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Using Educational Technology to Support Students' Real World Learning

Edward Bolton and Roger Emery

Introduction

Technology-enhanced learning (TEL) is the process of utilising information and communication technologies to support teaching and learning (Kirkwood & Price, 2014), with the aim of enhancing the learning experience for the student. This can be achieved by providing the learner with more flexibility with the pace, place and mode of learning that best suits them (Gordon, 2014). Learning, rather than reading or being told about a subject, can be experienced through different media such as video, simulation and augmented reality that gives context to the materials (Cook, Anderson, Combes, Feldman, & Sachdeva, 2018; Ahmet,

Case studies: Dawn A. Morley, Beth Gordon, Steven Bookman, Roger Emery, Tom Simons, Martina Brown, and Edward Bolton.

E. Bolton (✉) • R. Emery
Solent Learning and Teaching Institute, Solent University, Southampton, UK
e-mail: edd.bolton@solent.ac.uk

Gamze, Rustem, & Sezen, 2018). TEL also allows students and staff to communicate and collaborate beyond the physical teaching space by facilitating different modes of synchronous and asynchronous forms of communications such as webinar, online chat, forums, blogs and wikis.

We are currently in the throes of the fourth industrial revolution, where data are now becoming the natural resources that are fuelling economic growth. Digitisation is profoundly reshaping the way that we work and communicate with each other (OECD, 2019). Its effects are seen in almost every industry globally (Schwab, 2015). This rate of change of technology means that business is unable to keep up. The British Chamber of Commerce (Marshall, 2017) identified over 75% of UK companies experiencing a digital skills shortage in their employees of which 24% is a significant skills shortage. This skill deficit has been attributed to hampering productivity (Marshall, 2017) and a low proficiency to problem solve in technology-rich workplace (OECD, 2016). This may account for over half of graduates believing that higher education (HE) did not prepare them for their career (Pearson, 2019).

As educators in HE we have a duty to our graduates to prepare them for this rapidly changing world of work (Pearson, 2019). It is not simply training them on specific software but making them prepared for a digital landscape. No one technology learned will be future proof, but a range of software and experiences will make students more resilient to deal with continuous change:

Workers in a digital environment are more likely to maintain or improve the skills they develop during their studies or in past professional experiences, because digitisation widens the variety of tasks they perform. (OECD, 2019, p. 56)

Technology in education has mirrored the evolution of the web. With Web 1.0, tutors would support their teaching by placing courses online for student to access and consume in their own time. However, technology can also be used to support the move away from a didactic transmission model of learning, where the expert imparts their knowledge, to a more collaborative active learning process whereby the students can build, test and adapt their knowledge (Kolb, 1984). This is reflected in

Web 2.0, which focuses on the communications aspects supporting a social constructivist model of learning (Wenger, 1998).

Web technology could now be considered as moving to Web 3.0 in reaction to the fourth industrial revolution through its use of data analytics and provision of the personalised experience. This is reflected in educational technology through the implementation of progress tracking and learning analytics in an attempt to 'measure learning' but also to provide the student with a personalised learning experience and evidence of their progress.

Effective learning technology integration requires that this is done as part of the learning design process and not as an afterthought (National Academies of Sciences, 2018). Simply replacing one technology for another, for example, moving a document online to cloud storage, does not necessarily result in learning enhancement. The user would certainly gain productivity benefits that they are now able to access the document from any internet-enabled device and they know that they are always working on the most up-to-date version. Impact on learning may come if an activity is designed where the document is shared from that cloud storage to other students or a tutor. The collaborative conversations and feedback, made significantly easier and convenient through technology, help learning happen.

This chapter will explore several tools and processes where technology has been essential to enhancing the learning process in a real world environment. The concept map (Fig. 15.1) visualised the key themes of the chapter. The chapter will start with light-touch TEL solutions that are relatively easy to implement to explore real world scenarios progressing through more substantial curriculum change and complex technologies that increasingly represent or emulate the workplace more authentically.

