

Exploring the Challenges Concerning Deep Learning in SPOCs: a Case Study in a University in China

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ABSTRACT. *With the widespread popularity of E-learning in higher education, a small private online course (short for SPOC) generally becomes an increasingly hot spot of educational reform aiming for boosting the quality of higher education in China. The purpose of this study is to explore the challenges that teachers are faced with when they are conducting small private online courses. The design method used in this study involved a qualitative research methods that included online semi-structured interviews and in-depth interviews, carrying out a case study among a group of teachers in a university in China. The university has implemented the SPOCs for only 3 years to face with educational reform. The results indicate that there are four main challenges that were found: the challenge in scientific design of teaching activities, the challenge in better exploring students indeed need, the challenge in the interaction between teachers and students and the challenge in awareness of continuous innovation in online teaching. As a consequence of the challenges found, the teachers felt a need for professional development support. The results may help teachers determine what to take into account while designing and teaching SPOCs aimed at deep learning.*

KEYWORDS: *Challenges, Deep learning, SPOCs, Online teaching*

1. Introduction

Higher education institutions aim for deep learning (Biggs, 1999; Entwistle and Tait, 1990) and increasingly provide their education through online media (Liaw et al 2007). Since the 1990s, e-learning, referring to the way of learning through the Internet, has been rapidly applied and developed in the field of education, triggering “whether a walled university will be replaced by a wallless university (network school)”. The great discussion and practice has proved that e-learning has its own limitations, such as lack of the school’s humanistic atmosphere and academic atmosphere, it is difficult to directly feel the teacher’s personal teaching and personality charm. Learners are prone to loneliness and rely on equipment and the environment (Hara & Kling, 2000).

In order to achieve the goal and take advantages of face to face teaching in e-learning, a small and efficient e-learning way---SPOC---is generally attached a large amount of attentions in higher education. As a specific type of blended teaching patterns, SPOC not only can make good use of open e-learning way in MOOC, but also can combine the advantages of face to face education, which may be a better choice for teachers to improve teaching methods and teaching quality.

Qiongtai Normal University, which was founded in 1705, is a provincial full-time university in Hainan province in china. Qiongtai Normal University has conducted three years of practice experience of SPOCs to meet the need of teaching reform in “Introduction to Computer”. It has been proved that Small Private Online Courses could have good potential to promote deep learning for higher education. However, this asynchronous, little interaction and lack of visual cues and body language may have limitations for the promotion of deep learning compared to face to face learning. Therefore, this study looks into the challenges that teachers may experience when they are teaching in SPOCs for deep learning.

2. Literature Review

2.1 SPOC

(1) Definitions of SPOC

Small private online course(SPOC for short), the item “SPOC” was first used by Fox, who help to advocate the use of the MOOC resources to supplement classroom teaching. SPOC redefined the way and the role of teachers and their teaching mode. SPOCs emphasize students’ whole learning experience and aims to improve the quality of the course with online resources and technology. The following table shows different forms of online education.

Table 1 Different Forms of Online Education

Forms of online education	SPOCs	MOOCs
Number enrollments	Small (15–20)	Massive (up to 10, 000)
Instructor guidance	Much	Little
Peer interaction	Much	Much
Fixed dates	Available	Available
Retention rate	High >90%	Low <10%

(2) Characteristics of SPOC

The main contents of SPOC include two parts: online teaching and learning via online platform and offline teaching in face to face classroom. The former part requires students to finish some online tasks, such as watching videos, do some basic preview and discussion according to teachers’ instructions online. The second part pays more attention to a face to face teaching work between teachers and

students. The teaching work usually are critical and probing and cooperative. In the second part, teacher-student interaction and communication are the most part of it. Teachers shall answer questions that students may meet and lead students to frame the whole knowledge so that they can develop the deep acknowledgement and fully understanding about learning content through direct face to face contact.

(3) Related Research

Based on the literature published on CNKI in China, searching with “SPOC “as the subject, a total of 3849 results are obtained. Among them, there are 3, 511 articles published in journals, 170 doctoral and master’s theses, 147 international conference papers, 3 journal newspapers, and 17 foreign books.

Among these, the research content mainly focuses on the following themes: blended teaching mode (1646 articles), flipped classroom mode (1373 articles), MOOC+SPOC (168 articles), online education (245), college English teaching mode (115 articles). There are only 158 articles exclusively on SPOC. And most of the articles focus on the appliance of SPOC in higher education, such as teaching mode of classroom reform from teachers’ perspective, and only a few articles focus on the learner’s factors; at the same time, the proportion of literature on teaching design and teaching effect is very small.

Searching with “SPOC challenges/problems” as the subject, there are no articles found.

2.2 Deep Learning

(1) The Context of Deep Learning

In recent decades, there are two main ways related to students’ learning approaches: the deep learning approach and the surface learning approach. These two learning approaches show different aspects of learning.

