

Supporting eLearners by Increasing Digital Literacy Skills in Healthcare Educators

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Abstract

This paper presents a case study detailing the author's involvement in a teacher training module designed to improve healthcare educators' scope for delivering e-learning elements within their curricula. The best method for enhancing teacher understanding of how students experience learning in the online environment is by first allowing teachers to experience the process themselves from a student perspective. It is proposed that such exposure will allow teachers to gain greater insight into the potential benefits and pitfalls of online delivery and apply the knowledge gained to their own practice. Teachers from a wide range of healthcare specialities engaged in discussion forums and gained practice in new and varied methods of e-learning, discovering how they could be blended with traditional classroom-based delivery to achieve a diverse range of learning outcomes. It was found that the inter-disciplinary representation on the module created a potent mix of experience and viewpoints that greatly contributed to the overall learning environment. The cohort of twelve included adult and children branch nursing (hospital- and community-based), midwifery, allied health and a member of the e-learning support team.

Keywords: e-learning, Inter-disciplinary, healthcare education, blended learning, learning technologies, technology-enhanced learning, digital literacy, teacher training.

Introduction

The 21st Century has seen rapid social, economic, and technological advances which have questioned traditional forms of teaching that are no longer appropriate for the modern age. Teachers are no longer seen as knowledge experts but are co-learners and facilitators, increasing learning capacity through transformational learning (Bull and Gilbert, 2012). Learning itself is difficult to define; correspondingly, there are multiple definitions for e-learning within the literature. E-learning may broadly be described as content delivered on electronic devices, which is intended to support learning. The 'e', somewhat incidentally, represents the digital medium by which the material is delivered, but the 'learning' represents the necessity that it seeks to achieve educational goals through appropriate methods (Clark and Mayer, 2011). Educators can choose the level of contribution e-learning makes to their courses from e-supported traditional sessions, through a continuum of blended-learning strategies, to those run entirely online. E-learning may be individual or social, synchronous or asynchronous (Naidu, 2006). The government states that e-learning provides an important strategy for staff and students to attain the necessary knowledge, skills and attitudes for safe and effective care to improve patient outcomes, and therefore encourages e-learning in pre- and post-registration curricula (DOH, 2011).

Digital learning is going through rapid, and at times controversial, changes in terminology. This has led to very different understandings by those in education, research and industry as to what the definition of e-learning does or does not encompass, as there is no universal, internationally-agreed and accepted definition. This situation can raise important philosophical debate about education and the relation of technology to it.

Since its inception, circa 1998 (Cross, 2004), the term e-learning has been plagued by a lack of precise delimitation between researchers, authorities and countries. Sangrà *et al*, (2011) identified that there were actually four categories of definitions applied to the same term. As a consequence, e-learning has been variously defined as: technology-driven learning, a methodology of the ICT delivery system used, a communication-oriented model with an emphasis on flexibility and social interaction and, finally, as an all-inclusive unique educational paradigm in itself (Guri-Rosenblit and Gros, 2011).

A plethora of further terms have been applied to digital learning, including computer-mediated learning, technology-mediated learning, online learning and online technology. In 2009, the Higher Education Funding Council for England updated its e-learning strategy, stating the danger that 'e-learning' could be interpreted too narrowly by some and would therefore be substituted by the broader concept of Technology-Enhanced Learning (TEL). TEL would consider how technology may be used by institutions to enhance the process of learning, teaching and assessment (HEFCE, 2009). However, e-learning and TEL were still being used as interchangeable terms within the Higher Education Academy's 2014 report describing the important potential of technology to provide increasingly flexible approaches to educational provision (HEA, 2014). TEL appears to be experiencing similar controversies re its scope and definitions, leading to problematic misinterpretations within the literature. Kirkwood and Price (2014) express concern about the 'value-based judgement' incorporated within the term TEL and its assumption that technology has an inherent ability to enhance learning and, if so, what are the agreed measures that can be used to determine this? Bayne (2015) emphasised the UK-centric bias of the TEL term: whilst appearing inconsistently in European literature, its use does not prevail globally. Bayne also expresses misgivings about the separation of the 'technological' and the 'human' implied by TEL, suggesting that technology is there merely to enhance existing teaching practices, and therefore advocates the less disquieting term of 'digital education'. An in-depth discussion about evolving terminology is beyond the scope of this paper and the continuing debate may take time to resolve itself fully. The term 'e-learning' will here be applied in its broadest sense and is used synonymously with the terms 'TEL', 'digital education' and their variants.