The technologies that attempt to represent or simulate the real world equip learners with the tools that will enable them to seamlessly transition between study and the workplace. Those learners will have been able to take their theory and apply it in practice in a safe environment. When they enter the workplace, students will be entering a new community, not of learners but now of practitioners. The learner has now to balance the process of becoming part of that community of practice

Fig. 15.1 Concept map from the authors

(Wenger, 1998) and being accepted as part of that community by the already established practitioners whilst on the other hand challenging current practices with the latest developments in academia.

Removing Technological Barriers to Develop Real World Skills

This chapter will explore technology from two aspects: the first is learning the technology and the second is learning through the technology. The first focuses more towards training, furnishing students with the technical knowledge by which they are to operate the technology that will be used to learn. This is essential, no matter how engaged the student is and how much they want to contribute; without the technical skills they will be unable to do so. It is also presumptive to assume that because the students are of a particular generation (Prensky, 2009) they already have the required skill set of, for example, using social media tools (discussed later in this chapter). Knowledge of one system does not necessarily translate to another, and learning discussions through technology may be seen as

being more high stakes than a casual social situation, so the barrier of technology needs to be completely removed. The most effective way that this can be facilitated is within the classroom setting: tutors demonstrate and emulate desired behaviours, and the students practise this with guidance from the tutor. It is also worth pointing out that it is a necessity for the tutor to be comfortable with the technology, first to support their students, and second, if tutors value the technology themselves, this is picked up by students who will also value and engage with the technology (Morley, 2012).

Once the technological barriers have been overcome, the second step of learning through the technology can take place. This can develop a culture of learning: what the students are contributing, how this is adding value and whether this fits into the social norms that are expected in their future workplace. These two themes will run through all the technologies that we explore throughout this chapter.

Relevance of the Virtual Learning Environment in Relation to Real World Learning

Information technology, digital by its nature, is not limited to a physical location, thus provides the learner with more flexibility. The virtual learning environment (VLE), also referred to in some regions as a learning management system (LMS), supports learning by providing spaces outside the classroom for the learning to continue. For many students, use of the university's VLE is the primary online interaction with the institution (Phipps, Allen, & Hartland, 2018). This means that the student can continue their learning through directed activities without the tutors' direct intervention and feedback as this can be partially automated. As in simulations, VLEs give the ability for students to express their ideas, through blogs and fora in a safe space, reducing the consequence or repercussions of misconceptions and mistakes. The focus of learning is now about what the student is doing and not where they are. VLEs enable the learner to work at their pace, in a place and time that suits them.

To successfully utilise the VLE as an educational tool partly relies on the curation of appropriate content, but more importantly, it is the narrative that the students follow that deepens their knowledge and tests their ideas. Content is important, but the students need to be told why the resources are important and worth engaging with and connected to the knowledge they are learning. By using directive activities, students can be led to test their understanding in an automated quiz, asked to write a reflection on how it applied to their practice or articulate the arguments in their own words. The directed activity takes the place in lieu of the tutors' presence and allows the student to take action at a time and place of their choice.

The problem with the VLE is that it is a system that for the most part only exists in the realm of academia and does not represent any real world equivalent. For this reason, there are arguments that suggest it could be replaced with more authentic work-orientated tools such as online project management tools, especially Microsoft Teams (Phipps, 2019). There is, however, a growing interest in the use of online learning systems for employee training evidenced in the marketing of adapted VLEs for the commercial sector such as Moodle Workplace (Moodle, 2019) and Totara (Totara Learning, 2019). Many corporations are beginning to use VLEs to upskill their staff in a developing digital environment (Totara, 2020; Enlyft, 2020).

Platforms, originally marketed to the corporate sector, are finding traction in educational settings such as Trello, Microsoft Teams and MeisterTask. These incorporate two elements discussed earlier; social interactions between users and storage and management of collaborative work. They are based on Kanban boards, which visualise the work in progress related to a project (Rose, 2018). They comprise cards defining tasks that make their way across the board as members complete them. From the learners' perspective the 'project' is represented by the assignment and cards are the defined learning activities that will achieve this. Students interact and discuss by using the '@mentioning' function to alert other members of activity, which is recorded on the cards. Unlike the VLE, this cannot support individual self-directed learning and does not provide a structured narrative. Educators, therefore, have to balance technology that facilitates and enhances learning by exposing and training students to function effectively in the workplace.

