Challenges concerning deep learning in SPOCs

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Higher education institutions aim for deep learning and are increasingly providing their education through an online medium. SPOCs are a specific form of online education that has rapidly grown in the last decade. In this study, 11 SPOC instructors have been interviewed about the challenges they face when the aim is to promote deep learning. Five main challenges in achieving deep learning in SPOCs were identified: 1) Alignment in learning activities, 2) Insight into students’ needs, 3) Adaptivity in teaching strategy, 4) Social cohesion and 5) Creating dialogue. These results indicate that SPOCs have distinctive challenges compared to other forms of online education. Instructors may have to place more emphasis on the social and teaching activities compared to the cognitive activities of the course. Instructors can take the results into account while developing and teaching SPOCs. Consequently, it shows the need for training in how to design and teach SPOCs.

Keywords: challenges; community of inquiry; deep learning; MOOCs; online education; online learning; SPOCs; teaching/learning strategies.


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1 Introduction

1.1 Deep learning in online higher education

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). However, educational strategies to promote deep learning - such as prompts, contextualised scaffolding, encouraging students to ask questions, predicting and explaining during learning activities (Chin and Brown, 2000) - have been developed mainly in settings of face-to-face education. Online education rests on different approaches to the design and delivery of education than face-to-face education (Garrison and Kanuka, 2004; Salmon, 2012). One example is the typical emphasis on written asynchronous communication in online education due to the demand for student participation that is independent of space and time. And writing can be useful to support deep learning through reflection and precision of expression, and thus it can promote deep learning (Garrison and Kanuka, 2004). However, we know from face-to-face education that verbal communication plays a major role in creating a free and open dialogue, critical debate, negotiation and agreement, all elements in promoting deep learning (Fink, 2003; Garrison and Kanuka, 2004; Osman and Herring, 2007). Therefore, the emphasis on written communication also implies that there may be a need to compensate for the loss of the rich dynamic of fast-paced, spontaneous verbal communication.
We argue that Small Private Online Courses (SPOCs) may be a type of online learning for higher education that has good potential to promote deep learning. However, this asynchronous, written interaction and the lack of visual cues and body language may have implications for the promotion of deep learning compared to face-to-face learning. Therefore, this study evaluates the challenges that instructors experience when they aim to promote deep learning in SPOCs. In this paper, the term ‘instructor’ refers to people who design, develop and teach online courses.

1.2 Online learning and SPOCs described

Small Private Online Courses (Fox, 2013) are small-scale online courses and represent a specific, defined form of fully online education. In addition to the common self-paced and often non-moderated online courses, new forms of online courses such as Massive Open Online Courses (MOOCs) and SPOCs are increasingly popular. The SPOCs in our study have class sizes of about 15–20 students, which enable students to interact with their instructors one-on-one and with each other. SPOCs have a fixed start- and end date, which may stimulate the sense of community within the student group. Most of the learning takes place asynchronously, allowing for flexibility for students with busy schedules and who live in different time zones. During the course, an instructor scaffolds the students through the learning process. Similarly, to face-to-face education, qualitative assignments such as essays, presentations and projects are usually an important part of online education, and often include the provision of (peer) feedback. Table 1 shows the distinctive characteristics of each form. In this study, a course with a physical element is not considered to be a form of online education.

<table>
<thead>
<tr>
<th>Forms of online education</th>
<th>SPOCs</th>
<th>MOOCs</th>
<th>Selfpaced often non-moderated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number enrolments</td>
<td>Small (15–20)</td>
<td>Massive (up to 10,000)</td>
<td>Small (1)</td>
</tr>
<tr>
<td>Instructor guidance</td>
<td>Much</td>
<td>Little</td>
<td>Differs</td>
</tr>
<tr>
<td>Peer interaction</td>
<td>Much</td>
<td>Much</td>
<td>Little</td>
</tr>
<tr>
<td>Fixed dates</td>
<td>Available</td>
<td>Available</td>
<td>No</td>
</tr>
<tr>
<td>Retention rate</td>
<td>High &gt;90%</td>
<td>Low &lt;10%</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

In comparison with MOOCs, SPOCs have a much smaller number of students per course, involve more instructor guidance and usually have entry requirements. Furthermore, all students usually start the course with the intention to complete it, which results in a high retention rate (Uijl et al., 2017). This is in contrast to MOOCs, where courses are usually free and students often choose to follow only the parts that interest them or even enrol out of curiosity without ever actually participating (Koller, 2013). This causes retention rates of about 6.5% (Jordan, 2014). SPOCs include peer interaction and a fixed start- and end date, unlike self-paced courses. SPOCs also usually have more instructor interaction compared with self-paced courses.
Given its characteristics (see Table 1), a SPOC may increase the number of interactions and the sense of community, which is a good situation for deep learning to occur. Therefore, SPOCs may be a type of online learning for higher education that has good potential to promote deep learning.