This paper will take the reader on a novice lecturer's reflective journey through a multi-disciplinary e-learning module, highlighting the benefits of first-hand participation with a range of digital applications, whilst considering the particular complexities of the online environment educators need to prepare themselves for. The discussion will appraise the potential benefits, in terms of deeper forms of learning that may be gained from novel tools and environments (but only when applied thoughtfully), as well as the increased flexibility afforded by mobile and distance learning. This will be balanced by reflections considering the potential challenges and frustrations those working within this milieu may encounter. The importance of evaluating baseline digital literacies of learners and facilitators to determine technological learning needs is stressed. The paper considers: practical experiences, gained from a number of digital learning tools; reflections on the group's ability to form and maintain effective co-operative working relationships in the online environment through

synchronous and asynchronous modalities; the difficulties that can occur when utilising technology for communication; the importance of adopting an adaptive and flexible approach.

“lecturers need to understand what it takes to learn their subject in the context of the environment their learners inhabit...” (Laurillard, 2008, p.522).

Finally, the paper evaluates how the experience of module participation can consequently assist in the successful development of future modules when applied within the constraints of a pre-registration healthcare course. This case study is expected to be of particular interest to teachers seeking a broad introduction to how online and blended learning may be used to develop novel pedagogical approaches aimed at reinforcing student engagement and facilitating attainment of learning outcomes.

Background

It can be challenging for an educator to cover all required learning outcomes (LOs) with limited contact time. I certainly want to employ a greater variety of media to enhance student engagement and understanding of content and was therefore excited about the opportunity afforded by first-hand participation in an e-learning module, especially since it offered the potential for improving module materials and overall course design.

JISC (2014) developed a tool for teachers to examine the seven digital literacies of both themselves and their students. Our group was asked to undertake a Moodle poll to analyse how we felt about our digital literacies at the start of the module. I wouldn't categorise myself as a confident technology user and therefore rated my competencies as mainly average, occasionally poor or good. I would be described by Marc Prensky as a 'digital immigrant'. I was born before the digital revolution in the 1980s, I have not grown up with the internet or mobile technologies and I was a late adopter of Web 2.0 applications. I am not like younger 'digital natives' or the 'net-generation', who expect rapid access to information through immediate 'twitch' responses, communicate through instant-messaging, prefer graphics to text, are multitaskers and expect non-linear learning combined with social and technical interactivity (Prensky, 2001). At school, my teacher was my main source of information and learning was heavily dependent on remembering and reproducing content; although suited to the context of that era, such a way of learning is clearly less suited to the new, rapidly-evolving digital age. However, the generational digital-divide may not be quite so clear cut. It appears the net-generation are not consistent in their use and understanding of technology (Jones *et al*, 2010). Cultural background, academic discipline and gender may all be more influential than age (Margaryan *et al*, 2011) and, what differences are seen reflect rather the use of specific social-media tools than increased digital literacy per se (Valtonen *et al*, 2010). Therefore, the digital landscape is highly complex and it is likely that we are all at different points on the various literacy scales. The important implication is that students and teachers should work together to improve each other's areas of weakness.

Evaluation of Learning Experience

During the module, I developed skills in two clearly-linked main areas: task-orientated creation of products; the building of social relationships.

I took part in a group cooperative learning task, in which individuals, having divided the work between them, interacted together to accomplish a specific end-product or goal (normally set by the teacher). Such an approach is distinct from collaboration as a philosophy, which puts the emphasis on students' working through and integrating ideas together for a common goal; this latter method is more student-led and affected by group dynamics (Panitz, 1999). Our activity made use of the philosophy of paralogy (peer-learning) which is used in many e-learning courses and sees teachers and students as co-creators of learning, reducing the traditional teacher power-base (Corneli and Danoff, 2011). We were asked to build a Moodle database by choosing one or more technology learning tools to review; I chose the presentation tools Prezi and PowToon. As an exercise, it was very useful, certainly providing me with the opportunity to experiment with both tools to discover exactly how they worked and what their benefits and limitations were, as well as to think about possible contexts for their use. By uploading presentations to personal YouTube channels, the class could view and discuss each other's work – very motivating for all of us. It soon became clear how quickly such a resource might be built up, with students and staff learning together and sharing the workload. As we could choose tools that were most relevant to our practice, the activity supported an andragogical learning approach that was experiential and inclusive of individual interests (Jarvis, 1995). I personally gained insights into tools I might not otherwise have considered.