Discussion and Collaboration Online Emulating Workplace Culture

This area of discussion considers the digital workplace, with a stronger focus on students becoming effective practitioners and a lesser focus on conveying understanding of a particular academic subject. Two key skills that are required in the world of work are: collaboration in online documentation and online discussion.

A key aspect of social constructivism is the ability of participants to build on and communicate their ideas with one another (Wenger, 1998). Technology has allowed to transcend the physical four walls of the classroom and continue without geographical borders into the online space. However, this is not a simple case of moving from one medium to another. Due to its nature, the discussion could be high-paced and low structured (Garrison, Anderson, & Archer, 2009). Conversely, Garrison goes on to say that online discussions provide a totally different environment. The importance of this is the lack of synchronicity; points can be articulated in an educated and considered fashion allowing the student to assimilate, reflect and respond. From these online discussions 'higher-order cognitive learning' is achieved when a student actively contributes to the discussion (Garrison et al., 2009).

Since these discussions are asynchronous the participants do not have to be engaged at the same time as their peers, allowing for much more flexibility (Patel & Aghayere, 2006). This is significant to the non-traditional student who may be balancing other pressures such as work. For students with disabilities, for instance a hearing impairment, or registered for additional learning support, synchronous discussions, whether online or face to face, can be challenging, which limits engagement with the group. A possible solution to overcoming barriers to engagement is the use of distributed and asynchronous learning technologies such as online forums (Anderson & Kanuka, 1997). This allows the participant time to digest the topic of conversation and construct their contribution. Unlike the real world context, the asynchronous online communication gives students the opportunity to be more reflexive about their inputs allowing them a level of protection in their participation—what Lave and

Wenger (1991) would term 'legitimate peripheral participation' and is a useful step towards their practice in authentic real world following graduation.

A discussion is a two-way process that through the contributions of peers can develop ideas and come to a shared sense of understanding. Palmer, Holt and Bray (2008) qualify that this happens when contributions to the discussions are made and not from those who simply read the material. These students, 'lurkers', do not add to the community of learners (Honeychurch, Bozkurt, Singh, & Koutropoulos, 2017), and due to the lack of contribution, it is difficult to track whether the student has indeed read the material or has learned from it. Salmon (2011) suggests a few reasons for the learner not contributing: a lack of skill or confidence, communication overload, the public nature and permanence of posts, and nothing additional to add to the post. This follows the theory of the "1% rule" of internet culture, where 1% create content, 10% interact with that content and the other 89% will just view it (Arthur, 2006).

Contribution begets contribution, so students who do not receive replies to their online post will not see the value and stop contributing themselves. Social validation and reciprocity are influencing factors in computer-mediated communications (Guadagno, Muscanell, Rice, & Roberts, 2013). Tutors can provide guidance for students on how to interact, provide encouragement to students and reward the students who communicate (Sun, Rau, & Ma, 2014).

As so much more communication is now being facilitated by technology, it is crucially important that learners are encouraged to embrace this medium of communication. Learning activities can be designed with collaborative documentation and communication giving the students these crucial technical skills. Applying real world problems can breathe life into otherwise more abstract and less engaging aspects of the curriculum and gives them context (Light, Cox, & Calkins, 2009). Comments and discussion features allow students to interrogate initial problems, and collaborative documentation allows students to work together to generate ideas and refine a solution.

Businesses are taking advantage of continuous internet connectivity, by moving documentation from local devices to centralised cloud storage (Coles, 2016). Applications are also embracing the cloud with the

majority of providers making the switch in the coming years (IBM, 2018). As these services grow, we will see their reliability, security, expressivity and sustainability improve in the future (Varghese & Buyya, 2018). Benefits to users, and students, allow data created on one device and sent to the cloud, which becomes available on any other device with an internet connection. Backups are now automated, reducing the effects of human error and providers, such as Google Drive and Microsoft OneDrive, provide version control.