2 Promoting deep learning in SPOCs

2.1 Deep learning

There is a well-established body of research that supports the distinction between deep learning and surface learning as alternative student approaches to studying. This research has been conducted by different groups, including a Lancaster group (Entwistle et al., 1974), an Australian group (Biggs, 1987), a Swedish group (Marton and Säljö, 1976) and a Richmond group (Pask, 1976). Deep and surface learning are considered to be two extremes of a continuum: a deep approach to learning on the one side, where students are aiming towards understanding, and a surface approach on the other, where they are aiming to reproduce material for a test or exam (Aharony, 2006; Biggs, 1999; Hall et al., 2004).

Deep learning involves critical thinking, integrating what the student is learning with what he or she already knows and creating new connections (Biggs, 1999; Entwistle et al., 1983; Marton and Säljö, 1984). The student approaches learning with the intention to understand and construct meaning, and, consequently, make broad assumptions, relate new ideas to previous knowledge, relate concepts to everyday experience, search for relationships among the material, interpret this information and study beyond the course requirements (Akyol and Garrison, 2011; Beattie IV et al., 1997; Biggs, 1987; Biggs, 1999; Biggs and Moore, 1993; Booth et al., 1999; Eley, 1992; Ramsden and Entwistle, 1983; Kember and Gow, 1994; Marton and Säljö, 1984; Pegrum et al., 2014; Ramsden and Moses, 1992; Sharma, 1997; Trigwell et al., 1999).

Surface learning is to a large extent externally focused. It is the tacit acceptance of information and memorisation as isolated and unlinked facts. It focuses on recalling and regurgitating information and leads to superficial retention of material for examinations (Biggs, 1999). A surface approach to learning is characterised by an intention to acquire only sufficient knowledge to complete the task or pass the course.

It has been shown that deep learning results in better retention and transfer of knowledge (Ramsden and Moses, 1992) and leads to high-quality learning outcomes such as a good understanding of the discipline and critical thinking skills (Athanassiou et al., 2003; Biggs, 1999; Booth et al., 1999; Lindblom-Ylänne, 1999; Ramsden and Entwistle, 1983; Trigwell et al., 1999). Students are unlikely to develop appropriate skills and competences through a surface approach to learning (Hall et al., 2004). Therefore, in this study, we have asked instructors in SPOCs what challenges they experience while promoting deep learning, that is, while stimulating students to think critically, to make connections with prior knowledge and to create new connections.

The learning approach that a student chooses is not static or inherent to individuals (Biggs, 1987). Which learning approach will be chosen depends on both personal characteristics and the learning context. Students may change their learning approach depending on the learning context, as a substantial body of empirical research has
indicated (Aharony, 2006; Biggs, 1978; Marton, 1983; Ramsden, 1988; Trigwell et al., 1999; Zeegers, 2001).

2.2 The instructor’s role in promoting deep learning in SPOCs

The instructor is able to influence the learning approach through the learning context, including teaching methods, curriculum and assessment (Biggs, 1987; Hall et al., 2004). Good teaching supports and aids students in achieving deep learning (Ramsden, 2003). For example, the instructor can promote critical thinking by (re)constructing experience and knowledge through the critical analysis of subject matter, questioning and challenging assumptions (Garrison et al., 2001). A conceptual framework on how the instructor may design an effective learning context is provided by the Community of Inquiry (CoI). Since Garrison and Anderson presented their framework, it has become the basis for a substantial number of studies (Rourke and Kanuka, 2009). The CoI is aimed at engaging students in deep and meaningful learning (Anderson and Garrison, 1995; Garrison and Anderson, 2000). The framework is grounded in a critical, collaborative learning community, which the instructor is part of, consistent with the ideals of higher education. It is applicable in both face-to-face and online education. It defines an environment through three major components: Social Presence, Cognitive Presence and Teaching Presence (Figure 1). The sense of community and belonging should be on a cognitive and social level in order to promote deep learning. The teaching level is necessary to manage the environment and to focus and facilitate the learning experience. Further on, the interaction of all three domains is needed in order to promote deep learning (Garrison and Kanuka, 2004). It describes, among other things, the importance of interaction with both instructors and peers and how the instructor, as a facilitator, should guide the discourse towards 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.