Two brainstorming cooperative learning tools I gained experience with were Mindmeister and Padlet, both employing a highly-visual communication style. I found Padlet extremely straightforward, with a user-friendly interface for displaying ideas and resources in the form of post-it type notes. Able to provide links to other web-media, we discovered our differences and similarities when it came to e-learning and we considered what makes e-learning effective. This activity was helpful, early on, for group cohesion. I realised that a number of class-based brainstorming exercises I undertake with students would be more engaging using Padlet, as it allows learners additional time to research and gather articles, pictures, videos, and links, all of which can then be shared to encourage deeper learning. The mind-mapping tool Mindmeister likewise enabled us to create content together, this time to examine the meaning of e-learning. The nature of mind-maps allows the formation of structured links between different ideas, a process which enhances critical-thinking skills; it helped me to appreciate the potential scope of e-learning as a topic. Mind-mapping has been shown to enhance cognitive ability, with studies suggesting that its use may improve exam performance (Rosciano, 2015). I enjoyed, and still do enjoy, the mind-map concept, but I found it took me longer to use this tool correctly. My first efforts were clumsy and I was frustrated by the time taken to make additions to the map. During a later face-to-face session, we continued to work on the mind-map as a group: we were quickly able to pool resources and help each other gain competence with this tool, to the benefit of everyone's learning. Those who had not previously managed to use Mindmeister were then assisted in contributing map links, so that everyone could express her/his ideas. Any e-learning tool must therefore be carefully selected in terms of its usability. Educators must weigh up the time taken to learn how to use the tool for a particular student group against the learning gained. If this tool were to be taught at the beginning of a course that then included lots of brainstorming, then the time taken could be justified; it might not, however, be appropriate for one-off use, in which case, another mind-mapping or cooperative tool might be a viable alternative. Both tools support the principles of constructivist educational theory which promotes an active student-centred approach to learning, gained through the

accommodation and assimilation of new experiences into schemata of knowledge. In this theory, the student is responsible for her/his own learning, but social interaction is necessary for establishing meaning from the information gained (Keengwe *et al*, 2014).

Padlet and Mindmeister are examples of Web 2.0 applications. Whereas Web 1.0 (read-web) technology represents one-way communication comprising static web-pages that simply provide information, Web 2.0 (read-write-web) are interactive technologies allowing users to modify content and to create and share information (Shemberger and Wright, 2014). They encourage the course of learning to become self-determined (i.e. student-centric rather than teacher-centric), a process termed 'heutagogy' (Cochrane *et al*, 2012). To be exposed suddenly to seemingly endless sources of web-based material can nevertheless be intimidating, although it is suggested that the process of being immersed in creative and collaborative e-learning technologies can actually cause re-wiring of the brain and change the way we learn (Pritchard, 2014). During the course, I was introduced to Storify, an online curation tool that brings together content from across the web to create a narrative around a given topic. It requires students to search out, critically analyse and evaluate many sources of information, before linking the sources into a cohesive story. This communication tool can then be used to inform and engage others. Storify and other networking tools use constructivist principles, but also go further in that the learning is not just constructed by the student, but is also conceived by networks of individuals in many different formats and locations and is therefore shared. This has resulted in the development of a learning theory for the digital age called 'connectivism' (Bassett, 2015). Taken to its extreme, acquisition of knowledge is comparable to a rhizomatic plant with a multitude of nodes, each capable of spreading out on its own independently, resulting in nomadic, unstructured learning. Although equally exciting and terrifying as a concept, in reality a purely rhizomatic approach may not be appropriate for all courses (Bali and Honeychurch, 2014) and educators must realise when lack of structure and scaffolding could become a barrier to learning.

