Review

“E-learning” as a platform for the future of education in dentistry

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S Bhola
Dental Core Trainee, Princess Alexandra Hospital, Hamstel Road, Harlow, CM20 1QX
Author’s Email: surina.bhola@hotmail.com

The use of “e-learning” has greatly expanded in the last decade, with the increase in use of smartphones, the internet, and online forums and websites available to enhance learning. This article highlights the use of these technologies in higher education, healthcare, but more specifically, in the dental profession. To gather this information, a literature review was conducted, using the online databases EMBASE, MEDLINE and PubMed, as well as a search into Google Scholar. This article explores the types of learners, and learning styles, to assess whether “e-learning” caters to these learning styles. It also discusses the future of learning. The results of the literature search for this article show that e-learning is a varied and flexible source of education, in that it can adopt to all styles of learners, activists, theorists, reflectors, and pragmatists. This pays a large and ever increasing role to the future of education, especially in Dentistry.

Key words: E-learning, Dentistry, learning theories

INTRODUCTION

In the 21st century, there is a widespread and ever increasing use of multimedia and technology, as much of the population have access to the internet, social media platforms, and mobile devices. These are starting to be incorporated into learning curriculums, which makes this article very relevant for present, and future research. This article aims to define “e-learning”, and categorise what forms it can present in. It also uses relevant and recent literature to expand upon these topics, and relate them to the current learning patterns in healthcare and Dentistry. The different theories of learning are then addressed, relating the postulated styles back to “e-learning” educational methods.

METHODOLOGY

Data for this article was gathered using online resources, with a combination of EMBASE, PubMed, MEDLINE, and Google Scholar searches. Key words entered during the search included “multimedia”, “e-learning”, and “dentistry”. Specific aspects of focus of the literature review included the use of Smartphones and social media particularly. 36 publications were identified and reviewed, which were a heterogeneous mixture of different types of “e-learning”, not only in Dentistry, but healthcare as a whole.

Background

What is E-learning?

The term “e-learning”, can include many different forms of multimedia for the purposes of education. This can include via mobile devices or “smartphones”, the use of the computers, as well as the use of the internet and social media. Another synonymous definition, which can also be used to explain “e-learning” could also be described as technology-enhanced learning (TEL), which is defined as “the application of information and communication technologies to enhance teaching and learning”. The use of “e-learning” encompasses all these online and interactive facilities. “E-learning” has greatly expanded in the last decade, with the increase in the use of the internet, social media, as well as smartphones. With the natural evolution of the human race, these technologies have now become commonplace to the public, and provide a more convenient
and flexible way to gain information, as most can access these technologies at the click of a button.

“E-learning” can come in many forms:

1. As “social media”, where individuals can openly discuss online cases, and interact with members of similar professional streams. Social media also allows advertisement of business, and social networking with colleagues.

2. As “asynchronous”, in the form of modules or online tasks, that students can access in their own time, for example, for distance learning courses.

In this article, the author will mainly focus on “e-learning” in healthcare, and specifically the dental profession.

Social Media

The attitude of the general public towards social media has changed over the last decade, with an increase in the use of Social Media is the last 5 years (Lenhart et al., 2010) with sites such as Instagram®, Twitter®, YouTube®, and LinkedIn® having millions of users. Being in the 21st century, most dental practices have internet access, and most health professionals have smartphones, so these technologies are widely accessible to physicians.

Social media has been seen to be more engaging and collaborative in learning than traditional methods, and it has been suggested that it can be useful to not only train undergraduates, but also enhance learning in qualified clinicians (Cheston et al., 2013).

Oakley has discussed surveys amongst health care professionals which have shown that 94% of clinicians use smartphones to manage their personal and business workflow (Oakley and Spallek, 2012). Although a survey can be very much subjective and based on opinion, this evidence supports that as there is already widespread use of these technologies, therefore there is a wide scope for learning.