Figure 1 Community of inquiry

![Community of Inquiry](Image)

Source: Garrison and Kanuka, 2004
Instructors in higher education design and deliver their courses increasingly as blended or completely online courses. In this context, both students and instructors are questioning whether they are achieving the desired deep and meaningful learning experiences (Garrison and Kanuka, 2004). Difficulties with deep learning have been confirmed by a study by Millis (2010). According to that study, instructors in higher education face two challenges in their efforts to promote deep and meaningful learning in both face-to-face and online education:

1. the increasing reliance on technology and the need to use it ‘wisely and well’
2. the increasing size of classes.

To meet those challenges, instructors should not only recognise the value of the pedagogical strategy to promote deep learning but must also have access to tools, pedagogical support and access to inspiration. Since SPOCs are a form of online education, it is probable that these challenges apply to SPOCs, but to the best of our knowledge this has yet not been studied. To define the tools, pedagogical support and inspiration that instructors need for SPOCs, more insight into these challenges is needed. Therefore, the research question of this study is: “What challenges do instructors experience when aiming for deep learning in SPOCs?”

3 Method

3.1 Research design

The study design was qualitative and exploratory and used interviews with students and instructors in SPOCs, representing participants from different fields of study. The study was approved by the Dutch Ethical Board for research in education (NVMO, the Netherlands Association for Medical Education, approval no 210). The NVMO is an independent association that carries out activities for anyone involved in medical and health care education in the Netherlands and Flanders (Belgium).

3.2 Participants

For the individual interviews, we aimed for maximal variation and theoretical sampling. Therefore, the first author asked the head of four institutions’ Education and IT departments to recommend instructors from their institution and from these recommendations we selected instructors in SPOCs with varying experiences in years of teaching in SPOCs. In addition, we included instructors that are known for being keynote speakers at relevant international conferences about online education. The participating instructors represent different universities and virtual learning environments. A maximum of two of the same universities and a maximum of two of the same virtual learning environments were represented, which resulted in 10 different universities and 8 different virtual learning environments. We purposely included instructors from different parts of the world, including Europe, New Zealand, Canada and United States. We deliberately chose to select not only a wide variety of nationalities but also a wide variety of experience with both online learning and virtual learning environments, in order for the instructors to reflect the population and to include different ideas so as to increase the
validity of the entire population. The number of the purposive sample size was determined by data saturation as the collection of more data appeared to have no additional interpretive worth (Guest et al., 2006).

In total, 11 instructors were selected and asked. All instructors (4 females and 7 males) were involved in teaching online courses in higher education. The average age of the instructors was 51.8 years (SD = 20), the average teaching experience was 15.0 years (SD = 19.6), compared with their average experience with SPOCs of 10.4 years (SD = 6.8). Six instructors had 2 years or less experience with SPOCs, the other five instructors had 10 years or more experience with SPOCs and online distance education. Two of the instructors are also researchers in the field of online education. All selected instructors agreed to be interviewed.

3.3 Procedure

Participants were informed of the study’s purpose and approach in an invitation e-mail and at the start of the interview. Each participant signed a consent form. Interviews were based on an open interview scheme following a qualitative tradition. This was done to do justice to the complexity of the topic as well as to the nature of encapsulated expert knowledge (Berliner, 2001) since open interviewing allows the informants to answer from their own frame of reference (Bogdan and Biklen, 2003). Leading questions that were asked to all respondents were:

1. What challenges do you experience or expect regarding online learning in SPOCs to promote deep learning?
2. Are they any different compared to F2F education?

Other questions were asked to prompt and/or probe for additional information. We deliberately chose to focus only on challenges, and not successes, because we were looking for approaches for future improvements. Moreover, we expected that instructors would have mainly reflected on the obstacles they encountered and less on what went well.

