Introduction:

Continuing professional development (CPD) is essential for the maintenance and improvement of knowledge and skills of healthcare professionals. GP registrars are required to evidence this in their e-portfolio and likewise GPs are mandated to accrue and evidence a minimum of 50 hours CPD for their annual appraisal. Development of educational material for CPD can be delivered in many ways with an increasing movement towards online learning. Technology enhanced learning (TEL) encompasses online learning and is ever changing. This article will discuss a type of TEL known as Massive Open Online Courses (MOOCs) and the role of MOOCs in delivering CPD.

Continuing Professional Development:

Continuing professional development in healthcare encompasses training of individuals and teams to maintain a standard of safe and effective patient centred care. Skills and training needs delivered by CPD may be driven by the individual learner, at a local departmental level or at an institutional or government level. CPD is fundamental to working as a healthcare professional, with workforce needs changing and the face of healthcare and patient complexity changing, CPD must adapt to reflect this and deliver effective training for clinicians (GMC, 2012). To meet these demands CPD is often delivered in a way to be cost effective and accessible to the masses and increasingly in an online setting.

Effectiveness of CPD:

The effectiveness of CPD is ideally seen in the clinical setting; whereby that which is learnt on training courses is taken into practice to improve patient care. However, the effectiveness of CPD is often measured in an outcome setting limited to the training session itself, with feedback forms or multiple-choice questions to assess learning. To combat this reflective practice is encouraged with many CPD courses and as part of CPD as a whole (Schön, 1983).

Massive open online courses:

A MOOC is a relatively new and novel mode of TEL, the first being produced in 2008 at University of Manitoba (Liyanagunawardena and Williams, 2014). They are often produced by a University institute in conjunction with a commercial platform. Initially, most MOOCs were produced in North America but in 2013, the UK's first MOOC platform Futurelearn (https://www.futurelearn.com/) was launched (Liyanagunawardena and Williams, 2014, Pickering and Swinnerton, 2017). Unlike other methods of learning with a higher education institution, a MOOC is open access and free to sign up (although some incur a cost for certification). Most MOOCs run between 2-20 weeks with an average length of 6.7 weeks. Learner input required is about 4.2 hours a week on average (Liyanagunawardena and Williams, 2014). The content of a MOOC is often mixed to embrace variety, with video lectures, quizzes and discussion boards, and most MOOCs provide opportunities for social learning and links to further learning resources (Pickering et al., 2017, Zhao et al., 2018, Liyanagunawardena and Williams, 2014, Goldberg and Crocombe, 2017).

Pedagogy of a MOOC:

Pedagogy refers to the theory underpinning education and practice of teaching. There are two pedagogical positions of how a MOOC can be classified, a xMOOC, based on traditional lecture format whereby content is developed by experts and learning outcomes are already set, and a connectivist MOOC (cMOOC), where learning occurs through narratives and peers alone, with learners creating their own learning outcomes (Liyanagunawardena and Williams, 2014). The latter

provides the opportunity for all learning and content to be constructed amongst learners enrolled on the MOOC. However, most MOOCs today are xMOOCs whereby a set of learning objectives and educational content is provided with the opportunity for learners to interact and discuss this material or topic. The uniqueness of a MOOC is their open nature, which means learning is freely available to all those having internet access irrespective of geography. A MOOC can also be used within other pedagogies. For example, a flipped classroom pedagogy involves learners discovering content in their own environment using material such as videos, articles or TEL. Learners then come together in the classroom or a virtual classroom to share the individual knowledge and dissect what content and learning has been discovered, under the guidance of a lecturer or mentor (Hew and Lo, 2018).

Educational Theory

Underpinning this interactive learning experience of a MOOC is educational theory. Bandura described social learning theory in 1977 (Bandura, 1977). This theory suggests that learning takes place through observation, initiation and modelling, and that the environment in which learning takes place is an important influence. This is often the case with learning in healthcare, a MOOC provides an online environment that can influence the learning taking place and thus provide a richer understanding of CPD through sharing of ideas (Veletsianos et al., 2015). Communities of practice were described in 1991 by Lave and Wenger (Lave and Wenger, 1991) and explain why MOOCs maybe successful in CPD delivery. A community of practice is a group of individuals with a shared interest; a MOOC can provide an environment for a virtual community of practice to thrive, which can result in sharing ideas, collaboration and problem solving. For clinicians working in isolation, a virtual learning environment which nurtures social learning and communities of practice such as a MOOC may help provide a richer experience of CPD.

