while their professional expertise covers Massively Open Online Courses (MOOCs), mobile learning, distance learning and digital library development.

Forming a broad sample of distinct institutions, disciplines and geographical regions across the UK, we were able to explore their unique and challenging roles while identifying barriers and drivers to change. Through this process we discovered a compelling vision for the future of learning technology.



Learning technology: Meet the experts

1. Prof Neil Morris

Chair of Educational Technology, Innovation and Change, University of Leeds.

Neil has strategic and operational responsibility for Leeds' Digital Learning Team, which is responsible for its iTunesU site and MOOCs for the FutureLearn platform. He is a trustee of ALT, chair of the Editorial Board for the Association's Journal, Research in Learning Technology, and chair of ALT's Publication and Communication Committee.

2. Prof Mike Sharples

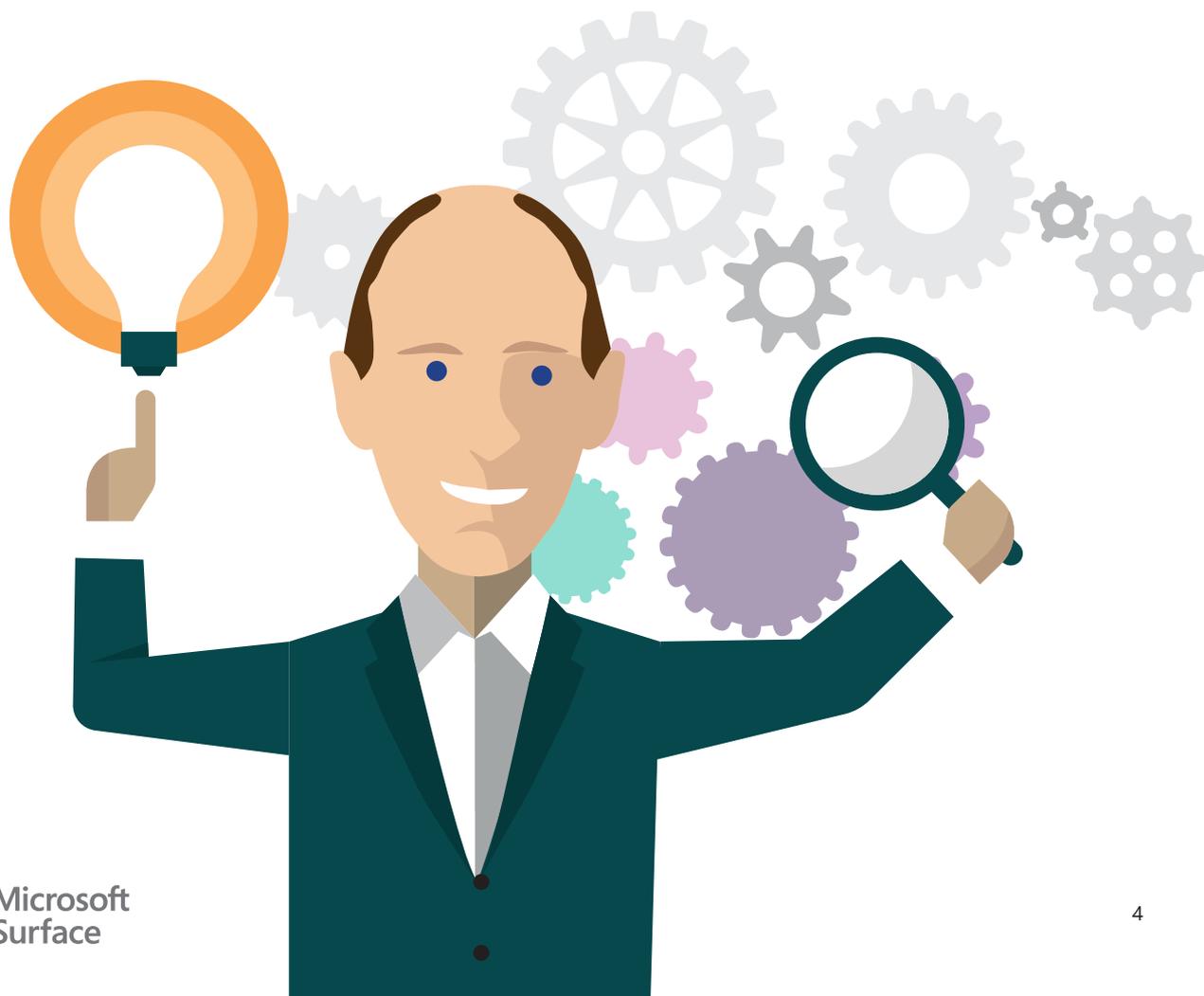
Chair in Educational Technology, Open University

As well as an extensive role at the Open University, Mike is Academic Lead at FutureLearn. Mike is also active within the Institute for Educational Technology and is a fellow of the RSA.