3.4 Analysis

The interviews were audio recorded and transcribed verbatim. The analysis of the data proceeded in stages, starting with open coding in which interview transcripts were coded into meaningful categories by the first author (Cresswell, 2007) and then moving to more selective coding stages according to an iterative process. Considering the open-ended nature of this analysis (Bogdan and Biklen, 2003), at every coding stage, all different categories were discussed by the research team until agreement on the categories’ content as well as the codes was reached. NVivo was used to code and retrieve the data. Codes were both predefined from the literature and emerged from the data. The use of transcripts of audio recordings assured accuracy. To avoid misrepresentation and misinterpretation of the interviewees’ statements, the transcript and a summary of the transcription were sent to each participant for member checking (Poortman and Schildkamp, 2012). All participants agreed with the transcribed content. The first author coded the transcripts. To enhance the reliability of the coding, an independent researcher analysed a random sample of approximately 10 percent of the
data for purposes of calculating the inter-rater reliability. Discrepancies in the coding between the two researchers were minor and were resolved prior to the commencement of a second round of analysis. Complex fragments of all texts, which was about 2% of the total, were discussed by the full research team. Internal validity was further enhanced due to the description of the results, which were context-rich, meaningful and thick. External validity was promoted by including the respondents’ quotes and by describing the coherence with the theoretical framework.

To ensure quality in all of the steps described, a formative audit was conducted by an independent researcher concerning all the steps of the data gathering and analysis (Akkerman et al., 2008).

4 Results

The analysis of the interviews resulted in a discovery of five recurrent challenges that SPOC instructors face when aiming at deep learning. Additionally, an emerging theme was the need for training on how to design and teach SPOCs.

4.1 Challenge 1: Aligning learning activities

The majority of the interviewed instructors were teaching their courses both face-to-face and online through SPOCs. The learning objectives and assessment methods were the same in both mediums. This was a requirement from their universities. The learning activities, including the teaching strategy and feedback, however, differed depending on the medium. SPOCs were often not aligned with the course objectives or course assessments and as a result they aimed more at a surface learning approach. In SPOCs, most instructors included questions in which they asked students to discuss and reflect, but often did not know how to further design these learning activities so that they aimed at deep learning. For example, in the discussion learning activities, questions concerning facts were asked by instructors instead of questions that demanded critical thinking, which instructors posed in a face-to-face classroom, such as questions that required the challenging of assumptions. As a result, students chose a surface approach and both discussions and reflections remained at a surface level. One of the instructors elaborated on this idea, saying: In online courses, faculty is requiring less of the conversation and the thinking and probing. Because it’s so much easier to deal in a learning management system with simple foundational knowledge and quizzes and moving on. […] Most online forums that I see faculty creating do ask them to reflect somewhat, but they don’t really pose question that encourage – well, what you and I might call – deep reflection, they still are at a relatively surface level, I find. I can’t explain, other than I don’t think that faculty by and large understand how to create questions that elicit higher order thinking – 14. Another reason for the lack of alignment of the learning activities is the current technology, which often encourages a hasty and surface learning approach. This is because online courses tend to be designed with technology that makes it quite easy for students to interact quickly and ask for feedback. For example, if a student has ‘liked’ a discussion topic, the student might be less eager to write down a more thoughtful response. Some instructors reported that more feedback requests were sent out compared to in classroom education. Many of these feedback questions fit a surface approach to
learning. As a result of both the number and the type of feedback requests, instructors provided feedback on a surface level, which did not promote deep learning. One of the instructors illustrated this as follows: One of the tendencies in the online environment is to make do with very quick and easy to do feedback, because it’s possible. In face-to-face, or even a classroom environment, there are no such things as a like, or a checkmark or a thumbs-up. And things like counting the number of followers, is absurd in a person-to-person environment. No, we use that in an online environment, a lot of the time that substitutes for more traditional forms of feedback – II1.

4.2 Challenge 2: Insight in students’ needs

During the delivery phase of the course, instructors found it difficult to monitor the progress of their students and find out what students needed so that they could potentially take action. This was especially the case if no face-to-face technology, such as videoconferencing, was used. 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 the individual student. This was illustrated by one of the respondents: Imagine taking a good instructor in face-to-face education. The feedback he provides will be based on his experience – so there are all sorts of things you could say and you have to pick out the most important things and then give feedback. That’s something an experienced instructor can do very well. And based on what you’ve seen before, you probably have good strategies for judging the student: ‘What kind of learning style will the student prefer? Does he prefer the theory? Should he read something, should you show something?’ Those things are not so easy in online education – I5.