I was initially apprehensive about the prospect of interactive social online learning as I thought it would be the antithesis of my personality type. However, I felt that exposure to this environment was necessary for my personal development and essential for my understanding of how social learning may be facilitated. There is evidence from the literature that certain e-learning environments have the potential to make students feel isolated and lonely in the absence of the face-to-face contact characteristic of traditional courses (Zembylas *et al*, 2008) and are consequently detrimental to both their motivation and learning, since the need for security and belongingness is usually a prerequisite of higher levels of performance (Maslow, 1987). To prevent this, facilitators should foster the growth of online student support networks, socialisation and a shared sense of purpose.

Many of our group already knew each other and our first face-to-face session made introductions easier and also allowed us to welcome new members. Regular online discussion forums then enabled us to become better acquainted and, unexpectedly, I quickly discovered much more about my peers than I had known through our previous face-to-face communications. We were forming a 'learning community' or 'community of practice' (CoP), defined as a group of people with a shared area of interest (in our case education and e-learning) who form a network to participate in collective learning, by building relationships and exchanging knowledge to create a shared repository of resources (Wenger, 2006). To establish this community, we needed to know the diversity of expertise and experience within the group - the introductions forum helped us here. I was able to identify those with

common interests and there was clearly the possibility of taking projects forward with the group. For social constructivist learning, we needed to be willing to exchange information and resources for the mutual benefit of the group and thus had to establish trust and develop a sense of 'group spirit', which grew between us over time. It was clear that friendships were being developed and, as a result, the sharing of learning increased, as expected in CoPs (Chang, 2012).

However, there were also times when some group members did not fully participate in the forums, or questions we asked of each other were not answered. It is important not to take lack of responses personally. There are numerous reasons for lack of participation in online CoPs, including unwillingness to share information to gain a competitive edge, concerns about intellectual property rights, lack of trust about how others might use the information, not finding the time and/or lack of commitment to post. Researchers have also demonstrated that non-participation is not always accounted for by student self-interest or attempts to hoard information and may be down to lack of confidence within the online community, or different cultural norms. Sometimes participants may not understand a task or think they have a worthwhile contribution to make; they may fear stating incorrect information which will then be open to public scrutiny and possible ridicule (Ardichvili *et al*, 2003; Ardichvili *et al*, 2006). Tseng and Yeh (2013), although stressing the importance of peer support and trust also warn against excessive 'blind trust' amongst group members which could lead to 'groupthink' where members tend to agree with each other and self-censor their opinions, rather than rock the boat.

The medium of communication can also affect participation. I wrongly assumed that, as an introvert, I would also find online socialisation difficult. In fact, I found the opposite and discovered I was more comfortable posting online than speaking in class. Studies undertaken by McKenna and colleagues (2002), propose that those with social anxieties may actually find the online environment a more secure milieu in which to express themselves, owing to the greater anonymity and lack of gating procedures this environment affords. McKenna *et al* (2002) define 'gating features' as visual or verbal barriers to relationship formation encountered in face-to-face settings. It is proposed that shy students will be more self-conscious about their physical or verbal characteristics (such as how they look or if they stutter) in the immediate presence of others than when they are within the safe environment of text-based e-communication. This theory is supported by the work of Joinson (2001), who studied online interactions between individuals both with and without the use of web-cams, as well as in traditional face-to-face exchanges. He discovered reduced levels of personal disclosure in encounters where individuals were required to interact either face-to-face or with the use of web-cams, when compared to purely text-based computer-mediated communication (CMC). The inhibition of personal disclosure caused by the presence of web-cams was later independently demonstrated by Brunet and Schmidt (2007). Teachers should be aware, however, that enhancement of student communication by computer-mediated anonymity has not been universally demonstrated in all contexts. Saunders and Chester (2008) pointed to a body of dissenting literature suggesting that online environments may actually reduce social communication skills by encouraging isolation and propose that further research is needed. Consequently, online environments may not suit all students equally. Teachers therefore need to consider carefully their use of online learning activities, as the results may be influenced by such factors as age, gender, culture, attributes of personality (such as degree of shyness), as well as the overall length of time spent online.

