MOOCs and pedagogy: the challenges and benefits of student centric MOOCs in Higher Education

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Abstract

MOOC is a buzzword that is filling up the corridors of universities round the world. With many embracing this learning phenomenon, it is important to not become lost in the media frenzy, and to view MOOCs objectively. One key area that needs to be considered by universities looking to develop MOOCs is that of pedagogy. This paper briefly outlines the Student Centred Learning (SCL) paradigms of social cultural theory and connectivism. Following the introduction to social cultural theory and connectivism, these theories will then be applied to the MOOC phenomenon. The challenges and benefits of basing a MOOCs pedagogy and design on one of these two theories will then be addressed. The conclusion will discuss a way in which an organisation might overcome challenges and embrace benefits when creating a SCL MOOC.

1.0 Introduction

Massive Open Online Courses (MOOCs) have been front page news for many years now, since their origins among the Open Educational Resources movement [1]. When the MOOC phenomenon started in 2008 with the CKK08 (Connectivism and Connected Knowledge) MOOC, a key aim was to test new learning theories. This MOOC and those that immediately followed were based heavily in the theories of SCL. However this trend for a student centric model changed following the highly successful Stanford MOOCs, including "Introduction to Artificial Intelligence"[2]. These MOOCs were more teacher-centric in nature, and following their success came the development of the major MOOC platforms (edX, Coursera, Udacity…). MOOCs hosted on these sites predominately use teacher centric learning methods. Due to the exposure and prominence of these MOOCs, it is the teacher centred learning paradigm that is often connected with this educative tool. This raises questions as to the reason for this pedagogical shift. What are the learning theories attached to student centric MOOCs, and to what degree does this form of pedagogy challenge and benefit those developing, running and taking MOOCs?

2.0 A brief introduction to student centred pedagogy

The first step is to review some of the learning theories applicable to SCL MOOCs. Whilst there are many theories of SCL and many models that may be applied to the classroom (such as Problem Based Learning, Inquiry Based learning…), two theories of student centred learning will be briefly reviewed. These theories are social cultural theory and connectivism. The first can certainly trace its roots back a hundred years[3], the second has predominantly been developed this side of the new millennium (for an example of early writing on connectivism see – Siemens[4]).

Social cultural theory was developed primarily by Vygotsky[5] in the early part of the 1900s, focusing on the need for social interaction to promote learning. Two main aspects of this theory are the Zone of Proximal Development (ZPD) and scaffolding. The first of these, the ZPD, shows how a learner develops understanding. In figure 1 there are two circles in a square, the centre circle represents everything a student knows, the outer circle everything they have the capacity to know. The square the circles sit in is all knowledge in the world, when information is learned it becomes absorbed into the inner circle and thus the outer circle grows into the square[6]

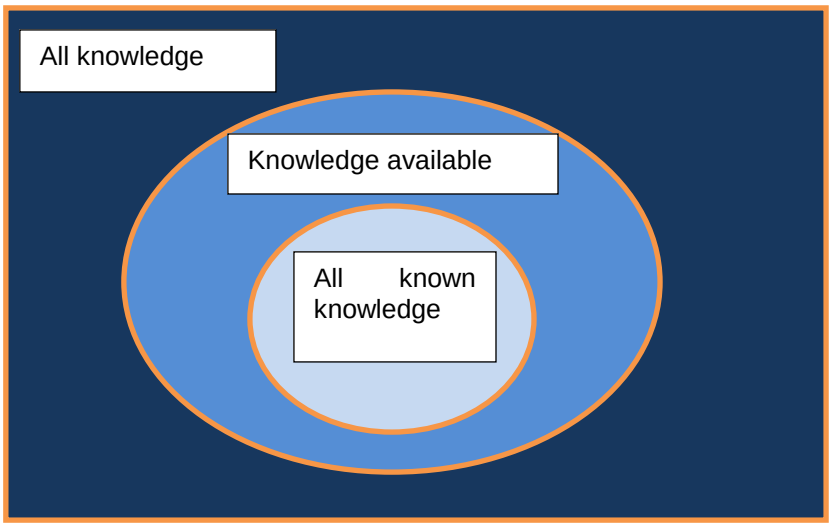

Figure 1: Zone of Proximal Development

In order for the student to access the knowledge in the outer circle they must be guided using their pre-existing knowledge; this is known as scaffolding. Scaffolding is supported learning, in which the teacher guides the student to the correct answers rather than directly telling them. Hannafin et al. [7] state that there are four components to scaffolding:

- Conceptualisation – The scaffolding supports the choice of information that is being considered.
- Metacognitive - The scaffolding supports the management of the learning process.
- Procedural - The scaffolding indicates the appropriate use of tools.
- Strategic support - The appropriate method with which to address the task is suggested through scaffolding.