3. Terese Bird

Educational Designer, Leicester Medical School, University of Leicester

Terese handles medical course design and delivery for tablet usage at Leicester, the first medical school to implement a tablet-per-student scheme for undergraduates. Her ongoing interests include mobile learning, virtual reality in medicine, learning and research through social media, open education and open practice.



Learning technology: Meet the experts

4. Prof Rose Luckin

*Professor of Learner Centred Design,
London Knowledge Lab,
University College London*

Rose's research applies participatory methods to development and evaluation, investigating the relationship between people, context, concepts and learning. Currently she's developing a framework for Ecology of Resources. London Knowledge Lab is a research institute established in partnership by Birkbeck and University of London.

5. David Hopkins

*E-learning Consultant,
Warwick Business School, University of Warwick*

David is an award-winning learning technologist with an interest in distance and social learning in UK Higher Education. He's a Fellow of the Higher Education Academy and a certified member of ALT.

6. David White

*Head of Technology Enhanced Learning,
University of the Arts London*

David is a regular speaker on topics such as digital identity, digital literacy and online credibility. He has been heard on Radio 4, the World Service and ABC Australia. He has described the digital world as "much more than a set of tools or a chaotic library, it's a place where we can learn and live".



HEIs & learning technology:

A brief overview

Higher Education in the UK has experienced decades of expansion and differentiation. During this period the relationship between the role of technology in education and the role of HEIs as a tool to achieve economic success has continued to develop.

Whilst advances in digital technology are creating new roles and changing the way we work, skills shortages remain particularly acute in some industries. Sectors as diverse as finance, retail and marketing now require advanced digital skills to compliment traditional skills.

Universities tend to be proactive in their approach to preparing undergraduates for the world of work. However, as the employment landscape becomes increasingly fluid, universities must constantly update their teaching practices to suit the demands of the jobs market.

Due to increasing marketisation of the Higher Education sector, universities also face new impetus to provide students with value for money. Competition between institutions to attract the best staff and students has increased, raising questions within the sector about how a university might distinguish itself and whether they should accept structural reconfiguration to suit these new demands.



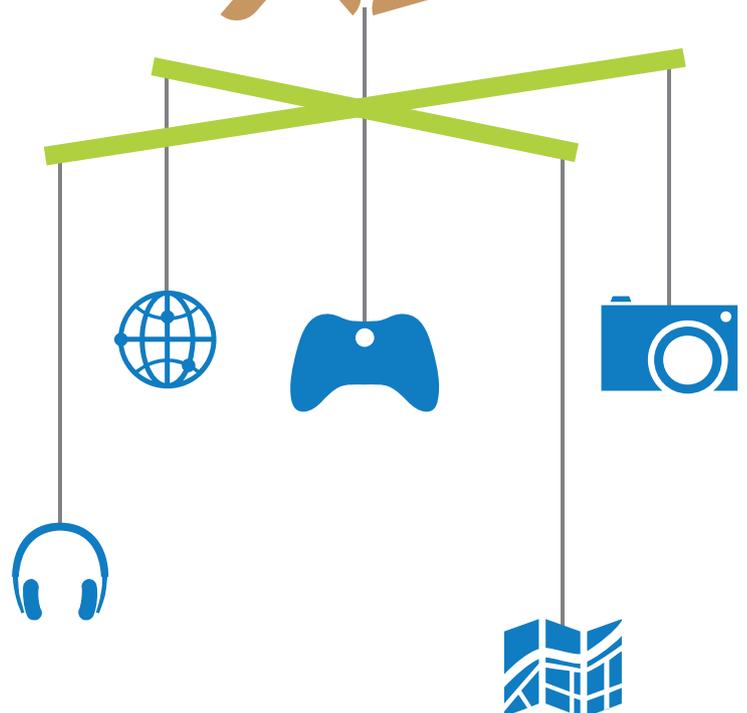
HEIs & learning technology: A brief overview

Besides marketisation, there are a number of key trends shaping the landscape of skills, technology and education in the UK. These include globalisation, demographic change, increased diversity, new demands for a better work-life balance, increased digitalisation and automation, processing of big data, scarcity of natural resources and new business ecosystems.¹

By developing a new approach to learning technology – one that meets the demands of employers while effectively engaging students – universities are furthering their role as transformative influences within society.

