Learning Design and Open Education

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ABSTRACT

Learning Design has emerged in the last fifteen years or so as a new methodology to help practitioners make more pedagogically informed design decisions that make appropriate use of digital technologies. In parallel we have seen the rise of the open education movement; first through the emergence of Open Educational Resources (OER) and then through Massive Open Online Courses (MOOCs). OER and MOOCs are challenging existing educational offerings and have specific requirements in terms of their design. This paper will describe the current status of Learning Design research and will then articulate the 7Cs of Learning Design framework (and related Learning Design frameworks) and will consider how this can be used to design OER and MOOCs.

Keywords: learning design, open education, Open Educational Resources (OER), Massive Open Online Courses (MOOCs), Larnaca Declaration on Learning Design, 7Cs of Learning Design

Introduction

The *International Journal of Open Educational Resources* (IJOER) focuses on the following aspects/impact of OER:

- The efficacy of teachers and students perceptions of OER in actual practice
- The cost and/or cost savings of OER
- The outcomes of OER
- The usage of OER
- The associated OER policy and practice implications

This article focuses mainly on the first of these in terms of teachers' and students' perceptions of OER. In particular, it focuses on how OER and MOOCs can be more effectively designed to enhance the learner experience. The article begins by providing an overview of different pedagogical approaches. It then reviews today's Learning Design landscape, drawing in particular on the Larnaca Declaration on Learning Design (Dalziel et al., 2016). It then focuses in on a specific methodology, the 7Cs of Learning Design framework and articulates how this can be used to support and guide the design process. It concludes by considering the specific opportunities and challenges associated with designing and utilizing OER and MOOCs.

Pedagogical Approaches

Mayes and de Freitas (2004) group learning theories into three types: *associative* (learning as an activity through structured tasks), *cognitive* (learning through understanding) and *situative* (learning as social practice). Connectivism can be added as a fourth type of learning theory. Siemens has developed connectivism as an approach that emphasizes the connected and networked nature within which modern learning occurs (Siemens 2005). This includes a learning ecology model that considers the elements involved in the learning process and how they can be facilitated within a networked ecology. It emphasizes the networking affordances of technologies.

The HoTEL (n.d.) project provides a useful visualization of learning theories, mapping these to cognate disciplines, key theorists and the central tenet of each learning theory. The report highlights the tension between academics wanting to use digital technologies effectively and the bewilderment as to the plethora of learning theories available.

Learning theory has been a contested scientific field for most of its history, with conflicting contributions from many scientific disciplines, practice and policy positions. With the continuing and disruptive influence of technology on information, knowledge,

and practice in all sectors of society it is no wonder that innovators, drawn to the interactive potential that computers bring to learning, are challenged by the theoretical basis for their innovations.

Figure 1 shows the visualization. In the center are the cognate disciplines the theory originated from (orange), next is the key theorists (red), then the learning theory (blue/green) and finally a summary of the focus of the learning theory (white). For example, from social anthropology, Lave and Wenger (1991) developed the concept of Communities of Practice (CoP), the central tenet of this focuses around groups of people who share a concern or passion for something they do and learn how to do it better as they interact regularly.
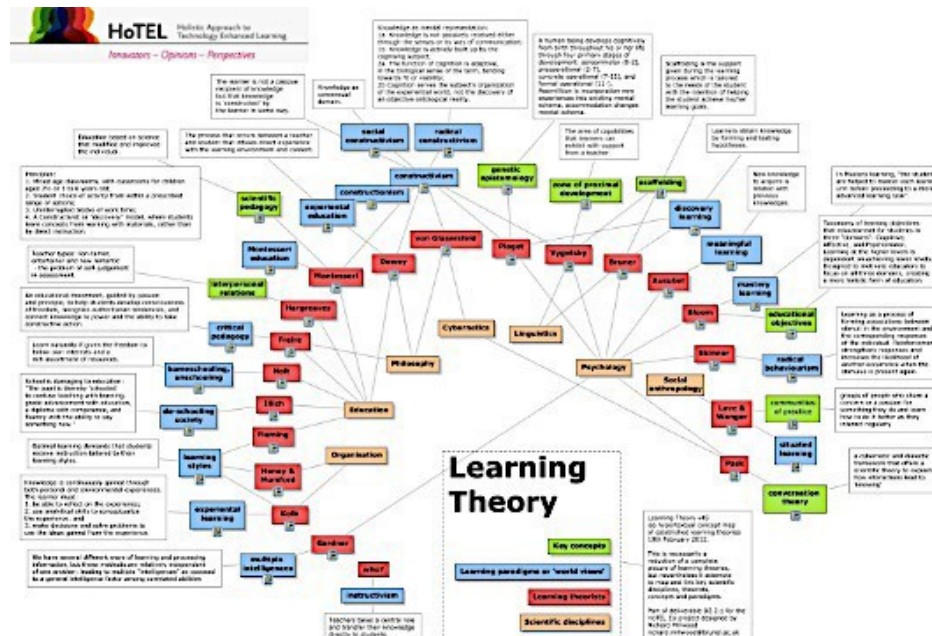