Scaffolding supports the learner to make their own choices, but allows a guide to reduce the risk of learning incorrect information or methodology. Social cultural theory also allows for peer-to-peer scaffolding, wherein students support each other. An example of this was Borthick et al.'s[8] study, which showed evidence that accountants with little to no knowledge of a computer-based information system developed the skills, ability and knowledge required faster through peer-to-peer scaffolding. Social cultural theory promotes the need for interactivity and socialisation within the learning process to support knowledge acquisition.

One issue that arises with the aforementioned theory is that it was developed many years before the advent of the Internet, raising a question as to the possible effect that being online has on the learning process. A theory that could possibly supply

an answer to this question is connectivism, developed by George Siemens[4], citing the following key areas as critical for learning[1]:

" ● Learning may be found in non-human appliances.
- The process of connection between specialised nodes or information sources is defined as learning.
- The potential to acquire more knowledge is more important that currently known information.
- All connectivist activities have the intent to find accurate up-to-date knowledge.
- To facilitate further learning, connections and networks must be maintained and cared for.
- Knowledge and the ability to learn require a diversity of opinions.
- A key skill in learning is the ability to make connections between concepts, ideas, and fields of knowledge.
- The ability to make decisions is a key part of the learning process; that which was applicable today may not in time remain applicable due to changes in the information and knowledge."

As can be seen, connectivism focuses strongly on the social aspect of learning. de Waard et al.[9] describe the learning process as set out by connectivism. The student (or as it is describe in de Waard et al. – node) is a singular point, which through social interactions connects to other nodes, forming a network that is unique to them. This network is their web of knowledge dissemination and acquisition. The second critical aspect of connectivism states "The process of connection between specialised nodes or information sources is defined as learning" as such not only does the network contain nodes, it also contains information sources (such as blogs, videos, articles…). Connectivism moves away from the need for a teacher/guide to support learners, and suggest a many-to-many learning approach rather than a one-to-many[10].

Whilst connectivism does have unique aspects, there is some criticism that it merely applies pre-existing pedagogies (including social cultural theory) to technology assisted learning[1]. Both social cultural theory and connectivism embrace the need for peer-to-peer learning; whether it is described as scaffolding or networking, there is a visible similarity. However it is possible to argue that connectivism (due to the advancements in communications technology on which it is built) has a far wider scope than the Vygotskian theory. Perhaps the greatest issue faced by connectivism, in response to the questions of its status as an independent theory, is its lack of research[11]. In order to fully address the similarities more research into connectivism is required.

3.0 Student Centred Learning and the MOOC

Having reviewed some of the base factors of SCL theory, the next step is to apply these theories to the MOOC. It must be remembered that the original MOOC, CCK08, was a connectivist MOOC[12]. It is from this original MOOC that the term cMOOC originates. These MOOCs follow the principles of connectivism, however a number of them (including CCK08) where developed to discuss and develop the learning theory. cMOOCs embrace the principles of connectivism, using technology to enhance the learning experience. They may have a key website but often this is only the start of the course material[13]. With the principles of learning networks, diversity of opinion and the desire for up to date information, the connectivist MOOC actively encourages collaboration and the use of social media (de Waard et al. 2011). Within the PLENK MOOC students used a wide array of social media to enhance their learning[14]. In doing so participants formed meaningful networks of learners, developed a body of content that contained a diversity of opinion and due to the continued creation and adaptation of content developed up to date information. As such connectivism and the MOOC, or at least the cMOOC, are for the most part connected.

This is not to say, however, that connectivism has a monopoly on MOOCs from a SCL perspective. There are a number of places where social cultural theory is applicable to MOOCs, one such area being acknowledging the learner's ZPD. If the MOOC is to follow a scaffolding approach to learning, then each step must expand the learners' knowledge into the outer ring of their ZPD. As such a potential structure for a social cultural theory based MOOC, could consist of short lectures to introduce the topic followed by a number of collaborative assignments supported and guided by course TAs. This gives structure to the MOOC but allows students to guide themselves through their own learning.

MOOCs were originally designed to use SCL methods, in particular connectivism, and these methods can still be applied to the online environment of the MOOC. Social cultural theory can be applied to promote knowledge acquisition expanding learners' knowledge stage by stage in accordance with their ZPDs, whilst connectivism embraces how this information is acquired and the impact of the technological aspects connected to MOOCs.