Use of Social Media for Learning and Working

Earlier, this chapter has discussed the facilitating conditions of online communication. Social media really gained mainstream popularity with the launch of Facebook in 2004, initially just to college and university students but then to the wider population allowing users to easily create and curate their own groups and networks. This marked the transition from Web 1.0 to 2.0, and presently there are around 2.45 billion users on the platform (Statista, 2019). Due to its popularity media advertising is shifting online to platforms such as Google and Facebook (Guttmann, 2019; eMarketer, 2018a, 2018b). The real world implications are two-fold, first as a medium where companies can communicate with their customers. Second, social media are now the platforms by which individuals build their professional identities (Beckingham, 2019).

Academics have been tempted to utilise social media platforms as they are familiar to students; they represent a real world environment and the students are already there. About 77% of UK students use social media to connect with other students, and 46% use platforms to support their learning (Pearson, 2019). These platforms do not present as much of a technological barrier and, therefore, have less of a training implication (Rowell, 2019). However, the transition of students from using social media as a professional space can have its repercussions. For example, health care students, such as nurses, have been advised to follow professional guidelines following high-profile cases of breaches of confidentiality (Morley, 2014). This is explored in depth in the first case study.

Before learners use social technologies in a learning context, they will likely have experienced them in a social context. As such their experiences may be varied. Critiques of social media claim that these platforms are in a race to the bottom for our attention, as time spent on the platform drives advertising revenue (Harris & Lewis, 2018). Algorithms promote the posts that drive engagement on that platform; those posts that elicit outrage have the most engagement more than any other emotion, leading to over sensationalised contributions (Vaidhyanathan, 2019). Students themselves may have experienced adverse actions from other users including trolling and callouts in their attempts to undermine individuals and their points of view (Marantz, 2019). These perceptions may inhibit meaningful engagement online, although on the learning platform, participants are known and interactions are monitored by academics.

However, private groups in social platforms such as Facebook do provide some level of protection. Students may themselves organise their own groups independently. Other services that students would want to consider on their journey towards becoming a professional are LinkedIn and Twitter LinkedIn boasts the largest professional network with over 660 million users (LinkedIn, 2020), giving them the opportunity to connect with industry professionals, and build a professional profile to find employment.

There is a difference between organic groups arising and explicitly using these platforms as a learning environment. Institutionally, supported systems will provide protection in terms of General Data Protection Regulation (GDPR), safe harbour and data protection. Student data are only used for the purpose of their learning and nothing else. Social media platforms are free at point of use exactly because user data are sold to other companies (Hardy, MacRury, & Powel, 2018), so it would be unethical to require students to sign up to these platforms to be part of the learning process. With the continuous progression towards 'online', the duty of educators is to prepare students so that they can make informed decisions on what personal data they share and how and what they communicate. Anything that is placed online will be searchable forever, potentially impacting future job opportunities.

Case Study 1

Facebook—Using Social Media to Connect Students at a Distance (Dr Dawn A. Morley, Principal Academic in Adult Nursing, Bournemouth University, Bournemouth UK)

As a personal tutor to adult nursing students, I experienced first-year student nurses returning from placement with stories of challenging treatment. The academic nursing team had carefully supported students through their first semester of academic study by placing them in the same seminar groups as their personal tutor groups. As students geographically dispersed to their first placements the support networks, accessible at university, were not called upon by students to make sense of their new learning environment or to seek advice on how best to learn.

It was clear some student nurses were communicating through Facebook, but this was not inclusive to all their group. In nursing, there are also underlying professional issues of students naively communicating on their personal Facebook accounts without realising the risk of breaching patient confidentiality—one of the cornerstones of the Nursing and Midwifery (NMC) code of conduct and punishable by exclusion from the professional register. It seemed that students when put 'at a distance' reverted to their social media accounts for support but the scale and risk of this were unknown.