However, the role of technology in Higher Education remains an open-ended question that requires both educators and learners to think intuitively and act pragmatically. While learning technology is quickly becoming the leading factor in improving student performance, it's important to remember that any change is driven jointly by students, staff and senior stakeholders.

1. UK Commission for Employment & Skills: The future of jobs and skills, labour market reform, industrial strategy, Further Education and training (Feb 2014)



Key findings:

Device Agnostic

Ofcom has reported that, in 2014, mobile overtook desktop as the most popular means to access the internet. Since then, 83% of UK premises are reportedly able to receive a superfast broadband service and the total number of UK 4G mobile subscribers topped 24 million. Smartphones are now the most widely-owned internet-enabled device, alongside laptops, while the popularity of wearable technology continues to take hold. ²

This means that students and academics could be working on anything up to three internet-enabled digital devices in a single session: a laptop or desktop, a tablet and a smartphone. Students, like most modern employees, are working on the move, at any time of day, in almost any location as work and leisure hours become blurred by increasingly 'mobile' lives.

The proliferation of product choice and greater access to information about new devices is helping to shift consumers' purchasing decisions away from preferences by brand. Instead, considerations of practicality and functionality are vital – this means that battery life, screen resolution, seamless compatibility and pre-installed software suites are now key elements of any purchasing decision.

David Hopkin of Warwick Business School raised this point as a key change, stating "we can and we should be device agnostic. We should be in a position where we can talk in generic terms about tablets." Despite this agnosticism, Neil Morris at the University of Leeds feels a unified approach to device provision is always preferable from the institution's perspective: "Ideally all students would be given the same device, already set up for use...".

2. Ofcom: Communications Market Report (2016)



Key findings: Device Agnostic



Many learning technologists predict the adoption of a one-device-per-student policy which would see the cost of a device purchase built into course fees. That device would be pre-packaged with relevant software by the institution or course leader. Although cost, security and control will remain prohibitive factors to this approach, some American universities have led the way by introducing a consistent device policy and it's anticipated that UK institutions will follow suit as practical, affordable solutions become more widely available.

On courses with a high percentage of international or mature students, it's reported that the disparity between the quality of personal devices owned by students and their associated digital skills can become prohibitive to teaching. This will continue to grow the need to introduce consistent device provision on certain courses.

David Hopkins also pointed out the untapped potential behind learners' personal devices: "We aren't using these devices anywhere near as efficiently or as effectively as we should do... We can use them to work more effectively with the academics, students and the whole institution." Mike Sharples concurred, adding that "each mobile device is a toolkit... and we're not exploiting that enough yet."

As 'device agnosticism' takes hold, tech providers will have new impetus to provide both functionality and practicality in a format that can be applied broadly across the institution. However, HEIs' purchasing decisions will continue to be driven by the demands of specific courses and subject areas. As new solutions continue to be developed, students and academics will continue to adopt a philosophy, as summarised by Sharples, that "it's no longer about what device you have, but what you can do with it."

Key findings: Seamless Capability

Consumers already expect seamless transition between their devices and obstacles to seamlessness can reduce the favourability of a device. In HEIs, failure to provide seamless platforms can hinder learning opportunities.

Neil Morris pointed out that students in their day-to-day lives are accustomed to video-on-demand and optimised browsing, saying “students expect seamless access across devices and platforms because consumer channels have already achieved this.” In this sense, learning technology cannot be considered in isolation, but as part of the media and technology landscape which is setting new standards for academic engagement.

Rose Luckin of the London Knowledge Lab echoed this, highlighting the disparity between digital

learning strategies and learners’ everyday lives: “It’s very much about fitting in with the modern lifestyle – being able to access everything you need wherever you are.”

