Peer-facilitated discussions to enhance OER-based e-learning

S.P. Karunanayaka
Faculty of Education, The Open University of Sri Lanka, Sri Lanka
J.C.N. Rajendra
Faculty of Natural Sciences, The Open University of Sri Lanka, Sri Lanka
H.U.W. Ratnayake
*Faculty of Engineering Technology, The Open University of Sri Lanka,
Sri Lanka, and*
Som Naidu
*Faculty of Pharmacy and Pharmaceutical Sciences, Monash University,
Melbourne, Australia*

Abstract

Purpose – The Open University of Sri Lanka implemented a fully online professional development course on open educational resources-based e-learning (OEReL), which adopted a scenario-based learning (SBL) design within the constructivist pedagogy. It was designed to facilitate knowledge construction in a collaborative manner with the support of open educational resource (OER), mainly through peer-facilitated discussion forum activities. The purpose of this paper is to present a case study on how peer-facilitated discussions affected the OEReL process, what factors supported and hindered peer-facilitated discussions, and what challenges were faced during the process.

Design/methodology/approach – The OEReL course consisted of five modules with 14 discussion forum activities. Content analysis of the threaded forum discussions was the key data collection and analysis strategy based on the community of inquiry (CoI) framework (Garrison and Arbaugh, 2007). It was supplemented with participants' reflections and focus group discussions.

Findings – The three elements of CoI – cognitive presence, social presence and teaching presence played a major role in knowledge construction in the OEReL process. A complementary relationship between cognitive presence, social presence and teaching presence was observed, where the three elements have interacted in supporting knowledge construction. Overall, the findings reaffirm the significant of role of instructors in cultivating the three presences within a peer-facilitated environment, by enabling learners to engage with the content in a meaningful manner through appropriate course design, structure and leadership.

Practical implications – Forum discussions created an opportunity for participants to engage in meaning making through social negotiation, where facilitation became a shared responsibility among instructors and learners. Peer-facilitation was the key strength that promoted critical, analytical and reflective thinking, as well as self-regulated learning. The SBL design, learning tasks with OER integration, and instructor guidance were the most supportive factors, while time constraints due to the participants' workload was challenging.

Originality/value – Through carefully orchestrated, well-structured and pedagogically sound OEReL environments, peer-facilitated forum discussions can be designed creatively and implemented in a meaningful manner to enhance knowledge construction.
Keywords Community of inquiry framework, OER-based e-learning, Pedagogical design, Peer-facilitated discussions, Scenario-based learning
Paper type Research paper

Introduction

The advent of open educational resources (OER) movement has opened up vast opportunities for innovative approaches in course design and delivery, especially in open and distance learning (ODL) contexts. The educational potential of OER which is based on a pedagogical and a digital dimension (COL, 2011) can be effectively harnessed by giving equal attention to both dimensions. While the pedagogical dimension requires a change from the conventional pedagogical beliefs and practices, the digital dimension is supported by the enhanced affordances of emerging new technologies. Rapid advancements in information and communications technologies (ICTs) enable efficient and flexible access to a wide variety of learning resources as well as communication facilities that support resource-based, collaborative and co-operative learning. However, such affordances of ICT can be made possible only through careful organization of teaching and learning formats.

The adoption of OER essentially requires a sharing culture among individuals. Integration of OER in the design of e-learning experiences would allow innovative use of technology as well as innovative use of pedagogy, enabling collaborative and co-operative knowledge construction by learners. Hence, open educational resources-based e-learning (OEReL) can make a significant impact on changing pedagogical practices, by utilizing the opportunities offered by ICT and OER to optimize the design of effective, efficient and engaging learning experiences (Naidu, 2010).