Students had been using wikis as an online collaborative learning tool for two of their first semester modules and this included an introduction to netiquette in relation to the NMC code of professional conduct. Having successfully trailed online, group communication as part of their academic learning, I sought the informed consent of two first year tutorial groups who were about to leave on placement. I wanted to conduct a mixed method study of 52 first year students (Morley, 2014) whereby each of the two groups were divided into their original online groups that they had communicated with at university. On this occasion, each group was given the option of continuing their communication on placement through an allocated online medium—that of email communication with their personal tutor, use of the established wiki and a newly set up

Facebook account for the purposes of professional communication. The personal tutor acted as an e. Moderator for each of the groups trying to ensure enough space was given to students to respond to students in the first instance.

During the placement, students' access and use of their online tools were monitored. They were encouraged to reflect deeper on their learning experiences through their allocated medium. However, students across all groups only used the new communication routes for asking specific questions about the course or expressing immediate anxiety about starting the placement or frustration when their supernumerary status was threatened. The latter led to some immediate advice from the personal tutor although students, despite their briefing, resorted to naming their placements which immediately had to be taken down from the Facebook page as previously agreed with the students. Students' reflex to communicate in the same manner as their personal Facebook pages was clearly very strong.

Overall, out of all the communication routes it was Facebook that was used the most and this seemed to occur predominantly during the 2-week settling in period of the placement. No student took up the option of personal communication with their tutor for difficulties that they wished to discuss individually (Morley, 2014).

As a result of the research study, a comprehensive eLearning online training package was designed by academics that recognised students' Facebook usage and prepared them for the differences of communicating online in a professional context. The third-year students that piloted the training enthused how much they had learnt and how it would alter their online communication behaviour both personally and professionally. The training package, e. Smart, was launched in the first semester for nursing and occupational therapy degree courses and was eventually adapted by the University of Southampton for their medical degree courses.

Research findings were disseminated to academics in three internal workshops and interest was high in finding more immediate and student friendly ways of communicating. As part of the workshop, academics were assisted in setting up a Facebook account for their usage in the professional setting. The long-term success of this was limited as no academic was naturally active on their Facebook accounts.

With the progression of time, the use of 'WhatsApp' and 'Twitter' have provided more accessible and immediate routes for group communication. Twitter provides a way of sending 'breaking news' to students that may be relevant to their academic or professional development. As a way of summarising academic sessions, it provides a way for students to informally feedback their views on their day's teaching. This provides a more immediate and qualitative route for student course feedback which proves useful for academics as they move to the next week of delivery.

Capturing Real World Learning Through e-Portfolios

An e-portfolio is an electronic resource created by the learner. This is a collection of digital artefacts articulating their experiences, achievements and learning. Behind any product, or presentation, lie rich and complex processes of planning, synthesising, sharing, discussing, reflecting, giving, receiving and responding to feedback (JISC, 2008).

As with other technologies explored so far, the technical skills that are developed for the learner to engage with learning do not necessarily translate directly into the workplace. Despite this, they offer the same enhancement with online communication and collaboration and logistical benefits over physical paperwork. This chapter will explore how these portfolios can be shared with (potential) employers or capture experience from employment. As with other technologies, academics need not only support their students in their learning journey but also support them in the use of the system (Eynon & Gambino, 2016). They also provide accessibility and usability anywhere, at any time, for students, academics and employers.

Portfolios support a social constructivist (Web 2.0) style of learning through reflection. Unlike simulation they do not attempt to mimic real life, but through evidence collected in them, they draw upon it as part of learners' prior learning (Brown & Thoroughman, 2017). Unlike written assignments, reports and exams that test a student's point-of-time understanding, portfolios are a means by which student can demonstrate the path they have taken in their learning. For this reason they are considered

a truer demonstration of their learning (Parker White, 2004). In real world learning the journey is as important as the final destination as, by its nature, it is an ongoing process of evidence collected through a variety of mediums (Eynon, Gambino, & Kuh, 2017). Learners continuously create links between the theory and real world concerns—as students grapple with lived experiences and try to make sense of them in the context of the theory (Lombardi, 2007). As a result, e-portfolios support the development of lifelong learners, and this ability to reflect on one's achievements, values and beliefs enables participants to make links to professional development better equipping them for a varied life of employment (Hartnell-Young & Morriss, 2007). An example of this developmental use can be seen in the Pace Pathway case study, where students use an e-portfolio all through their university programme and beyond into their careers.