This preference for seamlessness extends beyond devices to software and other digital spaces for collaboration, as stated by David Hopkins: “If students live and work in their own digital spaces, shouldn’t we be engaging them in those spaces instead of forcing them to come to our digital space?”

The ecosystem of hardware and software already used and increasingly demanded by HEIs takes that expectation a step further, necessitating complete seamlessness in order to maximise students’ use of available products as well as the university’s access to new data streams.



Key findings: Virtual & Augmented Reality

As an opportunity to enhance human interaction, bring disparate people closer together and provide unique socio-cultural experiences, the learning applications of virtual reality (VR) are essentially limitless.

VR is already a key edtech trend in 2016 as educators seek more interactive and immersive platforms. The VR market is projected to grow to a \$15.9 billion industry by 2019 and that growth is expected to be driven by a shift away from the traditional gaming sector into education.³

In Higher Education, medical schools have been early adopters. Specially commissioned software already allows students to pick up and examine human skulls in detail, while one specialist vendor is developing an immersive full-body experience for HE learners. Virtual microscopes and virtual field trips are already commonplace, however in the next few years it's anticipated that networks of virtual labs will act as a meeting place for researchers across a number of real labs.

For Terese Bird at Leicester Medical School, the benefits of VR go beyond the availability of immersive experiences – it's also easier and cheaper than sourcing bodies for autopsy: "Bodies are expensive. To get dead bodies is not an easy thing." Live-streamed autopsies from 'real life' labs are already widespread, but with VR these will be supplemented with interactive data displays and new levels of interaction that allow students to, for example, test their scalpel skills.

3. Virtual reality Market by Technology (Semi & Fully Immersive), Device (HMD, gesture Tracking), Component (Sensor, Display, Software), Application (Gaming, Entertainment, and Industrial), Geography - Trends & Forecasts to 2014-2020 (2015)



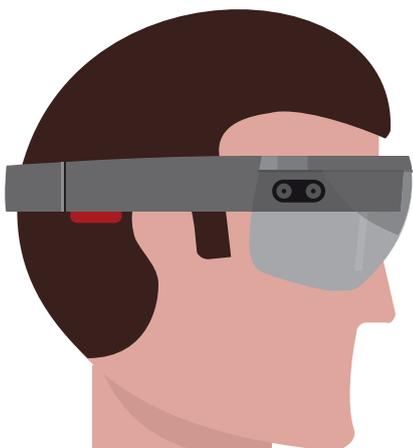
Key findings: Virtual & Augmented Reality

Looking further ahead, VR has a role to play in the transition from education to vocation by enabling students to test drive a day in the life of different professionals.

In comparison to VR, the educational applications of augmented reality (AR) are less developed, however remote learning courses will increasingly use combined virtual, augmented and traditional learning tools to bring distant ideas and experiences to life.

International students, for example, can already 'visit' prospective universities via digital tours and these tools will continue to develop in detail and quality as the drive to recruit international students increases. In turn, it will become possible to study entire courses at a world-class institution without leaving home.

However, the expense of bespoke programming for VR and AR continues to prohibit progress and there remains a gap between the demand and supply of content. This means that strategic investment into the development of new tools and platforms for educational purposes will continue to be a priority for tech companies and HEIs alike. At the same time, new platforms for quick and easy creation of interactive content will allow learning technologists to tailor their own materials without significant investment.



Key findings: Artificial Intelligence

The primary applications for artificially intelligent systems in HE will occur within marking and assessment. Automated systems designed to mark essays, for example, will reduce the time spent by academics on paperwork and increase their face-to-face time with students or their time spent engaging with research occurring outside of the institution.

Naturally there is resistance among some members of faculty to automation tools and behaviour change remains a priority. However, that all-important trust between academics, students and technology will only develop if the technology works well. David Hopkins, for example, sees overcoming the fear of change as one of his core responsibilities: "I'm not here to force technology, or force an approach on academics, but we do need to keep up with the times."