Figure 1. A map of learning theories.

Paniagua and Istance (2018) argue that pedagogy is at the heart of teaching and learning. While there are many different types of pedagogy, they particularly emphasize the importance of play, creativity, collaboration and inquiry. They cite six clusters of innovative pedagogies: blended learning, computational thinking, experiential learning, embodied learning, multi-literacies and discussion-based teaching, and gamification. Examples of blended learning include the flipped classroom, the lab-based model where students rotate between a school lab and the classroom, and in-class blended learning, where students rotate between online and face-to-face instruction. Computational thinking helps develop problem-solving through computer science and consists of logical reasoning, decomposition, algorithms, abstraction and patterns. Experiential learning

takes place through active experience, inquiry and reflection, there are four aspects: concrete experience, reflective observation, abstract conceptualization and active experimentation. Embodied learning connects the physical, artistic, emotional and social Multi-literacies and discussion-based teaching aim to develop cultural distance and critical capacities.

Evidently, there are multitudes of learning theories that can be used to promote different pedagogical approaches, emphasizing different ways to foster communication, collaboration and reflection, as well as the types of blended learning approaches described above. Digital technologies can be used to implement these, however, to harness the affordances of digital technologies and map them to different pedagogical approaches requires new approaches to design. The next section introduces the concept of Learning Design which has emerged in recent years and the subsequent sections describe a number of specific Learning Design frameworks.

The Larnaca Declaration on Learning Design

The [Larnaca Declaration](#) on Learning Design provides an [authoritative](#) and up-to-date overview of Learning Design (Dalziel et al., 2016). It states that at the heart of the Learning Design methodology are three components: guiding the design process, representing/ visualizing the design process and providing mechanisms for practitioners to share and discuss Learning Designs.

Guidance covers the many ways that educators can be assisted to think through their teaching and learning decision-making, in particular, how they can understand and adopt new, effective teaching methods. The guidance prompts the practitioners to think of the design from different perspectives, to articulate the nature of the activities and resources the learners will engage with, and to constructively align learning outcomes to assessment elements, i.e. to ensure constructive alignment (Biggs, 1999). The guidance prompts the practitioner at various stages of the design process and encourages them to critically reflect on their design approach.

Visualization is a very powerful alternative to text. Before today's music notation was developed, tunes had to be passed on orally, with an inevitable loss of fidelity. Now music from hundreds of years ago can not only be perfectly replicated in terms of the notes and tempo, but also even the emotion inherent in the piece. The aim of Learning Design is to develop an equivalent educational design language (Dalziel et al., 2016). In this respect, visualization is very persuasive, as different visualization can represent different nuances of the design. A number of visualizations have been developed. One of the earliest was the AUTC flow of activities representation, consisting of resources, tasks and support

(AUTC, 2002). Figure 2 shows that a 'Learning Design Sequence' representation uses the following graphical notation:

- Squares represent Tasks
- Triangles represent Resources
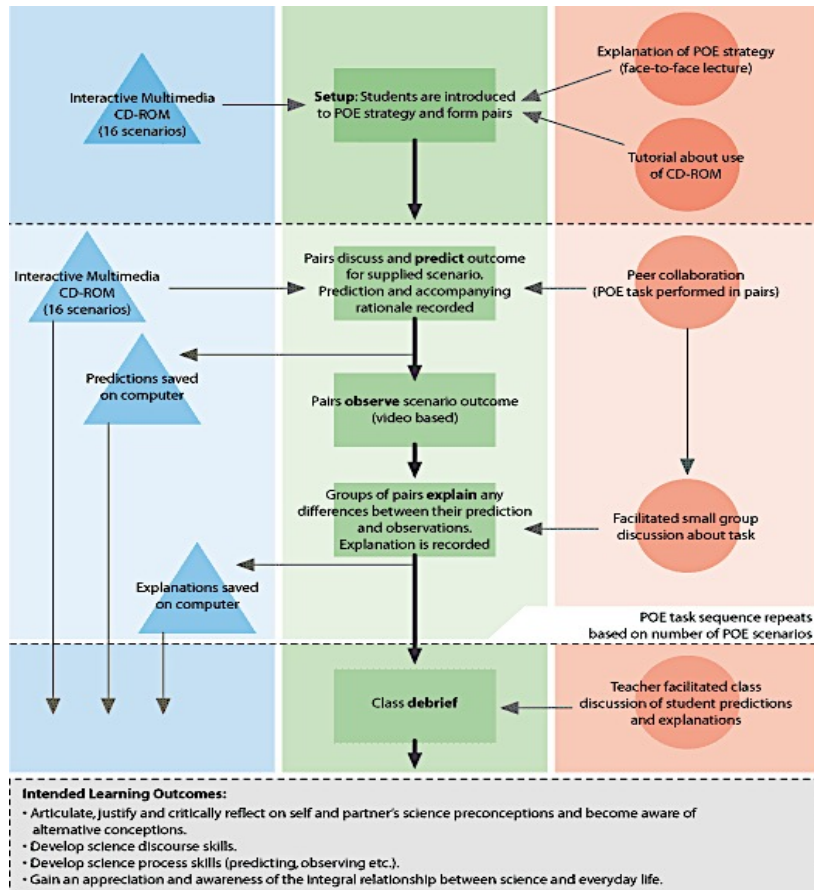- Circles represent Supports

Figure 2. The AUTC Learning Design Representation.

At about the same time the Learning Activity Management System (LAMS) was developed, which consisted of a flow of activities and associated tools over time (Dalziel, 2003). It is a tool for designing, managing and delivering online collaborative learning activities. It provides an interface for the designer to create a temporal sequence of tools. LAMS can be integrated with various Learning Management Systems (LMS), such as Blackboard or Moodle.

The Open University UK developed CompendiumLD -- a tool for visualizing designs (Conole, 2008). This is a flexible tool which can be used to articulate a number of different visualizations, such as the task swimlane representation (Figure 3), where the various components of the design are indicated in time-sequential columns. An alternative is an asset-focused visualization, where resources and activities are located in a central line, with associated activities for teachers and students either side.
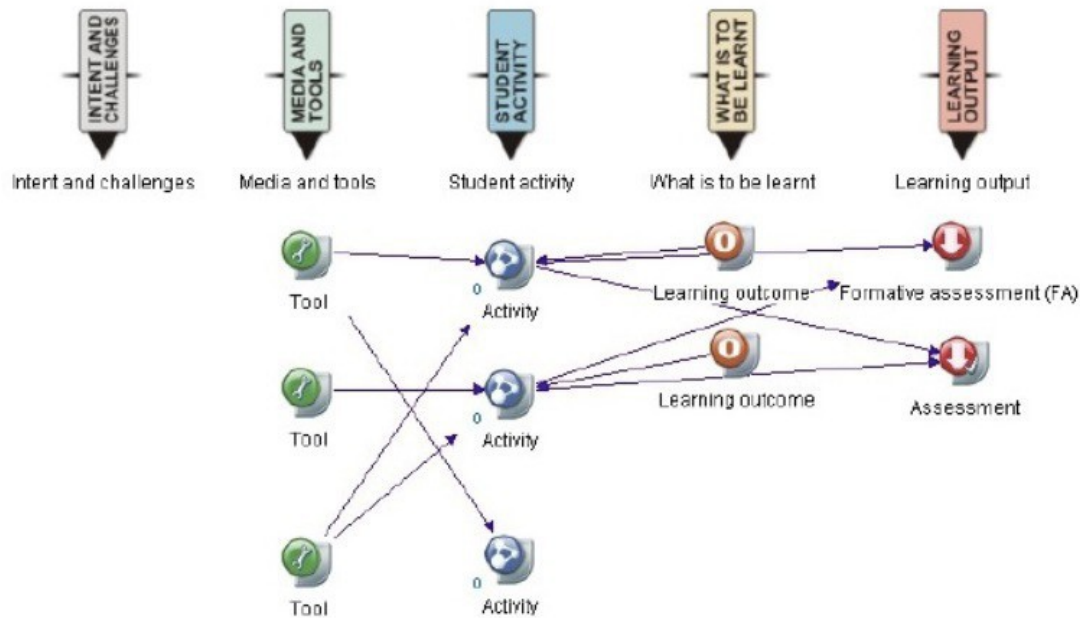