Students' reflections show how their experiences and learning have impacted their decision making and future actions. The important addition of reflection gives "meaning to the student lived experienced, and delivered learning" (Buyarski, Oaks, Reynolds, & Rhodes, 2017, p. 7) adding value to learning. This action repeats in a cyclical process, and the learning theory is underpinned by reflective practice (Kolb, 1984; Moon, 2004; Schön, 2009; Gibbs 1988; Driscoll, 1994). Students thus curate their evidence into a final portfolio showcasing the milestones in their learning journey. The connections that they make deconstructing, analysing, reflecting and summarising these different experiences deepen the learning process (Sutherland, Brotchie, & Chesney, 2011; Eynon et al., 2017), and the portfolio platform is the tool that provides the personal learning space for this to happen.

Portfolios can be a powerful tool if used correctly; however, the process can be easily undermined. Students who are goal orientated will see the portfolio as a means of showing all of their work rather than a curated selection (Robin & Bair, 2018).

Deadlines drive action, which is in direct conflict with the ethos of the portfolios of sustained effort and reflection over time. To counter this academics may need to design in regular formative assessment points to drive engagement and provide feedback reinforcing the cyclical reflective process. A far more structured approach is required when students must

evidence development or get 'signoff' when working towards a professional competency.

Conceptually the idea of collection and curation can be difficult for students to grasp, compounded by technical aspects of the online system that supports it. Software such as Mahara and PebblePad have two sections: first, the ability to input content, upload documentation, write blogs, create actions plans and write reflections all of which are private to the individual. The second is the portfolio, which resembles a webpage; this is where the student curates content from the pool of materials they have collected and generated. This becomes the 'public' presentation that best demonstrates the journey they have undertaken and what they have learned from the process.

The following case study looks to overcome the teaching investment both technically and conceptually by using portfolios as a tenant that runs through the entire course, rather than the burden placed on one module and the skills developed never utilised again.

Case Study 2

The Pace Path (Dr Beth Gordon, Assistant Vice President for ITS, Academic and Administrative Services, Pace University, New York, USA; Steven Bookman, Adjunct Assistant Professor, Pace University, New York, USA; and Roger Emery, Head of Learning Technologies, Solent University, Southampton, UK)

Pace University is a comprehensive institution in the New York, USA, metro area with approximately 13,000 students spread across six academic schools. Pace has been developing an e-Portfolio project, using the Mahara platform since 2010, which now is a mature and embedded provision to support students through their studies and on into employment.

The Pace Path was launched in 2014 and is a programme designed to provide all students with a competitive edge by setting them on a course to not only pursue their academic work but to also encourage them to pursue co-curricular work, advisory mentoring and networking from the very start of their university career. The Pace Path has been realised

through the use of the e-portfolio platform to provide students with a tool to highlight certain competencies that tie in not only to their coursework but also to their co-curricular work (e.g., managing and evidencing their interpersonal relations and organizational awareness) and by tracking these competencies early on from their first semester of Pace University. This is designed to help students better understand the areas to develop in order to be successful not only as students at Pace but also successful in their careers beyond Pace.

Introducing first-year students to the e-portfolio through the Pace Path program provides a firm foundation of reflective practice, even if it is not required for other modules later in their courses. First-year students are introduced to the process, using a template in the e-portfolio to guide them; however, students quickly develop beyond the template adding dynamic content, such as examples of videos developing through various stages of production during an internship placement.

Another key aim is to develop a positive online presence and develop a complete personal professional branding in an era of social media. Students follow a set of guidelines, which come from videos from recruiters, a lecture from Career Services, and the professor's experience in the subject discipline, including conducting the assessment. This provides the students with the tools to write for a social media audience and, in particular, potential employers.