I experienced increased social presence online, defined as the feeling that you are 'actually there' and are able to project your personality into the environment. As a teacher, by increasing student e-interactivity and avenues for communication, I can enhance social presence and decrease student loneliness (Vakoufari *et al*, 2014). Social-media tools can increase such online presence. The group participated in Skype and Canvas tutorials, exploring how these may be integrated into courses. I enjoyed the synchronous nature of these tools, as they prevented the previous frustrations I had experienced when not receiving responses from the discussion forums; however, I discovered that they could be prone to problems of their own, as some members of the group were unable to connect. Facilitators of online tutorials should therefore consider providing computer lab practice, to develop familiarity with the technology, and have a back-up strategy for disseminating tutorial information to those unable to connect. I had some personal concerns about being videoed, but it is true that the ability of students and teachers all to see each other can help with the human-element of personalising e-learning. In the same way as responding to posts, advertising your availability (e.g. sharing Skype addresses), using profile pictures/avatars and applying emoticons to represent feelings can also increase perceptions of connectedness (Jeremic *et al*, 2012). Synchronous and asynchronous forums should be seen as complementary rather than competing modes of communication. Asynchronous forums are believed to promote deeper, more reflective products, as students have longer to consider their responses and tend to write in more formal prose. Synchronous forums, although usually more informal, are useful for the exchange of rapidly-evolving ideas (e.g. debates) and are also more suited to increasing social presence and therefore filling the social void in the absence of face-to-face interaction (Oztok *et al*, 2013). I came to appreciate that socialisation plays an important role in allowing relationships to form and provides a foundation for learning. Pan *et al* (2015) stress the importance of online friendship formation, as friends are more likely to share knowledge in CoPs than strangers; therefore, by providing social-networking platforms, teachers can increase knowledge exchange. Conversely, other studies have demonstrated that too much time spent on social activities (gossiping/telling jokes) can be detrimental to performance during group work, as it may distract students from the task (Janssen *et al*, 2012). A balance is obviously required.

Application of learning to future teaching practice

Taking course-design from a macro to micro perspective, I think it important to realise that course design must follow an underlying pedagogy. As the fundamentals of learning remain the same (whether classroom- or e-learning-based) I shall draw on all three traditional learning perspectives: associationist (application of repetitive tasks for the building of skilled behaviours), cognitive/constructive (for building knowledge and understanding by incorporating new ideas into a framework of what students already know, either via interaction with learning objects and theoretical content or through social-interaction) and finally situative, by providing relevant activities they can apply to their practice with support from their CoP. Any e-learning applications used should be there purely to support LOs and not be included just for the sake of incorporating fashionable new technologies (Beetham and Sharpe, 2013). Constructive alignment ensures that all LOs, activities and assessment tasks are linked together at the correct academic level (Biggs and Tang, 2011). One challenge presented by new e-learning tools is understanding how they can be applied to achieve LOs at the correct level in each of the domains. Fortunately, some authors have produced supportive media to guide educationalists. Churches (2009) has created a revised

digital taxonomy for Bloom that provides examples of how a range of digital tools and social media can develop students from lower- to higher-order thinking.

My future modules would most logically employ a blended-learning approach. I have learnt, however, that blended learning, if applied clumsily, will only confuse students and make courses feel disjointed. Blended learning should not consist of e-homework and online tests, but should feel seamless as an integrated approach best exemplified by the 'flipped classroom', which allows knowledge content to be delivered online (e.g. the advanced organiser) freeing up classroom time for group work such as discussion, debates and practical activities (Hubbard, 2013).

To run successful e-learning, I should integrate three levels of interactivity (Moore, 2015): learner-instructor, where the e-moderator's online presence supports and provides timely and thoughtful feedback; learner-learner, supported by synchronous and asynchronous communication tools and learner-content, where interactions between learners and content are scaffolded with well-designed activities. My role as e-moderator at each stage of a module would change, depending on the degree of student experience and autonomy. Salmon's (no date) five-stage model is an excellent example of this role: from stage 1, where students learn how to log on and navigate the VLE and where ground rules are established, to the building of social relationships, to the gaining of confidence in sharing knowledge and the taking part in online activities together, to stage 5, which involves looking back on the learning achieved.

However, for those seeking to integrate increasing proportions of e-learning into their curricula, I am aware that there are significant challenges, which should not be underestimated.