4.0 Challenges facing the SCL MOOC

Whilst there is a connection between SCL methodology and MOOCs, this is not without faults. When developing a MOOC, both those teaching and those learning are affected by the pedagogy applied. As such a number of challenges are faced when developing, teaching and learning through a SCL-focused MOOC.

The first of these challenges is the reaction to the shift in paradigms from teacher centric to student centric, which affects both the teachers and the students. Norvig[2] during a TED lecture suggest that within a MOOC the traditional "sage on a stage" teacher cannot exist. This transition can be a difficult process for

lecturers, with one lecturer from the CCK08 MOOC saying "Learner control is not without frustration for the instructor. I recall feeling a bit frustrated that the concept of connectivism that I was trying to communicate… was not resonating with participants."[12]. However this position of reduced power does not reduce the workload. Jesse Stommel and Sean Michael Morris ran an SCL meta-MOOC entitled MOOCMOOC; whilst there was little if any traditional teaching involved in this course there was a large collaborative element. Tutors reviewed much of the content produced by the MOOCMOOC participants and as such despite the lack of traditional teaching models, Stommel and Morris had a workload of 150 hour each to produce and run the seven day long MOOC[15]. The challenges facing SCL MOOC teachers focus on the shifting role of the teacher and the high workload that developing courses with high content production can incur.

Teachers are however only half of the teaching and learning process; students are also challenged by SCL MOOCs. A number of papers have been written about CCK08, including Mackness et al.'s[12] paper, which outlines four key areas of difficulty for students within a cMOOC: autonomy, diversity, openness, and connectedness and interactivity. By its connectivist nature CCK08 placed the learner in a position of autonomy that, it could be argued, has even less guidance than previous forms of SCL. However, another study of CCK08 found that out of the 90 survey respondents 51 dropped out of the fora, citing their uncontrolled, unregulated nature and the behaviour of those involved[16]. The autonomy can be a liberating learning experience, even more so than that of a social cultural theory model; however the challenge for those overseeing the MOOC is the need to plan for the inappropriate behaviours that may arise whilst maintaining the sense of total autonomy. Students of CCK08 embraced the freedoms it gave, but were discouraged from interacting with the course due to negative experiences with other learners[12].

Whilst there are challenges in the way in which teachers teach and students study, there is also a challenge in what they learn. This is particularly apparent in the connectivist cMOOCs, where although there may be a focal course website, this is not of necessity the host of all information connected to the course[14].Weller[17] talks about the changing nature of knowledge; traditionally university have been stores of knowledge and have been able to charge, sometimes, large amounts of money for the privilege of accessing this knowledge. However this has changed somewhat with the widespread uptake of the Internet, content is no longer solid and unchangeable but fluid and malleable[18]. This raises challenges for both teachers and learners; the principles of connectivism state "that which was applicable today may not in time remain applicable due to changes in the information and knowledge." Whilst this may lead to innovative thinking it calls into question the validity of that which is being learned. Hand in hand with this is the risk that content created by the participants will not contain accurate information, be it conventional wisdom or innovative thought. This shifting content and risk of inaccuracies are a challenge for the developers and the learners of the cMOOC. However this is less of a challenge for those following the principles of

social cultural theory, in that there is a guide monitoring the learning and content that is being undertaken by the student.

The final challenge to be discussed is assessment and accreditation. A number of issues, including problems with authenticity[19] and weighting[20], impede potential accreditation of MOOCs. Within the framework of social cultural theory and connectivism there are additional issues. For social cultural theory the issue arises in the methodology of testing; if it is to be posited that students perform best working collaboratively then there is a potential to argue that they should not be tested individually. On the other hand this could lead to difficulties in testing as a group, running the risk of freeloading students who may not have learned the content gaining the same mark as a student who did the majority of the work. The issues with accreditation are greater for connectivism. As has been noted there is a huge amount of user generated content connected to a cMOOC. Overlooking the accuracy issues with user generated material, another concern is how to assess the learners' acquired knowledge. If media generated around the course is to be marked, the question is which types – blogs, forum posts, facebook discussions – and by what marking criteria.