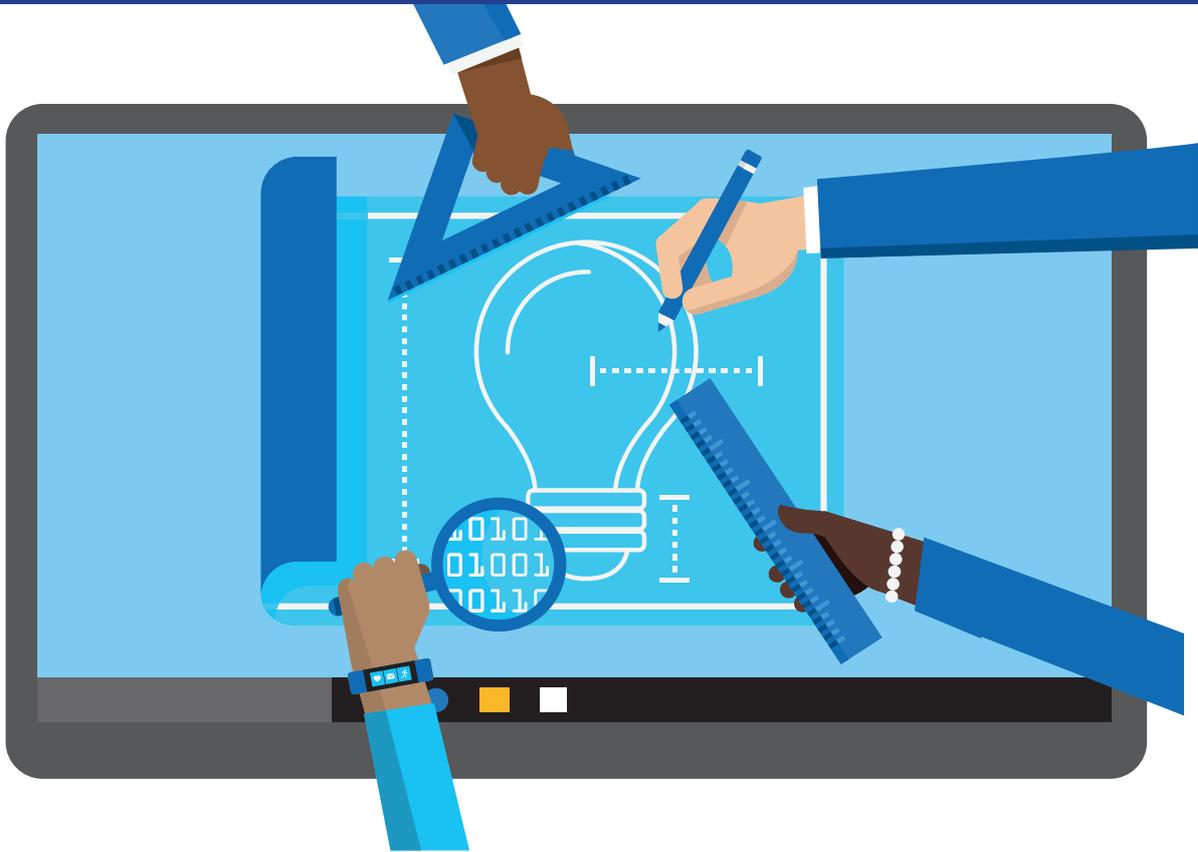
Mike Sharples at Open University has found early "augmented assessment" to be effective and he feels fully-formed marking and assessment via AI will be particularly relevant at a remote learning specialist like the Open University. Sharples also highlighted potential applications

of AI within the careers service, whereby skills development can be linked more explicitly to the workplace. For example, AI can help match students more appropriately to suitable careers before providing them with a responsive, true-to-life re-enactment that can be experienced outside of classroom hours. In this case, the opportunity to undertake "alternative problem-solving activity" helps to satisfy the university's commitment to preparing undergraduates for the world of work.

Beyond the horizon, Sharples believes the applications of AI could see all campus buildings equipped with hardware that allows the site to "explain itself" in terms of student numbers, frequency of visits and time spent in certain areas. As with any technology, Sharples notes, the development of this capability should always inform improvements of the campus as a physical space.



Key findings: Collaboration



By 2020, it's predicted that more than 50% of the workforce will be members of Generation Y, i.e. born in the 1980s and 1990s, primarily the children of baby boomers and having grown up in a connected, mobile and collaborative world. ⁴

Work in the future will be more interconnected and network-oriented. Employees will be working across specialist knowledge boundaries as technologies and disciplines converge, requiring a blend of technical training and the 'soft' skills associated with collaboration. Virtual collaboration will flourish alongside growth in outsourcing and the need for flexible project management, particularly in the creative and digital sectors.