In their 2014 publication 'flexible pedagogies', the Higher Education Academy highlighted the educational benefits of utilising technologies to offer students 'flexible learning pathways'. These pathways grant students access to a variety of level-appropriate learning materials and content, depending on their capability and unique learning needs. This 'learning utopia' produces 'personalised learning environments' which are tailored to the learning styles, interests, preferences and aptitudes of individual students. Such an educational model recognises that learning outcomes may need to be differentiated for different students and, in the true spirit of andragogy, could be determined by the students themselves. This also assumes that course structures could be moulded to accommodate the increased flexibility required, including the academic teaching and assessment timetables. Clearly, even when desired, this approach may not always be practicable (HEA, 2014). The undergraduate health care modules I am currently engaged with impose a number of constraints on content and delivery, largely owing to specific curricular requirements demanded by professional registration. This can reduce the ability of teachers to innovate and promote truly flexible and individualised e-learning. Such restrictions are not conducive to separate learning pathways and individualised assessments. Additionally, health care students are expected to attend university for a number of face-to-face sessions to practise a range of 'patient safe skills', in simulated environments with equipment and mannequins. This allows tutors and peers to provide direct supervision and instant feedback. Traditional 'hands-on' practical training remains a vital component of health care education and students recognise its worth in allowing them to gain the necessary communication, kinaesthetic and situational awareness skills fundamental to their roles in working with

patients. Not surprisingly, therefore, these sessions have been demonstrated to boost both student confidence and competence (Cant and Cooper, 2010; Cook *et al*, 2011; Motola *et al*, 2013). However, such constraints do not prevent the use of technology to support practical skills training, as is evidenced by the increasingly popular use of videos, gaming and virtual reality computer simulations such as second-life® (Rogers, 2011). The challenge for teachers is to decide which course elements should remain face-to-face and which aspects would be more successfully achieved online, ultimately allowing all elements to be seamlessly blended together into a logical and coherent course design.

Institutional support for e-learning and a continuous commitment to providing the necessary infrastructure and staff training is a recipe for the development of quality courses. Specifically-designed learning platforms termed Learning Management Systems (LMS) or Virtual Learning Environments (VLE) are now a common feature of most UK educational institutions. These systems have been embraced for the many advantages they offer in standardising the e-learning interface for all students and staff within an organisation. My university employs Moodle as its LMS. Moodle functions as a 'one-stop shop' for uploading and downloading online content. Moodle provides students with easy access to a range of resources, such as files, videos, and Moodle-incorporated learning tools that include quizzes, databases, polls, wikis, forums and workshops. External tools may also be assimilated into Moodle sites and links to libraries and student support services are provided. Moodle accommodates the central collation of e-records and e-submissions via portals, which improve the efficiency of course administration. A good LMS should be fully accessible through standard browsers and compatible with the software the majority of students and teachers have access to. Providing accessibility is extremely important and the functionality of any LMS needs to be regularly assessed and updated. Careful selection of the LMS to be used is important to ensure its capabilities meet the needs of students and staff equally. Standardisation of a learning platform has many advantages, as it makes navigation easier. Staff and students do not constantly have to learn new page 'set-ups' and tools. However, any LMS inherently assumes a locus of control when compared to Web 2.0 learning environments and it could be argued that control in an LMS tends to be skewed towards the teacher and institution rather than the learner and therefore moves away from the learner-centric model. Tomberg *et al*, (2013) discuss the pedagogical principles which can be undermined by close-controlled learning environments, but goes on to say that Moodle, with its open-sourced architecture and various adaptive 'plug-ins', is far more flexible than older LMS designs in this respect. Moodle may also be able to help improve learning outcomes through the use of learning analytics, whereby tutors may monitor student progress by analysing data on how many times and for how long students access various pages on the LMS, which activities they take part in and which they complete, viz. the students' 'digital footprint'. It is a particularly useful tool for identifying struggling students and its use, it is believed, can assist with student retention (Sclater *et al*, 2016).