Questioning students to check their understanding of the course material was harder without body language, facial expressions and quick informal chats. One of the instructors explained: Some students are very good at statistics. You don’t need to discuss the different tests with them. Other students don’t understand those tests at all. If you talk to students and ask a few questions, you know quickly in which category they fit. But online – you may never find out. So I would like to know more about their needs, but I really wouldn’t know how to find out – I1.

This shortage of insight impeded the provision of timely and customised feedback – which was preferably provided without having to spend time analysing individual test scores. Or, as one of the respondents said: There should be a better way of monitoring the progress, or whether the participant or the student is actually, you know, spending enough time enrolled or not – I7.

4.3 Challenge 3: Adaptivity in teaching strategy

To develop an online course, instructors usually had to design ahead and think of what potential learning activities and course material would allow students to achieve their learning objectives. Web lectures, templates, assignments, quizzes and topics for discussion forums were usually developed and set before the start of the course. In face-to-face education, instructors often have an immediate sense when their question is not stimulating the deep thinking for which they were aiming. If this is observed in the classroom, the instructor is able to change the teaching strategy on the spot, based on observations. Instructors quickly adapt to the situation, rephrase the question, ask a deeper
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follow-up question or change some slides or offer an additional assignment, based on the current situation in the classroom. One of the instructors expressed this as: If you teach face-to-face, you do so by walking around, help students a bit. And it may not be structured, but they still learn something. You can surely say, if they are done too quickly, a few students, you say, 'Well, try it once again'. So that's a lot more flexible – 16. And another instructor made the following comparison: It's kind of the difference between setting out in your car to get to a destination and, you know, if the road is blocked ahead, you can quickly move the car, take a different route and you know, if you make a couple of extra turns, you’ll get to your destination. In an online class, you've essentially stopped – 14. In other words, the instructor of a SPOC lacks room for the improvisation, spontaneity and adaptivity that may sometimes be necessary to adjust to the students’ needs and to promote deep learning.

4.4 Challenge 4: Social cohesion

Instructors said that in online education they needed to feel connected to the students and to feel like they were ‘real persons’, because this helps them to feel free to express themselves when providing students with critical feedback. Interaction should include not only the course content but also expressions of each other’s emotions and feelings. When instructors felt this kind of social cohesion, they were more motivated and it was easier to respond to the needs of individual students. In some student groups, they felt like there was a lot of social cohesion, in others student groups, they did not. Instructors noticed that in student groups with more social cohesion, students tried harder to help each other by probing, and students felt more emotionally secure to add their own different perspective to discussions, which enables them to make connections between different concepts. Compared to face-to-face courses, it was harder to stimulate the same social cohesion: You know, it is an indirect type of interaction. Because I talk to them by talking to my screen. And at a certain time, that they pick, they look at what I have to say. But there is no interaction. That is my main problem: how can I create an online interaction in such a way that it feels like we are together? – 12, as one of the instructors elaborated. Another instructor explained: As an instructor, you lose involvement if you don’t see each other: if it is remote, you can much more easily let it go – 16. Social cohesion may also be necessary in order to receive and accept feedback, or as one instructor explained: If you want to teach a student something, you have to confront him with his current ideas, or his current way of doing things, and you have to say something about it. That can be quite painful, or difficult to accept or generate uncertainty. Face-to-face you have a lot more resources to manage this well, and to feel: ‘How does he handle this?’ Because you have to make sure the student retains his confidence – 15.

4.5 Challenge 5: Creating dialogue

In order to promote deep learning, instructors said that establishing a dialogue was important. In a dialogue, people respond to each other’s contributions and try to look for common understanding. It stimulates students to bring up their assumptions and discuss them with both peers and the instructor. Most of the communication in online courses, however, was asynchronous and written. This caused too much delay between an assignment and the feedback response. One of the instructors explained: When I am in the classroom, I can immediately react on feedback, for example by saying ‘Yes, I will like to
come back to that later’. (…) Online I was typing my feedback and the person who read it, did so several days later, and there was not much more interaction going on – I6. Even though there was often a lot of interaction going on in a SPOC, the time delay between actions and reactions complicated back and forth probing. According to some of the respondents, this resulted in a less personal experience, which may have consequences for the students’ commitment to the course.