Students have always worked at all hours of the day and night, but the popularity of digital collaborative

spaces will lead to new working styles that reflect the world of work. Increased flexibility could lead to greater productivity and should ultimately lead to better use of face-to-face collaboration. The end goal here is ensuring that the processes of ideation and execution are efficient and transparent.

A new "social approach" to learning is giving institutions access to expert voices from around the world, with leading specialists transmitted live to the lecture hall via Skype. This social approach is supported by new instant messaging platforms such as Yammer, which provides a safe and secure online environment for students and academics to share their thoughts.

4. PwC: Millennials at Work - Reshaping the Workplace (2011)

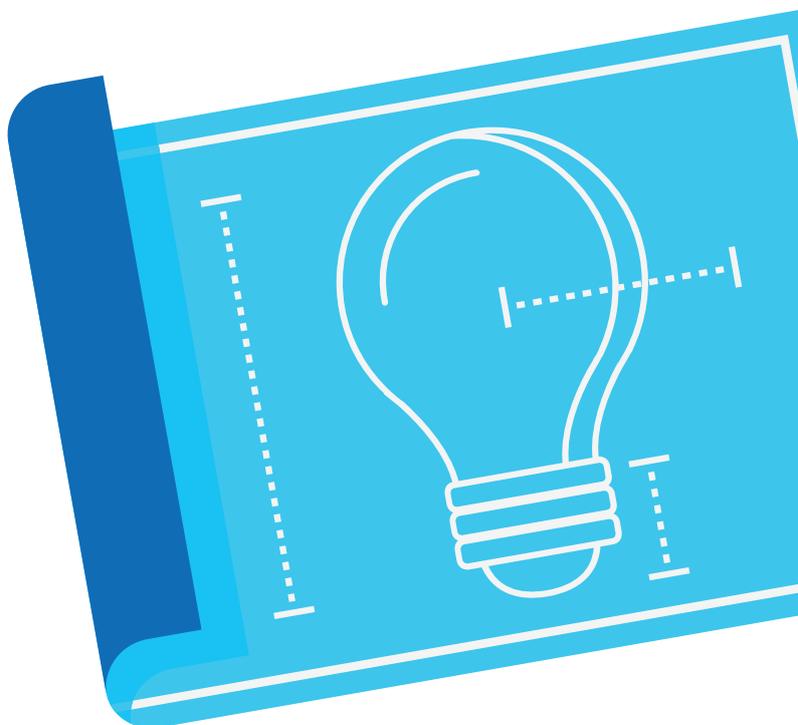
Key findings: Collaboration

In turn collaborative technology will support innovative teaching ideas like the 'flipped classroom', where the traditional pattern of information and concept acquisition in class is inverted. Already popular in the US and growing in popularity in the UK, faculty staff will post learning materials online for students to view before using class time to focus on application, problem solving and assessment. This frees academics to develop critical reasoning and creative discussion, making the most of their face-to-face time.

Shared annotation and digital inking are already offering new educational opportunities for collaboration - for example, Terese Bird at Leicester Medical School is making use of "heat maps" to show which part of a document other people are looking at and commenting on. In the immediate future, the functionality of these tools will continue to grow and this will be reflected by high levels of adoption.

David White at the University of the Arts London pointed out that "collaborating, working in teams and critically evaluating" are particularly important within the creative industries, however he was keen to stress that tech tools won't change the basic nature of collaboration, "they simply change the parameters of when, where and who with."

In short, collaborative learning will remain the most effective method for an educator to enhance critical thinking and digital technology will become increasingly essential as a tool to maximise time spent working collaboratively with peers.