Figure 3. The Task Swim Lane visualization.

Another kind of representation is the pedagogical pattern, which begins with the problem to be addressed, followed by a structure solution, and mapping to related pedagogical patterns. Goodyear (2005) describes the concept of a pedagogical framework as a loosely coupled structure in which hierarchical relations can be made between:

- pedagogical philosophy (how we think people learn, what knowledge consists of, how we think people should be treated, etc.)
- high-level pedagogy (broad approaches such as problem-based learning, cognitive apprenticeship, collaborative knowledge building)
- pedagogical strategy (e.g. the use of an online debate)
- pedagogical tactics (the detailed methods we use to set tasks for students, encourage their participation, offer guidance and feedback, etc).

He goes on to state that pedagogical patterns are useful in many respects:

- They provide the teacher-designer with a comprehensive set of design ideas
- They provide these design ideas in a structured way – so that relations between design components (design patterns) are easy to understand
- They combine a clear articulation of a design problem and a design solution and offering a rationale which bridges between pedagogical philosophy, research-based evidence and experiential knowledge of design
- They encode this knowledge in such a way that it supports an iterative, fluid, process of design, extending over hours or days.

Finally, practitioner invariably learned best from their peers, the best ideas for innovating their teaching is often through sharing and discussing designs with others. So, for example, the short 'coffee room' exchange where one teacher describes how they have been using a wiki to facilitate collaboration amongst their students may be more useful than reading an extended case study of innovation. Facilitating sharing and discussing of ideas can be done in face-to-face contexts or through the use of social media such as Twitter or Facebook. Finally, specialized social media for sharing and discussing learning and teaching ideas have emerged such as Cloudworks[1] (Conole and Culver, 2010).

Cloudworks combines social and participatory functionality to enable multiple forms of communication, collaboration and cross-boundary interactions amongst different communities of users. Figure 4 shows a screenshot of the homepage. The core object in the site is a Cloud, which can have anything to do with learning and teaching; such as a description of a learning intervention, a description of a tool or resource, a question, or a discussion point. Clouds can be grouped into Cloudscapes; a Cloud can belong to more than one Cloudscape. Clouds are a combination of social and participatory functionality. Firstly, they act much like a multi-user blog; anyone can start a Cloud and others can sequentially add content to it. Secondly, they have a space for discussion. Thirdly, users can enrich the Cloud by adding embedded content, tags, links and references. Finally, they have additional Web 2.0 functionality, such as an activity stream for the Cloud, the ability to tag, RSS feeds and Twitter-like "follow" and "be followed" options.

Figure 4. Cloudworks.

The Challenges Facing Education

The Larnaca Declaration on Learning Design begins by contextualizing why Learning Design is important, focuses on the following aspects: the challenges face educators, education and the Government (Dalziel et al., 2016).

Firstly, education faces many challenges in the changing modern world. Learners are changing in their approaches to education – they use digital technologies, they multi-task, they collaborate and they are becoming less patient with teacher-centric styles of education. This mirrors a recent Open Universities Australia report (OUA, 2018) on the 'I want what I want when I want it' (IWWIWWIWI) generation of learners. The report states that learners are increasingly demanding and want personalized and flexible learning opportunities. This raises the question of how universities can ensure that they are meeting these needs. There is a dichotomy in that university education is becoming more expensive and at the same time information is more ubiquitous (Portolan, 2017). Many are arguing that we do not need a degree to acquire the knowledge and creativity required to be successful and gain meaningful employment.