With deep learning, students are aiming for cognition and understanding, while surface learning is mostly for them to memorize, retell or reproduce the materials for a test (Aharony, 2006; Biggs, 1999; Hall, Ramsay, & Raven, 2004).

According to the constructivist’ views of knowledge and learning, with deep learning students are prone to understand and construct meaning of the objects, and consequently, think critically, link new knowledge with previous knowledge and search for relationships among the materials (e. g. Akyol & Garrison, 2011). However, students are unlikely to reproduce high-quality learning outcomes or understand whole through a surface learning (Nelson Laird, Seifert, Pascarella, Mayhew, & Blaich, 2014).

(2) Related Research

Searching for educational literature on CNKI in China, with the item of “deep learning”, the results show that most of the literature research focuses on deep learning models (4912 articles), deep learning theory (1390 articles), deep learning

practice (569 articles), deep instructional design (367 articles) and deep learning of classroom reform (33 articles).

Then using “SPOC deep learning” as the subject to conduct a literature search, 98 relevant literatures are found. The research content mainly focuses on the practice of the SPOC-based classroom deep learning model. And there is no article about teachers’ challenges in SPOCs.

3. Problem Statement

During the teaching and learning procedures, teachers are able to influence the learning approach through the learning context, which includes teaching content, methods and evaluation (Biggs, 1987; Hall et al., 2004). Good teaching supports and aids students in achieving deep learning (Ramsden, 2003). A conceptual framework on how the teacher may design an effective learning context is provided by the Community of Inquiry (CoI). The study is aimed at engaging students in deep and meaningful learning (Anderson and Garrison, 1995; Garrison and Anderson, 2000). The study showed that teaching level is necessary to manage the environment and to focus and facilitate the learning experience, besides Social Presence. Cognitive Presence in order to boost deep learning. This is important in both face to face and online learning.

However, we assert that methods are different when most of the interaction is asynchronous and written. What’s more, according to a study by Millis (2010), teachers in higher education face two challenges in their efforts to promote deep and meaningful learning in both face to face and online education: the increasing reliance on technology and the increasing size of classes.

Since SPOCs are a combination of online education and face to face education, it is probable that there are still some new challenges in SPOCs in this university. And to the best of our knowledge this has yet not been studied in China.

4. Research Questions

In order to fully understand the teaching situation of the teachers in SPOCs, identify their difficulties, and guide them to solve the difficulties as soon as possible for improving school teaching quality, we conducted this study. More insight into these challenges among teachers is needed. Therefore, the research question of this study is:

- 1) What Challenges Are Teachers Faced with When They Are Aiming for Promoting Deep Learning in SPOCs?
- 2) Are There Any Differences Compared to Face to Face Class?

5. Methodology

5.1 Research Design

The design method used in this study involved a qualitative research methods that included semi-structured interviews and in-depth interviews. Because of the Covid-19, all interviews are conducted online through e-mail, QQ and WeChat apps. The content of the interviews were carried out around challenges, difficulties and problems and focused on the main challenges on the implementation of SPOCs among a group of teachers in a university in China.

5.2 Participants

There are three individual participants (Wu, Zhang and Liao) in this study. They were selected from different special areas in the school, aiming for maximal variation and theoretical sampling. Wu is the head of school academic affairs and also teaches Chinese 2 times a week. In addition, she has much more online experiences than the other two teachers, both in theories and practice. Zhang is a young teacher who teaches technology information in IT departments. Liao is an English teacher, and the number of the students is 38, larger than the average.

Table 2 the Brief Information of the Participants

Participants	Age	Year of SPOCs experience	Course	Number of students
Wu	55	3	Chinese	30
Zhang	30	3	IT	34
Liao	35	2	English	38

5.3 Procedures

Participants were informed of this study's purpose and approach before the interview. Interviews were based on online semi-structured interviews and in-depth interviews. Leading questions were asked to all respondents, and other questions were asked in in-depth interviews.

6. Findings and Results

The analysis of the data proceeded with open coding in which interview transcripts were coded into meaningful categories and then moving to more selective coding stages. The analysis of the interviews resulted in a discovery of four main challenges that teachers face when aiming at deep learning in SPOCs.

6.1 The Challenge in Scientific Design of Teaching Activities

Teaching procedure includes teaching objectives, teaching content, teaching designs, teaching activities and so on. In online class, teachers usually set a series of activities for students to finish. However, these activities may be more at a surface learning approach for the course objectives or course assessments. What's more, most teachers set questions which they asked students to discuss and reflect, but often did not know how to further design these learning activities to aim at deep learning.

As Liao said: *We usually set some basic knowledge or teaching videos from MOOC resources in online class, and this requires less of the conversation and the thinking and probing. They still are at a relatively surface level.*

Meanwhile, more and more learning feedback activities are given in online class, and most of these questions and feedback are less thoughtful response.

While in face to face class, teachers can better control the teaching and learning activities, instruct students to think critically, and spend more time discussing with students.