Instructors said they lacked expertise concerning online asynchronous dialogues. They often do not know when and how to question and challenge students, and how to question and collaboratively guide discussion. One of the respondents explained: *What I find in online courses is that most faculty don’t really understand how to keep that conversation going. It's almost a dead conversation from the start, if they start with foundational knowledge. Because there isn’t an opportunity in one forum that can keep that digging going – I4.*

### 4.6 Professional development support

As a consequence of these five challenges, a need was expressed for professional development support. The instructors recognised that designing and teaching a SPOC required a different pedagogy than face-to-face education. Instructors frequently reported that they had insufficient expertise, since they had not followed an online course themselves, nor had they had any form of training in teaching an online course. Instructors would have liked to have a wide repertoire of teaching strategies available and to know when and how to use them. More specifically, they had questions about what online discussion formats improve and increase students’ thinking, and how instructors can confidently design and manage online discussions that promote deep learning. *As an experienced instructor in face-to-face education, I knew certain things work very well. But when I started here, I noticed that some of those things don’t work at all when I try them in the online situation and that I need some help – I8.*

### 5 Discussion and conclusion

Against the background of the increasing popularity of online learning in higher education, we aimed to identify challenges instructors experience when trying to promote deep learning in SPOCs as a specific form of online education. SPOCs may be a type of online learning for higher education that has good potential to promote deep learning because of the small groups and the possibilities for community building and interaction, which may facilitate deep learning. However, compared to face-to-face learning, the asynchronous, written interaction and lack of visual cues and body language in SPOCs may lead to changes with respect to how deep learning is promoted compared to in face-to-face learning. The five challenges that were found were: alignment of learning activities, insights into students’ needs, adaptivity in teaching strategy, social cohesion and creating dialogue. As a consequence of the challenges found, the instructors felt a need for professional development support. These findings are discussed in the light of Garrison and Vaughn’s (2000) ‘Community of Inquiry framework’, which is aimed at how the instructor may design an effective learning context aimed at promoting deep and meaningful learning (Anderson and Garrison, 1995).
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The results indicate that for the instructors who participated in our study, the three elements of the framework of Community of Inquiry, the Cognitive Presence, Social Presence and Teaching Presence, had not been adopted in a balanced way. Cognitive Presence, the extent to which students are able to construct meaning through sustained communication, was not specifically mentioned by any of the instructors though there are some similarities with the challenge ‘creating dialogue’. However, the findings of our study support the need for Social Presence, an element that includes group cohesion, open communication and affective/personal connections. The Social Presence of the learning group members is associated with the degree of participation and social interaction amongst them and, as such, is therefore considered a critical variable for learning (Kreijns et al., 2014). Based on the results of this study, we concluded that instructors find this harder to create in a SPOC compared to in face-to-face education, as reflected in the challenge ‘social cohesion’ in this study. Social Presence must provide the cohesive tension to sustain participation and focus, which is what instructors in this study acknowledged but said that they found harder to provide in SPOCs compared to in face-to-face education. Our findings also show that there is an emphasis by the instructors on Teaching Presence. This element is essential to moderate, guide and focus the discourse, but instructors find this relatively difficult to realise in a SPOC. Teaching Presence is the means by which to bring together Social and Cognitive Presence in an effective and efficient manner. This element includes setting the course design and determining the learning activities that should be aligned with the learning objectives and the assessment, in line with the results of this study. Teaching Presence also includes the teaching strategy, with aspects such as moderation, guiding, focusing discourse and tasks. Teaching Presence also includes adaptivity (Entwistle and Walker, 2002), which means that good teaching is about enhancing strategic alertness, that is, that teachers are alert to ‘teachable moments’ as they occur, or deliberate moments by injecting adjustable learning activities, so that they can adequately act upon them. The instructors in this study indicated that the provision of Teaching Presence in a SPOC is challenging, as expressed in the challenges ‘aligning learning activities’, ‘insight in students’ needs’, ‘adaptivity in teaching strategy’ and ‘creating dialogue’. Garrison and Vaughan (2008) indicate that Teaching Presence is especially essential in an online learning environment where students are not always in direct contact. The emphasis on Teaching Presence in the results of this study shows that Teaching Presence might be underexposed in a SPOC. One may deduce that establishing Cognitive Presence is relatively easy in SPOCs. This corresponds to the study of Heckman and Annabi (2005) who found that courses with asynchronous written communication generate high levels of cognitive activity, at least equal to, and in some cases superior to, the cognitive processes in face-to-face courses. An explanation for this may be that Cognitive Presence in SPOCs does not differ from face-to-face education that much, while Teaching Presence is in fact fundamentally different. Institutions may not have created sufficient possibilities for instructors to learn how to adopt Teaching Presence in their SPOCs.