New initiatives are arising to address this such as 'uncollege',[2] which aims to help learners identify areas of interest and to accelerate their learning. It is a social movement that aims to change the notion that going to college is the only path to success. Furthermore, we are seeing an unbundling of education (McCowan, 2017). Learners increasingly do not want to do full three-year degrees; they want bite-sized chunks of learning. They may choose to pay for: i) quality assured learning materials, ii) learning support, iii) a guided learning pathway, or iv) accreditation. Universities need to shift from offering a specific one-time experience to providing lifelong opportunities to enable learners to acquire skills useful across multiple careers.[3] Different learners will have different needs and will, therefore, choose different components.

In addition, learners are increasingly mixing formal educational offerings with free materials and courses, available through Open Educational Resources (OER) and Massive Open Online Courses (MOOCs). As a result, new forms of recognition of learning and accreditation are emerging, such as digital badges, certificates of participation/completion, and Accreditation of Prior Learning (APEL). The OpenCred project provides a summary of these (Whitthaus et al., 2016). It articulates a number of factors associated with non-formal learning (identity verification, supervised assessment, quality assurance, etc.).

Secondly, educators face many changes – such as expectations of adopting innovative teaching approaches, alignment of teaching to external standards, growing requirements for professional development and difficulties in balancing a complex range of demands from different stakeholders.

Thirdly, Government and educational institutions also face many changes, such as the rise of the knowledge economy and the need for different kinds of graduates, a shift from knowledge scarcity to abundance (Weller, 2011), and the impact of technology – especially the internet via open sharing of educational resources and massive open online courses (MOOCs).

In the context of these changes, effective teaching and learning in the classroom (and beyond) remains central. How can educators become more effective in their preparation and facilitation of teaching and learning activities? How can educators be exposed to new teaching ideas that take them beyond their traditional approaches? How can technology assist educators without undermining them? How can learners be better prepared for the world that awaits them?

All these factors suggest that more rigorous approaches to design are needed to help practitioners move beyond a concentration on content to a focus on learning activities and

the learner experience. Typically, practitioners draw on their own subject expertise and their own learning experience (typically based primarily around lectures and tutorials). They need more guided support to 'think outside the box' and to innovate in their design.

The 7Cs of Learning Design Framework

The 7Cs of Learning Design framework consists of a set of resources and activities to help practitioners create pedagogically informed design decisions that make appropriate use of digital technologies. Figure 5 shows the 7Cs framework, each C has associated with it a set of resources and activities to guide the design process (Conole, 2016).
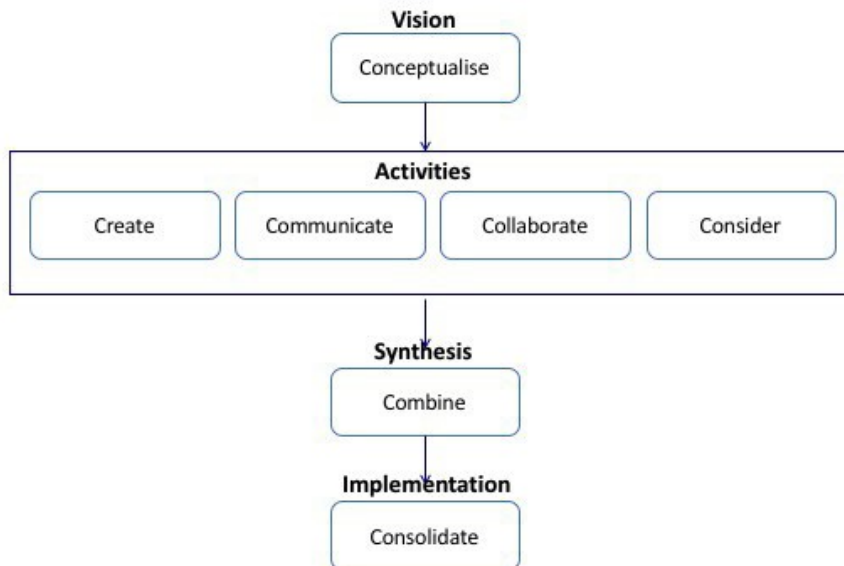
Figure 5. The 7Cs of Learning Design Framework.