Asynchronous learning

“E-learning” can also be described as asynchronous, i.e. it can be accessed in the users own time rather than to a schedule. For example, distance learning and forums, where students can view resources at any time. This is very similar to social media, as is flexible learning with online discussion. However, asynchronous online learning seems to have more structure, e.g. modules and tasks. Moreover, it has been proven to be effective in higher education (Green et al., 2014)(Green and Hughes, 2013), and may allow reflection (Kerawalla et al., 2008). E-learning may be a form of education where sources of information are more evidence based, and this is something that educators may wish to take into account, as having a set structure allows more time to explore the validity of sources. This is different to social media, where contributors may be relaying information based on personal experience.

Asynchronous e-learning provides a palatable solution to learners who are limited by work schedules or by duty hours and can encompass learners with varied needs, clinical knowledge, and learning style.

It has been shown that asynchronous online discussion provides a palatable amount of information for learners who may be limited by location or work schedules, as well as catering to different types of learning styles and levels of knowledge. In paediatric medicine, it was proven to improve knowledge independent of clinical teaching (Hou et al., 2008).

Uses of “E-learning”

Higher Education

Social media has been shown to be used in higher education on a larger scale than previous years (Selwyn 2012), but no longer as a one-way system, but one which allows multiple users to interact with each other. Selwyn proposed that social media has been seen to be increasingly useful amongst students entering university, for adaptation to university life, interacting with peers and with faculty (Selwyn, 2012) (Yu et al., 2010). Relating this to healthcare education, studies have shown that around half of the academic staff in the UK use some form of social media occasionally for work, however, it is more as readers rather than creators (Finch et al., 2013). Many universities have profiles and groups on social media websites, such as Twitter and Facebook, where students can interact with each other, share resources, in one study, 53.79% of colleges/universities had an official Facebook page (Reuben 2008)(Hall et al., 2013).

In addition, Twitter has been shown to have a positive effect on college student grades and interaction (Junco, 2011), as well as YouTube videos being useful for teaching for faculty staff (Moran et al., 2011). Although all this evidence has been gathered through surveys and questionnaires, which can be subjective and biased, it still conveys the widespread use of social media, especially at the undergraduate level. Nevertheless, even at Postgraduate level, a study by Pearson showed that over 90% of faculty used some form of social media in either their own education or teaching, and 70% of faculty agreed that “video, podcasts, blogs, and wikis are valuable tools for teaching” (Moran et al., 2011).

Dentistry

The main focus however, in this article, is the use of “e-learning” in Dentistry specifically. “E-learning” is useful, not only to undergraduates, but also to fully qualified experienced clinicians in their continuing professional development. Dental educators have started to use social media to educate students. For example, many dental treatments, and “before and after” cases have now been published on educators Facebook pages. This may not only serve to education experienced clinicians, but to also serve as inspiration and motivation for younger dentists. These cases also allow open discussion, where clinicians may ask.
questions to further educate themselves in their own learning journeys. However, more research is needed to try to incorporate this into traditional learning (McAndrew and Johnston 2012).

The use of social media is widely used in primary care (Henry et al., 2012) conducted a study of dental practices in 2012 that reported that 51% of practices used social media, 91% for marketing, and 73% to increase online presence (Henry and Molnar 2012). This shows that there is value in social media in a dental setting. Podcasts, a form of social media defined by the General Dental Council (GDC), the regulator for dental professionals in the United Kingdom, have also been seen to be useful in prosthetic dentistry for undergraduates, and can be listened to students from their mobile phones or computers (Hanna et al., 2011); (General Dental Council, 2016). In this particular study, Facebook and YouTube proved to be the most popular amongst students.

Evidence also suggests that mobile “apps” (a software developed specifically for use on smartphones and tablets) have been useful to access textbooks, and regular updates from organisations and royal colleges (Nwosu and Mason 2012). This helps to keep students, and well experienced clinicians up to date with their education, as well as having readily available sources of information for access. Smartphones, such as the “iOS” or “Android” systems, have been shown in maxillofacial surgery, to improve efficiency for diagnosis, triage, and patient care, as they are not limited by a computer (Dhuvad et al., 2015). One particular statistic showed that 94% of British maxillofacial trainees owned a smartphone, 89% of whom had downloaded medical apps, and used them regularly for their continued professional development (Carey et al., 2015).