Creating an e-portfolio has opened students' eyes to how they will be viewed by future recruiters and employers. Many students see their accomplishments differently, and they mean more to them having them on the e-portfolio. They feel much more comfortable in the search for internships and jobs after having created an e-portfolio. These rich dynamic e-portfolios provide students with evidence of their employability beyond a CV and LinkedIn profile. Developing the language to prepare for the world of searching for jobs or internships helps students prepare for employability even if students do not use their e-portfolio during their interview process. By creating an e-portfolio, they build the language for discussing their strengths and weaknesses, their goals and aspirations. As a career development tool, it is extremely powerful.

The academic team did not want access to end when the student graduated after four or five years at Pace, so they worked together to ensure

that alumni had lifelong access to their e-portfolio, which has also been a key to maturing the e-portfolio initiative and supporting the Pace Path. It also helps Pace because they maintain contact with their graduates and helps the students because e-portfolios, for employability, are critical not only right when they graduate but also six months to a year after when they are often searching for either graduate work, first jobs, second jobs or new opportunities. To have access to the e-portfolio allows students to show evidence of what they are capable of. They may not have a whole slew of professional experience behind them, but they have a lot of great academic and co-curricular work, perhaps an internship too, which just does not come across as clearly through something like LinkedIn alone. However, through e-portfolio, there is concrete evidence. Many students see their accomplishments differently and having developed an e-portfolio helps visualise their skills and qualities to feel much more comfortable in the search for internships and jobs. Creating an e-portfolio has opened students' eyes, as to how they will be viewed by future recruiters and employers.

Research carried out by Pace with employers in the area has shown that employers are really looking for this evidence. Dr Beth Gordon reflects: "It can make the difference by showing a technological proficiency and a certain savviness that our better students knew all along. However, we are trying to make it, so that all of our students have this same opportunity to show their best selves and do it in a powerful way through the e-portfolio".

Simulating the Workplace

Simulations allow learning to imitate real-life situations reducing real-life risk whilst still giving students the experience of it. Due to this they are used in situations of high economic, social, environmental or life-endangering risks of failure, for example, coxing an oil tanker or intubation on a patient. A level of immersion that is comparable to the real situation develops reflexive knowledge and skills, and this is especially crucial in high-stress, demanding environments as this will trigger processes developed in simulations enabling the student to act.

In previous sections it has been discussed that students are required to learn additional technical skills in order to engage with eLearning. In contrast with simulations, technical skills developed often directly translate to skills and behaviours required in the workplace. For example, a simulation of a ship's bridge will attempt to replicate what will be found on a real ship. Academics can then focus on the skills, attitudes and behaviours desirable to a practitioner of that given occupation (Cook et al., 2012). Not all simulations require the use of information technology, but with recent developments it has allowed an enhanced experience through the use of augmented reality and virtual reality (Holley & Hobbs, 2020). This gives the user a greater level of immersion without the cost of custom-made facilities, and this technology is further explored in the next chapter.

Information technologies have also enabled the capture of the simulation providing the student with a tool to review their performance, analyse, reflect, and learn and develop from it. The subsequent case study explores how this is implemented with students. Students can rewind, replay and scrutinise their verbal language, body language and ability to listen and develop professional skills without feeling embarrassed or judged in real world settings (MacLean, Geddes, Kelly, & Della, 2019). With this they are able to reflect and create action plans for their areas of development to work on to better their performance at the next simulation.

Case Study 3

Adult Nursing Simulation Scenario (Tom Simons, Lecturer in Adult Nursing, Edward Bolton, Learning Technologies, and Martina Brown, Senior Lecturer in Nursing, at Solent University, Southampton, UK)

Solent University is proud of being an institution that teaches vocational skills and gives students real world experience to better enable them to succeed in the workplace. The nursing degree is one such example. The university has designed the teaching space to mimic a real hospital ward, including adjustable beds, monitoring equipment, intravenous

and oxygen supply. In place of patients the beds are filled with anatomically realistic dummies (Laerdal nursing Anne high fidelity simulators), who have skin real to the touch, breathe and have a pulse. The simulator allows the operator to directly interact with the student using their voice or a pre-recorded response/sound effect, such as vomiting. Students will have the opportunity to practice techniques, procedures and turn theory into practice. This gives them the opportunity to familiarise themselves with the setting and the dynamic of the space. In addition to the standard ward equipment, these rooms are also fitted with cameras, microphones and a computer.