The Open University of Sri Lanka (OUSL), with the support from Commonwealth Educational Media Centre for Asia (CEMCA), implemented a fully online course on OEReL, which has been adapted from a core set of modules in a course developed by CEMCA in collaboration with the Wawasan Open University, Malaysia. It was conducted during a period of 24 weeks commenced from December 2014, for academic staff members of the OUSL. It adopted a scenario-based learning (SBL) design within the constructivist pedagogy, facilitating knowledge construction in a collaborative manner with the support of OER. Peer-facilitated discussion forum activities were a key feature in the OEReL course. This paper is a case study of how peer-facilitated discussions affected the OEReL process of the participants, what factors supported and hindered peer-facilitated discussions, and what challenges were faced by them during the process.

While peer-facilitated discussion forums is a common feature in most online learning environments, maintaining lively and interactive discussions to achieve expected knowledge constructions are often a challenge. Especially, in this particular instance where OEReL was a novel initiative for Sri Lankan educators, professional development on it through a fully online course was even more challenging. The study intended to investigate how and to what extent the peer-facilitated discussion activities, designed within the SBL course design, enhanced knowledge construction during this initiative.

Review of literature

The concept of OER encourages changing the traditional roles of teachers and learners to become collaborators in knowledge construction. A constructivist learning environment will support collaborative construction of knowledge through social negotiation among individuals, and the meaningful use of technology will enable such learning (Jonassen *et al.*, 1999). Since OER is playing a significant role in nourishing the participatory culture of learning, creating, sharing and cooperation (Cape Town Open Education Declaration, 2008), integrating OER into teaching and learning, supported by technology, will necessitate a systematic design based on constructivist principles, theories and models.

E-learning, commonly referred to as the "intentional use of networked ICT in teaching and learning," incorporates "all educational activities carried out by individuals or groups working online or offline, and synchronously or asynchronously via networked or standalone computers and other electronic devices" (Naidu, 2006, p. 2). Developing an OEReL environment will require more learning-centered pedagogical designs grounded in social constructivism, where learning becomes a collaborative process within a cultural and social context (Vygotsky, 1978). SBL is such a collaborative pedagogical design appropriate for e-learning, which incorporates authentic learning scenarios to situate learners and engage them in learning through facing challenging tasks (Naidu, 2006). However, the opportunities afforded by ICT can be optimally utilized only by the careful design of learning experiences.

From a social-constructivist perspective, ICT enables ample opportunities for learners to construct knowledge together through various synchronous and asynchronous strategies. Computer conferencing, more specifically asynchronous online discussion forums, play a significant role in this regard (Garrison, 1997). Further, discussion forums are proven to be very effective peer-based e-learning environments (Ching and Hsu, 2013; Xia *et al.*, 2013; Baran and Correia, 2009; Harris and Sandor, 2007; Rourke and Anderson, 2002). Peer learning occurs when the learners actively participate in knowledge construction through interactions with each other, and hence such an environment will be aligned with a social-constructivist approach.

Successful online learning will depend on how the learners are supported and facilitated throughout their learning process. The first-stage model of e-moderation (see Salmon, 2000) provides a framework to support or scaffold learners in an online learning environment. Accordingly, the online environment should be designed to facilitate learners to progress smoothly along these five stages: access and motivation; online socialization; information exchange; knowledge construction; and development (Salmon, 2000). This structured program would be further enhanced with careful design of online learning activities – "e-tivities" (see Salmon, 2002), that will enable active and participative online learning by individuals and groups.

The practice of online learning can be guided by the community of inquiry (CoI) framework which identifies critical prerequisites for a successful online learning experience (see Garrison *et al.*, 2001). It comprises three elements – cognitive presence, social presence, and teaching presence, as well as categories and indicators to define each presence (Garrison and Arbaugh, 2007). Cognitive presence is defined as "the extent to which the participants […] are able to construct meaning through sustained communication" (p. 89); social presence is described as "the ability of participants […] to project their personal characteristics into the community, thereby presenting themselves to the other participants as real people" (p. 89); teaching presence is explained in two functions: "design of the educational experience" performed by the teacher; and "facilitation," that may be shared among the teacher and the students (Garrison *et al.*, 2001). As evidenced by research, these

three overlapping elements within the CoI framework are very significant in enhancing knowledge construction via meaningful collaborations in online learning environments (deNoyelles *et al.*, 2014; Lambert and Fisher, 2013; Tekiner Tolu, 2013; Annand, 2011; Akyol *et al.*, 2010; Shea *et al.*, 2010). The CoI framework considers construction of meaning through social collaboration; hence it is grounded in social-constructivist theory.