Key findings: Learner Analytics

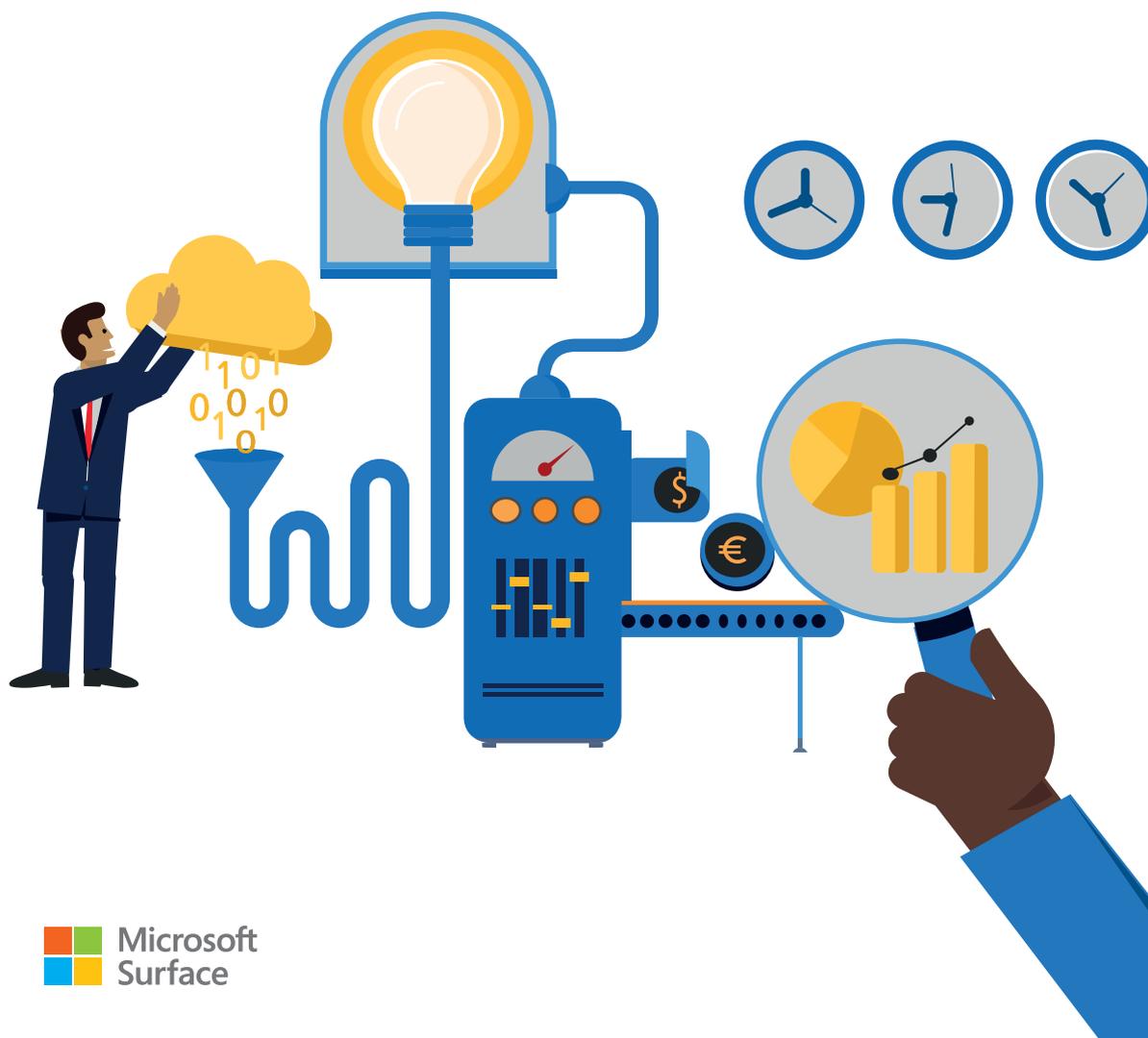
New analytic tools are already creating a predictive approach to assessment and evaluation, whereby HEIs can project a student's performance based on just a fortnight of study. This allows academics to suggest corrective measures before problems arise, as Mike Sharples at Open University explained: "by the end of a students' second week we can predict whether they're going to succeed or fail... this helps both us and the student." Learner or predictive analytics therefore can serve to both measure and shape a student's progress.

Universities will also unlock new insight into how students are engaging in digital and physical spaces. For example, with the use of library card data it's

possible to measure how much time a student spends in the library and which books they check out.

The results of this data, alongside augmented assessment, can then be mapped against standardised performance measurements. However, to achieve this the university requires a seamless ecosystem that is capable of linking multiple databases while also promising information security.

The long-term ambition for most universities is a fully transparent system of evaluation and self-assessment. However, for most the immediate objective is a robust and modernised method to accredit and certify.