And Wu also pointed out: *The academic affairs officers , through online supervision, find that many teachers have problems with the design of teaching activities. The quiz and the quick answer is more, and presentation or other types of task which require more time and energy to cooperate and discuss is less. The design of teaching activities directly affects the classroom effect. If the teaching activities are designed reasonably, students are more involved, actively participate, and have a strong classroom atmosphere, which shows that it is a good lesson. Teaching evaluation is also linked to this.*

6.2 The Challenge in Better Exploring Students Indeed Need

During the delivery phase of the course, teachers found it difficult to monitor the progress of their students and find out what students actually need in order that they could potentially take action to give specific instructions. It was more difficult, compared to in face-to-face education, to gain insight into where students were located throughout their learning process and thus what feedback or guidance would be appropriate for each student. In addition, questioning students was harder to check their understanding of the course material without body language, facial expressions and quick informal chats in online class.

Three teachers all express their opinions about trying to explore students' indeed needs. One of the teachers expressed this as: *If you teach face-to-face, you shall walk around students, observe their expressions and feelings when giving lectures. You can better control the whole class by asking a few questions, waiting for and helping students who are slower and so on. So that's a lot more flexible in face to face class. For a questioning student, it may need more body language, face expressions and eye contact for teachers to focus on his or her learning. While in online class, teachers*

and students are lack of visual cues and cannot observe these tiny information. Teachers cannot know clearly how much students had gained in a lesson, and which information they have not got.

6.3 The Challenge in the Interaction between Teachers and Students

In online class, teachers need to assign tasks to students and put forward learning goals, track and diagnose students' learning, and resolve learning difficulties. Managing online interaction refers to the behavior of teachers creating an online interaction atmosphere and analyzing the interaction situation. On the one hand, teachers need to organize, guide, and encourage students to conduct online interactive exchanges and discussions; on the other hand, they need to provide immediate evaluation and feedback on students' discussions and speeches.

However, from the interviews, it was found that although most online teaching platforms have interactive communication sections, or use instant messaging tools such as QQ and WeChat for online communication. But the interaction effect is not very good.

Zhang said: *If there is a problem that requires more detailed communication, it is best to communicate in person, face to face. QQ is not very clear, it is slower. Off-line communication is better. Typing online is too slow, and it is possible that other people are not there, and someone may not reply in time. Online is still very troublesome. Nobody is necessarily talking online.*

According to interviews, the interactive content on the platform, the interaction between teachers and students is mostly for students to ask about teaching arrangements. There is less interaction between teachers and students for other content. Some teachers think it is only teacher's identity and role.

6.4 The Challenge in Awareness of Continuous Innovation in Online Teaching

During the interview, it was also found that the interviewed teachers had confidence in the information technology skills currently required for the courses they were taught, and were able to meet the various network multimedia information technology skills required for the teaching of this course. However, with the development of information technology, the key to teachers' information literacy is not whether they can use information technology, but the awareness of when to apply technology and flexible decision-making on how to apply technology.

Wu, the head of school academic affairs, said: *I don't think this course currently requires relatively high information technology skills, including online communication on the platform and QQ. Under the current circumstances, I think it can still meet the teaching of this course. Maybe in the future. There are more challenges.*

In the SPOCs, the online and face-to-face teaching modes are organically integrated, and the advantages of the two modes are fully utilized to achieve the best

teaching effect. This kind of teaching design ability is particularly important. Teachers need continuous teaching innovation.

7. Discussion

Under the background of the increasing popularity of online learning in higher education, we aim to identify challenges that teachers may experience when trying to promote deep learning in SPOCs. SPOCs, a special type of online learning mode, may have good potential to promote deep learning for higher education because of its small groups and the possibilities for community building and interaction, which may facilitate deep learning. However, compared to traditional face to face learning, it contains more online interaction and lacks of visual stimulus and body languages and other social contact may produce challenges to teachers aiming for deep learning compared to face to face learning.

The results indicate that for the teachers who participated in our study, it is harder to create a better teacher-student interaction in a SPOC teaching model compared to in face-to-face education. Our findings also show that there is an emphasis by the instructors on the scientific design of online teaching activities, and they feel a urging need for professional development support. Institutions may not have created sufficient possibilities for teachers to learn how to design online teaching activities in their SPOCs.

This study is a first attempt to explore the challenges that have been experienced by teachers in SPOCs in this university. Future research may build upon the results of this study to further explore whether the identified challenges influence the learning experience and learning performance of *the students*. The results may help teachers determine what to take into account when designing and teaching SPOCs aimed at deep learning. The research results also show that institutions need to give teachers more training and learning opportunities.

8. Conclusions

To conclude, the quick rise of online education is inevitable and creates both opportunities and challenges. As we explored in SPOCs, the results show that instructors face several challenges in achieving deep learning with their students. It is quite essential to continue this research in the future and to explore how these challenges can be overcome and give some useful suggestions to teachers and institutions. Based on this study, professional development programs for teachers may play a vital role in promoting deep learning in SPOCs, and will promote the effectiveness of online higher education.

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