When designing learning interventions, academics typically focus on content; the 7Cs framework enables them to think beyond content to the learning activities the students will engage with and the student experience. The 7Cs framework has been used now in hundreds of workshops.[4] Evaluation of the workshop is overwhelmingly positive. Participants state that the workshop helps them to be more creative and innovative in their design practice. Working in teams means that participants can build on each other's knowledge.

Other Learning Design Frameworks

Conole (forthcoming) describes a number of other frameworks for design, a flavor of these is provided here. Arguably the most popular and useful frameworks are the ICAP framework, SAMR framework, the 8LEM model, and the TPACK framework.

Specialized Requirements for Designing OER and MOOCs

Open Educational Resources can be defined as

Teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution (UNESCO, 2011).

Designing OER and MOOCs offer a number of opportunities and challenges for education. When they originated it is arguable whether or not OER were consciously designed; the focus tended to be on the content, associated copyright and populating OER repositories. Furthermore, the inherent design was not made explicit and this made it difficult for others to use or repurpose them. This constraint is almost certainly one of the factors behind the lack of uptake of OER. The emergence of MOOCs followed a different pathway. The first MOOC was the Connectivist and Connected Knowledge MOOC in 2008. This aimed to build on Siemen's concept of connectivism (Siemens, 2005); which privileges the way in which social media can be used to support learners. In around 2011 an alternative type of MOOC emerged via organizations such as Udacity, EdX, and Coursera. These MOOCs were more individually focused consisting mainly of videos and formative quizzes. The former is known as xMOOCs and the later cMOOCs.

Weller (2018) suggest there are a number of principles associated with open practices, including the freedom to reuse, open access, free cost, easy use, digital/networked content, social/community-based approaches, ethical arguments for openness, and openness as an efficient model. Open education can be defined as:

Resources, tools, and practices that employ a framework of open sharing to improve educational access and effectiveness worldwide.[6]

Weller (2018) and Weller et al. (2018) state that open education is an evolving term that covers a range of philosophies and practices aimed at widening access to education for those wishing to learn, with the current focus predominantly on practices based around reuse and sharing.

The perceived benefits of OER are that they provide a way of capturing and sharing content, that might be used or repurposed by others. Open practices have many facets

and are complex, they are not new but are having an increasing impact in education as a result of new digital technologies, and in particular social media. There is a lot of rhetoric around the potential of open practices and naïve assumptions about their impact, but it is important to caution against this; they are not inherently good in themselves but it is more to do with how they are appropriated. In other words, the nature of and benefits of open practices depends on the context, i.e. how they are applied and implemented.

Wiley (2007) developed the 4Rs framework for thinking about the bundle of permissions around the use of open educational resources; namely reuse, rework, remix, and redistribute. These 4Rs are the ways in which OER can be used:

- Reuse – Use the work verbatim, exactly as it was found
- Rework – Alter or transform the work so that it better meets a particular need
- Remix – Combine the (verbatim or altered) work with other works to better meet a particular need
- Redistribute – Share the verbatim work, the reworked work, or the remixed work with others

He argues that there are two criteria associated with OER: firstly free and unfettered access to the resource, and secondly whatever copyright permissions are necessary for users to engage in the 4R activities. He later added a 5th R: Retain – the right to make, own, and control copies of the content (Wiley, 2014).

The OpenEdu framework for higher education institutions presents ten dimensions for opening up education (Inamorato dos Santos et al., 2016) (Figure 6). The ten dimensions of the framework are divided into two categories: core dimensions and transversal dimensions. There are six core dimensions (access, content, pedagogy, recognition, collaboration and research) and four transversal dimensions (strategy, technology, quality and leadership). Inamorato dos Santos et al. argue that open education is often thought of as relating to content (OER) or research (open access). The framework places opening up education beyond these two aspects and introduce both content and research as core dimensions ('what' is included), which are supported by means of the four transversal dimensions ('how' it is provided).