Examples of MOOCs for CPD:

The University of East Anglia (UEA) has worked with the Futurelearn platform to develop MOOCs from an early stage, resulting in the production of several courses in the area of medicine and health. This process has involved collaboration with clinicians, educationalists and learning technologists. Table one illustrates the variety of MOOCs which are available and the various MOOC platforms which host the courses. It is usually through pre-existing contracts between institutes and MOOC platforms that MOOCs are produced, and not something and individual would set about developing in isolation.

Insert table 1

MOOCs and CPD:

Unlike traditional online learning, which is often closed to a group of learners, MOOCs are open for all to learn from. They are launched at a set time but once this time frame (e.g. 3 weeks) is open, learners can log in and learn at their own convenience. Most MOOCs stay open for several weeks after the set term expires to facilitate completion. This provides flexibility for busy healthcare professionals. The design of a MOOC means that learners can comment within a discussion forum which is open to all learners enrolled on that specific course. This usually results in some discussion and sharing of ideas, experiences and learning. Unlike traditional e-learning, a MOOC, through these interactive discussions, has the ability for a learner to feel connected to other learners and those who deliver the training, and thus facilitating social learning. Therefore, they can provide a forum for CPD in an effective way, both for achievement of learning outcomes and reflective practice.

MOOCs for professional development

MOOCs can provide an opportunity to achieve professional learning goals which may be set out in a personal development plan, be part of an expanding job role or development of a special interest or skill. For example, case study one 'clinical supervision with confidence' (Futurelearn, 2014) may help a newly qualified GP gain some of the skills needed to become a clinical supervisor, or a well-established clinical supervisor may wish to update their training. Case study two 'Goal-setting' (Futurelearn, 2019)would provide the training to GPs to deliver a consultation using goal setting and therefore develop that individuals' communication skills.

Insert case studies

MOOCs for personal development

Reflective practice allows a deeper understanding of self, and often forms part of what drives and defines a learning need and can therefore lead to a topic for development in a personal development plan. These can be achieved through continuing professional development. However, much of this can be clinical learning needs or revolve around practicing as a GP. Other tools such as colleague and patient feedback can provide opportunities to reflect on personal development. MOOCs on topics such as 'de-mystifying mindfulness' (https://www.coursera.org/learn/mindfulness) or 'personal and professional success' (https://www.coursera.org/specializations/wharton-success) could help address areas of personal development which may have been identified through multi-source feedback, reflective practice or a mentoring session.

MOOCs as a teaching resource

There is also a role for MOOCs in education. Many GPs will be educators in some way, either through supervision of colleagues, trainers, supervisors or tutoring of medical students. Incorporating resources from MOOCs within teaching sessions can be valuable and help encourage self-directed learning (Gordon, 2014). Because of the variety of educational tools used such as videos, text and activities, they often appeal to a diverse group of learners. Tutors who wish to use a flipped classroom approach (Hew and Lo, 2018) could make use of MOOCs to understand a topic at a learner's own pace. This can then be used for problem-solving, addressing difficulties, and having detailed discussions in a face to face setting. An example of how this might work in practice could be a GP registrar tutorial, where a MOOC could be completed by a trainee or group of trainees in advance, and the face to face tutorial used to discuss and critique what has been taught. A flipped classroom approach has been reported to provide a higher learning gain and greater level of satisfaction for learners (Hew and Lo, 2018).

Conclusions

MOOCs can be developed by clinicians and learning technologists to provide CPD, this is mostly achieved through working with an academic institute and a MOOC platform. A MOOC, when facilitated and designed well, can provide a flexible learning environment for busy healthcare professionals and a social learning experience. The case studies which have been discussed within this article highlight the breadth of topics which can be taught using a MOOC platform and the global reach this methodology of TEL can achieve. If this article has sparked an interest in MOOCs as an alternative way of gaining CPD, take the plunge and join a course, as this is where the learning begins.

Key Points:
- CPD is a fundamental yet evolving practice for healthcare professionals.
- There are various ways to deliver CPD and TEL is likely to be central to this delivery for practical and financial reasons.
- MOOCs are a platform for online learning which allow for interaction between learners and educators enrolled on a named course. They are affiliated with a University and can be an effective method for delivering CPD

MOOCs provide free and open educational resources which can be accessed by those who may not otherwise have access to such learning. They can also facilitate virtual communities of practice developing around a shared interest or goal.

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