3.0 Benefits of a SCL MOOC

While there are many challenges with setting up a MOOC with a SCL pedagogy there are also many benefits, some of which are discussed below.
The potential benefits for teachers in a social cultural theory MOOC could mirror those which occur in an offline SCL classroom. One challenge for teachers in a SCL MOOC is the transition to facilitator rather than teacher, however from looking at the transition in an offline classroom this relinquishing of control may be less imposing that originally perceived. Webb[21] suggests that placing students into groups does not necessarily lead to group discussions, and it is the role of the teacher to promote discussions and debate, control interpersonal issues that may arise and assist in the students' analysis of information and ideas discussed in the group. This role of group leader is well received by students; one study identified that students found their teacher becoming more important as a guide to support them through the vast amounts of information that was readily available[22]. Teachers in an SCL MOOC do not have to fulfil the role of knowledge delivery system but must take an active role in supporting and developing students' learning processes and learning experience.

For the student there are a number of benefits to partaking in an SCL MOOC. Levy[23] discusses his experiences as a participant in the PLENK2010 MOOC and draws on its collaborative nature, stating that if he had a question it was quickly answered on the fora. This collaborative nature is also cited as a benefit by participants in Mackness et al.'s[12] study, finding that even small networks (four to ten people) and one off connections were considered beneficial. As such the ability to work together, however brief that collaboration may be, is a key benefit

for students undertaking SCL MOOCs and one that should be promoted by those developing and running the courses. However there is more than just collaboration that makes a SCL MOOC beneficial for students. The autonomy, whilst sometimes problematic, is an important part of the MOOC and a key benefit for students granting the ability to learn when, where and how they like[24].

The final benefit discussed here is that of dropout rates. It is duly noted that both SCL and teacher-centric MOOCs suffer from high levels of attrition[25]; however this is not always the end of the learning process for the student of the SCL MOOC. Rodriguez suggests that within cMOOCs up to 50% of dropouts continue to follow the MOOC as lurkers. Whilst they do not partake in learning activities or examined aspect of the course they do continue to learn.
Levy[23] raises the point of learning without assessment, suggesting that the participants of the PLENK2010 course learned without the incentive of accreditation. The SCL MOOC is learning for learning's sake. This said whilst this may be a benefit in getting students to enjoy learning and learn for its own merit, there is still, currently, the need for assessed learning to achieve a qualification. Dewar et al.[15] suggest a possible solution to this is for MOOCs to be used as learning tools to support the learning required to undertake external exams. This would allow students the freedom to learn but also grant them the desired qualification at the end of the course.

5.0 Discussion

There are many challenges of running an SCL MOOC, both social cultural theory and connectivism have issues with the shifting of pedagogies. However connectivism has added difficulty in the autonomy given to the students, wherein teachers find it difficult to sit back and let their students learn, and students find it difficult to develop their learning unaided. In addition to this issues are raised as to content and accreditation.

On the other hand, students and teachers can benefit from a more collaborative environment. Whilst autonomy may have challenging aspects, it is embraced by learners, giving them a sense of independence. Furthermore learners begin to learn and enjoy learning in its own right rather than having to learn to achieve a qualification.

These challenges and benefits must be taken into account when an organisation is considering undertaking an SCL MOOC. Firstly the pedagogy which the MOOC will take must be decided upon. Social cultural theory allows for more guidance and support, but limits some of the autonomy given to the students, and is without specific reference to the online aspect of learning. By contrast connectivism allows for greater exploration of content and producing learning networks, however this

theory has issues of validity and by its very nature is unstructured and in many ways anarchical.

A potential way for organisations to overcome some of the challenges, particularly those arising from unguided learning, is to have a number of teaching assistants (be they paid or volunteers). This would firstly relieve the lecturer of some of the burden of running the course. Secondly these TAs could monitor the forums, stepping in when there are issues of behaviour and to support learners who may be feeling lost in the autonomy of it all. Another way TAs could help is through assessing user generated content. During the PLENK2010 MOOC there was a daily newsletter called 'The Daily', which contained information on the best social media content pertinent to the course, Students found this beneficial and subscriptions to The Daily went up even as active participant numbers went down[25]. As such by employing a small number of TAs to support learners, without removing their autonomy, many of the challenges of the SCL MOOC can be overcome.

6.0 Conclusion

There are challenges with using an SCL pedagogy for a MOOC, however there are also benefits. Whether the model is social cultural or connectivist students gain more autonomy and develop their own learning styles through learning networks and peer-to-peer scaffolding. Students of these MOOCs are no longer passive learners but creators of content. The SCL MOOC moves beyond just filling the empty minds of students with information, it demands of them collaboration and creation. That is perhaps the biggest challenge and the biggest benefit of the SCL MOOC, allowing students to govern their own learning, creating learners who actually enjoy their learning experience.

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