The report goes on to describe the ten dimensions in more detail (click on the white hotspots below):
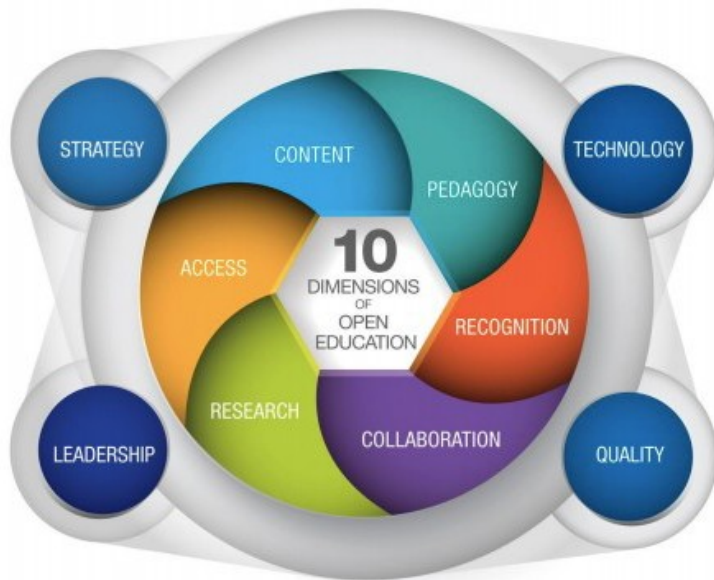
Figure 6. The Ten Dimensions of Openness.

Czerniewicz at al. (2015) argue that MOOCs are a flexible and open form of self-directed, online learning designed for mass participation. They argue that the affordances of MOOC technology are as follows:

- **Educator involvement**: While educators are involved in the design and production of the MOOC, their involvement during the running of the course is minimized because of the lack of formal assessment or formal academic credit.
- **Engagement**: It is possible to engage with a large number of students via discussion forums.
- **Re-watchable:** Students are able to watch and re-watch lecture videos.
- **Scale**: MOOCs are designed to reach a large number of students.
- **Assessable:** Most MOOCs include in-video, concept-check questions, with immediate feedback, as well as peer review.
- **Customized learning experience:** Participants can learn at their own pace and choose which material they engage with

The promise of MOOCs is that they provide free to access, cutting-edge courses that could drive down the cost of university-level education and potentially disrupt the existing models of Higher Education. Motivations for learners include: supporting lifelong learning or gaining an understanding of a particular subject, with no particular expectations for completion or achievement, for fun, entertainment, social experience and intellectual stimulation, for convenience, often in conjunction with barriers to traditional education options, and to experience or explore online education.

However, there are a number of criticisms of MOOCs. Forbes (2017) argues that three of the most pressing critiques of an open learning system are (a) lack of an effective system to measure and validate the progress of the learners, (b) how to integrate the course credits into the present system so that it counts towards a degree from a college, and (c) how do you ensure personalized guidance and mentorship.

Conclusion

This article has critiqued the relationship between open education and approaches to designing for learning. A central tenet is that OER and MOOCs have particular affordances; of significant note is the opportunity to open up practice. It has argued that new approaches to design are needed to create engaging OER and MOOCs that will enhance the learner experience. Conole and Brown (forthcoming) reflect on the impact of the open education movement on learning, teaching and research. They outline some of the barriers and enablers associated with open education. These include the fact that despite the rhetoric OER and MOOCs are not been used extensively by teachers and learners and the need for appropriate Continuing Professional Development (CPD) to harness the potential of digital technologies and specifically the need for new digital literacies. They list a range of CPD possibilities that go beyond the standard fixed workshop model, which provide opportunities for colleagues to share and discuss learning and teaching ideas. They conclude by stating that OER and MOOCs are important as they get us to think about the learner experience and they challenge traditional educational offerings.

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[1] http: cloudworks.ac.uk

[2] https://www.uncollege.org/

[3]https://www.chronicle.com/interactives/store

[4] The workshop outline and associated resources and activities is available online https://www.slideshare.net/GrainneConole/learning-design-workshop-2017

[5] http://cetl.ulster.ac.uk/elearning/documents/About-HLM.pdf

[6] https://www.oeconsortium.org/about-oec/