Using the other form of “e-learning”, which is more structured, many online modules are available to clinicians, linked with either university modules, or private companies that offer continued professional development. These online modules provide short attainable targets, providing education in the form of videos and audio files, as well as interactive quizzes. These allow dentists of all experiences to continue to thrive, especially if the specific learner prefers a more structured learning approach (see later).

**What are the advantages of “E-learning” over traditional approaches?**

Traditional educational approaches, such as lectures, have significant disadvantages compared to e-learning. “E-learning” is quicker and easier to access from multiple locations. It allows fast interaction between users, and does not require traditional lecture space. It allows the user to alter and access audio and visual files, and as is not paper based, is more economical. In addition, regular updates can be made, without the need to organise a large group of individuals.

**How can “e-learning” be related to learning styles?**

There are many learning theories in the literature (see below), and research has postulated that in the human population, not all of us learn in the same way.

Moreover, the most popular learning theory has been coined by Honey and Mumford, 1992, using Kolb’s theory (1984) that identified 4 types of learners:

1. Activists
   a. Enjoy new experiences
   b. Make decisions intuitively
   c. Don’t like structured learning

2. Theorists
   a. Think logically and systematically
   b. Learn with structure and planning, rather than intuition

3. Pragmatists
   a. Prefer group work, debates
   b. Like to risk take
   c. Dislike reflection and deep thinking

4. Reflectors
   a. Like to observe and describe
   b. Prefer to reflect and understand meaning

This has demonstrated that what learning style is effective for one cohort, may be disadvantageous to another. This may require amendment of learning and educational strategies for each student.

**Discussion**

When discussing education, the different types of learners have to be considered to increase the effectiveness of information processing. It has been well versed in the literature by Honey and Mumford that everyone has a different style of learning, which is also dependent upon many factors, such as age, and previous learning experience. However, e-learning has the scope to cater for all types of learners, who can learn independently from clinical teaching. This is a good protective environment for undergraduates.

The Social Learning Theory (SLT), is another recent theory, which has proposed that learning is most effective when participants can engage with each other, and learn in groups, compared to traditional lectures (McLeod, 2011), which is something which has become popular with the increase in social media. Nevertheless, “e-learning” allows learners the freedom to experiment with multiple styles of learning, which is something more traditional forms may be limited in (Cuaresma, 2008).

Using Honey and Mumford’s learning theories:

1. **Activists – Social Media** offers a more relaxed type of learning, with the user having the flexibility to engage in their own time, and as they wish, for example, through online forums and blog posts.

2. **Theorists – Online learning modules** offer a more structured alternative, with end of module targets, for those who prefer planned education.

3. **Pragmatists – Online forums** allow debate and group engagement.
Reflectors – All types of “e-learning” allow reflection and meaning, as this can be done in the users own time. Relating this to the original objectives, this article has shown that “e-learning” is widely used in the 21st century by dentists, and has a significant advantage over traditional approaches. It also shows that “e-learning” encompasses online interactive forums, audio-visual files, as well as access to lecture and course material. The literature review conducted has shown that there is a widespread use of “e-learning” in the 21st century, and that this may possibly replace or heavily substitute traditional approaches. Nevertheless, “e-learning” strategies have the ability to mould to the learner’s individual style, and this is something which traditional forms may lack.

Conclusion

This review has demonstrated that technology enhanced learning is an ever increasing and valuable tool in enhancing education in healthcare. Social media particularly can come in many different forms, and depending upon the learning style of the individual user, it can be customised to fit the needs of the particular student in question. It allows flexible and structured learning, opportunities to challenge peers in discussion, as well as the freedom to reflect.

Future updates

Further research is required to assess if there is a particular online framework which could be applied to learning in Dentistry. This could combine both traditional and more modern forms of learning, to deliver the best possible educational system. There may also be scope to expand this to having differing platforms, dependent upon the type of learner accessing the material. At the same time however, these platforms would be built upon evidence based education. This provides the most valuable online experience, moving “e-learning” forward into the new age.

Conflict of interests

The author declare that they there is no conflict of interests.

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