OEReL online course

The OEReL course was a fully online professional development course for educators to develop their competencies in integrating OER in e-learning, through actively engaging in the same process during the course. It consisted of five modules – concept and practices of OER; search and evaluation of OER materials; licensing and copyrights; designing learning experiences for OEReL and integrating OER in e-learning. Integration of OER was a key feature of the course, and it was done in different ways and at different levels. Each module included an OER-related learning scenario, leading to OER-related individual and group tasks, with the support of different forms of OER (e.g. text, graphics, animations, audio, video) as learning resources. During the progression with each module, the complexity of OER-related activities were gradually increased, moving from reuse, revise, remix of OER, to creation of OER by the participants.

The online learning environment of the OEReL course was created in the Moodle learning management system (LMS). It adopted a SBL design grounded within the constructivist pedagogy, incorporating authentic learning scenarios where learners are situated and challenged with various tasks (Naidu, 2010).

A common structure was adopted in all five modules in the course as follows: a learning scenario; an individual activity based on it; supportive learning resources (OER); a group activity via a discussion forum; and an assignment submission including a self-reflection. A sample module format is presented in Figure 1.

The OEReL online course was designed considering the key design principles appropriate for e-learning including real world, problem-based learning situations where learners are encouraged to become self-regulated learners through social negotiation, with the facilitation of online tutors and peers (Salmon, 2000). Accordingly, peer-facilitated discussion forum activities with specific tasks were designed to facilitate knowledge construction in a collaborative manner, with the support of OER. These tasks were created with the influence of the "e-tivities" framework (Salmon, 2002). A sample format of a discussion forum activity is presented in Figure 2.

Participation in the discussion forum was an assessment requirement, and hence a rubric was prepared to assess it and shared with all participants via the LMS, so that all participants were clear about the expected contributions. Table I indicates the common assessment rubric used for discussion forums.

15 March - 21 March

Planning for an OER-based e-Learning Course

    Learning Scenario - Planning for an OER - based e-learning course

    Learning Activity - 1

    Learning Resources - 1

    Dialogue Begins...(Group Discussion - 1)

    Assignment - Part I

    Assignment Part I - Submission - Due 21 March 2015

    Assessment Rubric - Part I

Figure 1.
A sample
module format

Figure 2.
Format of a group
discussion forum
activity

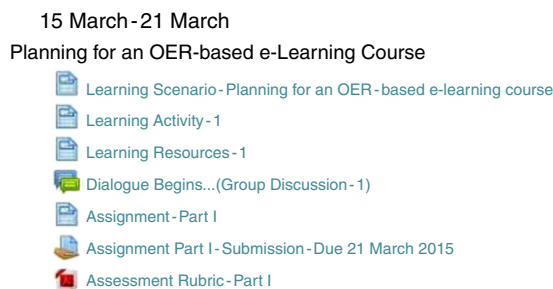> ### Dialogue Begins... (Group Discussion - 1)
>
> Post your **individually developed learning outcome (only one L.O.** in relation to your selected topic to be designed as an OER-based e-Learning course), to this discussion forum within the first two days of the week.
>
> Post this as a reply to the discussion topic already started, and keep along that same thread. (Without starting new discussion topics.)
>
> **During the first three days of the week, respond to the posts of at least two of your peers** and comment on the appropriateness of the three components of each LO, with suggestions on how they might be improved.
>
> **e-Moderator interventions:**
>
> The moderator will log into the forum once every day to offer feedback and guidance.
>
> **Schedule and time:**
>
> One week (spread over 5 days).
>
> Posting your work should happen during the first two days of the week.
>
> Responding to work of your peers should be done within the first three days of the week.
>
> **Learning Resources:**
>
> The essential resources (OER) and additional resources given will help you write your **learning outcomes.** You need to study the relevant sections/pages indicated in the web links given.
>
> **Next:**
>
> Based on peer feedback and tutor comments, you can now revise and refine the LO developed by you, and then **finalize all required** learning outcomes **(3-5)** for your course, along the same lines, clearly indicating the **three key components required (Behavioral change, Condition; Standard)** in each LO, and also indicating the **learning domain (Cognitive/Psychomotor/Affective)** under which each LO can be placed.
>
> This will be your Assignment - Part I