One of the greatest challenges when running online learning is student acceptance of this learning modality, presenting a notable difficulty with students who have previously been exposed to largely teacher-led methods. I have discovered the importance of spending some initial time on orientating students to the Moodle environment, checking access and providing extra support for those unaccustomed to this platform. Students require an understanding that control over their learning has shifted from teachers to themselves. Students who proactively engage with available resources are less likely to feel alienated

and lost in the online domain. Participation in online activities can be made compulsory for course progression, in order to encourage student engagement. Evidence suggests, however, that, despite significant pedagogical benefits offered by the flipped classroom model, it may not work for all students in all circumstances, with a proportion continually resisting participation (Berret, 2012). One factor in online engagement is the perceived ease of use of the LMS by students and the relevance of its content to their educational goals. To students, teachers represent the first line of support in responding to and resolving their concerns (Sánchez and Hueros, 2010). Another significant factor, as discussed previously, is the retention of the human component within the online environment, so ensuring that students have access to tutors and peers to reduce possible feelings of isolation (Martin-Rodriguez *et al*, 2015). Teachers therefore require training and support from their departments and institutions when implementing flipped-classroom approaches (Yarbro *et al*, 2014).

Ironically, in our efforts to provide a wide range of multimedia resources for students with different learning styles and assist with flexible learning, we can run the risk of overwhelming them with too much information, resulting in 'cognitive overload' (Lau *et al*, 2014). Students may feel the workload involved in an e-learning course is higher, so teachers must implement reasonable timescales for the completion of online activities. Packham *et al*, (2004) has previously cited coursework overload as one reason for student withdrawal from e-learning programmes.

Successful e-learning also requires teacher engagement and there are some reasons for staff failure to engage fully with e-learning, including technophobia and reduction in the time spent directly interacting with students in a classroom setting, which can reduce their feelings of personal fulfilment as teachers (Childs *et al*, 2005). An increase in workload and resource requirements that can be introduced by e-learning and blended approaches is another consideration (Panda and Mishra, 2007). The time allocated to students for researching their own material and collaborating can take up a significant proportion of a module, when such knowledge could be imparted more efficiently with classroom teaching. Unlike large group lectures, the flipped classroom model also tends to involve collaborative group work within smaller student-led discussion seminars, thus necessitating an increase in staffing and additional room bookings. Monitoring and responding to online student discussion forums can also be resource-heavy. As a teacher, I need to consider what my courses are attempting to achieve. Do I advocate rote learning of large volumes of detailed material, much of which will probably be forgotten soon after the assessment processes have been completed, or a method by which students will understand a smaller amount of material at a deeper level, which they can build on using constructivist approaches? For the latter, I must provide students with opportunities to explore and debate. As a facilitator, my role is to guide and ask questions, whilst allowing students to learn from their own mistakes and discover the answers for themselves. This goal is a substantial challenge when concurrently targeting the achievement of a large volume of specific learning outcomes. Clearly my aim must be to find the balance between these two opposing forces.

I shall need to develop strategies to manage workload and reduce the time spent on creating new learning materials. Although e-learning resources can take longer to produce initially, they can also be time-saving in the long run if created intelligently and future-proofed so that they require only minimal updating later. In addition, Moodle has incorporated a means by which resources created by teachers across different modules can be assessed freely,

therefore saving time and preventing repetition of work. Similarly, student research generates content that can be utilised and shared. Having developed in me and my fellow participants a range of digital skills, this module has shown very clearly how rewarding and enjoyable e-learning can be and it has sparked my interest to learn more.

Conclusion

Good e-learning courses should challenge any previous negative assumptions about learning in the online environment. E-learning is capable of enhancing the achievement of student LOs if intelligently utilised at the right time and in the right context. Learners bring a spectrum of digital literacy levels with them and high-quality courses should combine knowledge and skills acquisition with online socialisation and collaboration.

Health care is rapidly incorporating such new technologies as e-records, telemedicine, social networks of patients and health professionals (Gretton and Honeyman, 2016). Educators cannot afford to ignore this. Button *et al* (2014) emphasise the need to incorporate digital literacy into pre-registration curricula to support life-long learning. Teachers, too, require support from managers to improve their own digital literacies, perhaps by undertaking courses such as that which has been described here. Otherwise, there is a real risk that educators will become under-skilled and be seen by new generations of learners as using increasingly irrelevant teaching methods, thus producing graduates who fail to meet employers' requirements. Educators need to stay innovative and open-minded about how best to capitalise on e-learning technologies: failure to do so will result in an incalculable disservice to the students they teach and jeopardise future standards of patient care.

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