Conclusion

The nature of learning is changing rapidly, with physical and generational barriers less relevant than ever. As we adapt with technology, we will 'learn how to learn' throughout our personal lives and careers.

Whether it's anytime learning or lifetime learning, the appeal of online education platforms such as MOOCs will continue to grow as people of all generations see the benefits of learning anywhere, anytime.

In practical terms, technology allows more learning to occur off-campus. With access on demand, learning in short bursts and constant connectivity with peers and experts, Higher Education is moving towards a blend of class-based and distance learning that reflects modern working styles.

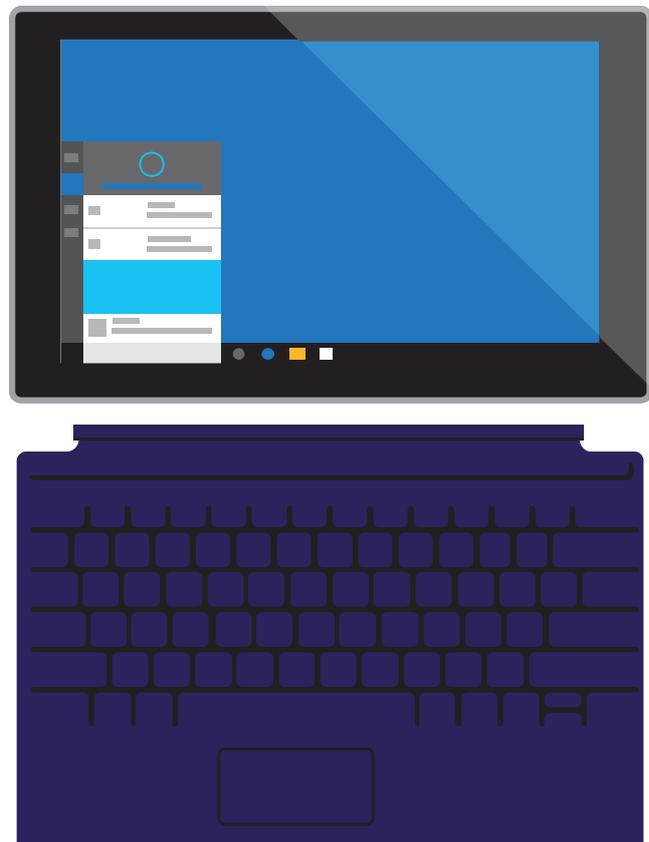
Return to 'real education'

Although mobile technology has permanently changed learning environments, all of our interviewees stressed the point that learning technology should be a tool and never the end goal. The ideal university education is still about improving a student's ability to produce appropriate ideas, solve problems correctly, build on complex theories and make accurate inferences from the available information. David White at University of the Arts London summarised this by saying, "digital technology can help turn education back to what it ought to be."

When correctly integrated into the academic environment, technology can support the

development of skills and self-directed learning while freeing academics to focus on a deeper connection with their subject and students. If the overall objective is the provision of a cutting-edge learning experience, learning technologists report that it's vital for all infrastructure investment to maximise the value created by academics' expertise.

David Hopkins reiterated the point that the role of a learning technologist is "to make sure that the academics use their time with the students efficiently."



Conclusion

No more 'digital natives'

In an era of lifetime learning, seamless IT infrastructure, predictive analytics, ground-breaking new technology platforms such as VR and global collaboration, the digital skills gap should no longer be considered a generational issue – there are no more 'digital natives'. Instead the skills gap will be dictated by the intelligent use of social networks, willingness to 'play' with tech, self-management of learning and palm-sized innovation.

This change in how we define and assess digital capabilities in education and employment is naturally linked to socio-cultural changes in the UK, summarised here by Sharples: "As we become a more multicultural society, it means we're a more multi-educational society."

Across the country, strategic and creative partnerships between vendors and institutions are producing unique results for students and academics thanks to this innovative technology. Our "multi-educational society" is already benefiting from devices that provide greater versatility and, in turn, digital technology will help institutions to develop vital new techniques for learning beyond traditional barriers of time, place and age.

The revolution in learning technology is quickly becoming the most significant factor in improving student performance – in turn helping universities to fulfil their transformative role for society, the jobs market and the economy.





The Future of Learning
Technology in UK
Higher Education

For more information
on Microsoft Surface see
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