Data feeds are taken from these devices along with a mock phone line and ECG monitor (displaying the vitals of the dummy patient) and fed into a capturing system installed on the computer. The ward telephone is connected to the system and can be used to ring the GP room for handover that would take place in the community or between wards in the hospital. Students will be asked to practice various scenarios where they will implement their knowledge. They assume different roles required to work as a team in their given scenario, which is aimed to test their practical competency but also the demands and stresses of the busy environment of the workplace. An operator will remotely control symptoms of the dummy patient and be able to call and directly talk to the students via the internal phone. As the scenario progresses complications are added to the scenario aimed at testing the students' resourcefulness, resilience and communications skills.

In one such scenario the students may be conducting a routine blood extraction when the operator simulates the dummy having a heart attack. Each of the students working individually, or in small groups, is encouraged to collect and interpret patient physiological data, establish a provisional nursing diagnosis and propose a nursing care plan, all to prevent the patient's condition from further deterioration. As the students progress, more complexities are added with additional time and resource pressures.

As the simulation is taking place the computer is capturing every aspect of the event. The video of the student and their movement actions, phone calls to the nurse students, ECG monitor of the dummy patient and all the conversations that the student has with the patient and other staff. The student is given the recording at the end of the simulation and is required to reflect on their actions. From this they then develop an action

plan on areas to work on. With the benefits of such a system the students can revisit and better analyse the nuances of their actions and model them against best practice to see what area they should work on to develop.

To mimic the workplace and induce some panic and adrenaline, the tutor will run a real time scenario where they will inject a bit of urgency to stimulate an energetic response. The students can then get used to how they react and how to react to situations in the future.

The prospect of this can be daunting to a lot of students. An alternative for them is to attend other beds in the ward to practice routine tasks. The fact they are still in the room will offer the opportunity to watch the simulation unfold. At the end of it they are included in the debrief with the video where they are then asked to feedback their thoughts and feelings. This provides the simulation of a real-life experience that they have observed and which might help alleviate some of their fears of taking part in the future.

Not all the students are comfortable with cameras, so it is important to try to embed those concepts slowly. They know the CCTV is there, but it is not mentioned until the second module of the first year. When the students know they are being recorded there is a risk that they start concentrating on how they are perceived on camera rather than concentrating on the task in hand. This can be detrimental to their learning.

Simulating and recording major incidents is an effective way of showing the students the communication chain of command which is pivotal to deal with the situation. iPads record bed spaces and students are allocated patients. Students focus on the treatment for their allocated patients and here is also an overarching camera to capture the whole environment. The first time the student is given no structure to deal with the patients and their skills. This is done purposely in order to promote a level of chaos. Tutors can then use the overarching cameras to demonstrate how the chaos affects the whole room. The individual iPads record how the individual students react to the situation.

The students have an assignment where they must reflect on their practice and their conversation that has been recorded. This forces the student to go back and engage with the video recording. Whereas if this were a formative assessment not all learners will necessarily engage with

reviewing the situation because they may not feel comfortable watching themselves and reviewing themselves.

Conclusion

This chapter has explored numerous ways that technology can be uniquely used to support learning in real world experiences looking at 'light-touch' TEL solutions before moving on to explore real world scenarios that are enabled through more complex technologies to attempt to authentically emulate the workplace. The increasing need for digital literacy as part of future employability (Pearson, 2019) can be addressed at university through a better orientation to the increasing availability and functionality of technology. The chapter has also presented three case studies, where technology has enhanced pastoral support, the use of portfolios and simulation by adding an additional dimension to existing, traditional learning.

However, a word of caution with the use of TEL: it must be remembered that these are just tools, as with any tools its acquisition does not provide success. Academics need to model appropriate practice so that students develop confidence and increasing professionalisation with the technology (Morley & Carmichael, 2020). The eLearning process needs to be carefully planned and how this will emulate real world experience. From the perspective of the academic, a real world approach needs to be cultivated continuously and integrated seamlessly into the narrative of the learning process that students will follow.

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