We indicate that the results support Garrisons and Kanuka’s (2004) argument that teaching online is not just finding the right mix of technologies; rather, it demands a new course design, based on a new pedagogical approach. The many interactions in SPOCs do not necessarily lead to deep learning. The traditional face-to-face interaction differs in dynamics from and cannot just be exchanged with asynchronous and written ways of interaction without rethinking the design as a whole. This is especially the case if no synchronous communication technology, such as videoconferencing, is used, which is
often the case due to the demand for studying anytime anyplace. Even though the instructors acknowledged this, the results of this study show that knowing this does not necessarily mean that instructors are able to redesign their courses based on a new pedagogical approach. Course redesign support may involve assistance in deciding how course objectives can be achieved best through online learning activities such as online discussion groups, simulations, discovery labs, multimedia lessons, tutorials, assignments, research projects, quizzes and digital content (Garrison and Kanuka, 2004). There are few good practices available to indicate how deep learning in SPOCs can be promoted. Instructors experience this search for how to promote deep learning in SPOCs as a quest and this study will hopefully contribute to the insights needed.

To improve the quality of SPOCs, instructors may need to put more emphasis on Teaching Presence and Social Presence – for example by sharing personal meanings, focusing discussions and encouraging collaboration. According to Garrison and Vaughan (2008), addressing them is essential in order to shape cognitive and metacognitive processes and learning. They indicate that students need to have some metacognitive understanding of the inquiry process, if students are to learn how to learn, in order to reach deep learning. Obviously, the challenges we found are intertwined. Improving deep learning in SPOCs is not just a matter of dealing with these challenges one by one; rather, all challenges should be taken into account and addressed when designing, teaching and assessing SPOCs.

To the best of our knowledge, challenges in SPOCs have not been thoroughly investigated previously. This study is a first attempt to explore the barriers that have been experienced by instructors in SPOCs. Future research may build upon the results of this study by further determining whether the identified challenges reflect the learning experience and learning performance of the students. This study may help instructors to make more informed choices while choosing a SPOC as a medium for their educational programs. The results may help instructors determine what to take into account while designing and teaching SPOCs aimed at deep learning. We suggest that methods for meeting the challenges be considered in future research studies concerning deep learning in SPOCs. The practical implications of our study findings extend to providing learning opportunities for instructors of SPOCs. This need for support is in line with other studies conducted concerning online education by Aycock et al. (2002), Dziuban et al. (2004), Margaryan et al. (2015), Millis (2010), Reilly et al. (2012) and Twigg (2003) and shows that this urgency still exists. This study provides more details on the topics that should be included in a professional development support program. It should specifically be aimed at rethinking and redesigning the teaching and learning relationship, aligning the learning activities, developing tools to monitor students’ progress, and how to facilitate social coherence and an online dialogue aimed at deep learning. Fundamentally, transforming the pedagogical approach of instructors can open new worlds of opportunity for the profession and for higher education.

To conclude, the quick rise of online education is inevitable and creates both opportunities and challenges. As we explored the relatively young field of SPOCs, the results of this study show that instructors face several challenges in achieving deep learning with their students. It is essential to continue this line of research and to explore how these challenges can be overcome. Based on this study, professional development programs for instructors may play an important role in promoting deep learning in SPOCs, and will support the effectiveness of online higher education.
Acknowledgements

The authors would like to thank Rianne Bouwmeester from Utrecht Medical Center in the Netherlands (UMC) for contributing to this article by executing an audit. In addition, we thank Carrie Chan for the useful comments to the draft of this manuscript.

Disclosure statement

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors. The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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