Methodology

Research design and research questions

This was a descriptive study of how peer-facilitated discussion forum activities affected professional development in OEReL of a group of academics within a specific context – OUSL, an ODL institution. A case study approach was adopted in this inquiry, which allowed an in-depth examination and gaining first-hand understanding of people and events in a real life context (Yin, 2003).

The learning design of the OEReL online course was within the social-constructivist pedagogy, facilitating knowledge construction in a collaborative manner with the

Aspect	Criteria	Points 5	Points 4	Points 3	Points 2	Points 1	Points received and comments
(c) Engagement in the group discussion forum	5. Active participation: how often; meaningful contributions; critical/analytical/constructive comments to peers	Participated in the discussion forum with at least 3 contributions – one self-post and two peer feedback posts critical/analytical/constructive comments provided to peers	Participated in the discussion forum with at least 3 contributions – one self-post and two peer feedback posts, but not critical/analytical/constructive comments	Participated in the discussion forum with at least 2 contributions – one self-post and one peer feedback posts critical/analytical/constructive comments provided to peers	Participated in the discussion forum with at least 2 contributions – one self-post and two peer feedback posts, but not critical/analytical/constructive comments	Participated in the discussion forum with at least 1 contribution – one self-post or one peer feedback posts but not critical/analytical/constructive comments	

Table I.
Assessment rubric
for discussion
forum activity

support of OER, through peer-facilitated discussion forum activities. The CoI framework (Garrison *et al.*, 2001), which identifies critical prerequisites for successful online learning considering construction of meaning through social collaboration, guided the designing of collection and analysis of data in this study.

The research questions of the study were as follows:

RQ1. How did peer-facilitated discussions affect the OEReL process among educators?

RQ2. What factors supported the peer-facilitated discussions in enhancing OEReL?

RQ3. What factors hindered the peer-facilitated discussions in enhancing OEReL?

RQ4. What challenges were faced by the educators in the peer-facilitated discussions?

Participants
The participants of the study consisted of academic staff members representing various departments of OUSL. Table II presents the background information of the participants.

The 35 participants who enrolled in the OEReL course constituted 51 percent females and 49 percent males, majority being lecturers (42.85 percent) and senior lecturers (34.29 percent). While a majority (62.85 percent) was with less than ten years' experience in the higher education sector, 85.71 percent have claimed either excellent or average proficiency in the Moodle LMS. However, by mid-course, out of 35 registered, 14 participants (40 percent) were actively engaged in the course, and only ten participants (29 percent) successfully completed all five modules receiving Mozilla badges.

Collection and analysis of data
Data collection was conducted throughout the course using various strategies. For the purpose of this study, content analysis of the threaded forum discussions was the key data collection and analysis strategy based on the CoI framework (Garrison *et al.*, 2001). It was supplemented with participants' self-reflections as well as with focus group discussions.

Aspect	Category	Number	%
Gender	Male	17	48.6
	Female	18	51.4
Highest educational qualification	PhD	13	37.1
	MPhil	3	8.6
	Masters (other)	9	25.7
	Post graduate diploma	1	2.9
	Bachelor's degree	9	25.7
Current designation	Professor	2	5.7
	Senior lecturer	12	34.3
	Lecturer	15	42.9
	Librarian	4	11.4
	Lecturer (temp)	2	5.7
Experience as an educator (in the higher education sector)	⩽5	13	37.1
	6-10	9	25.7
	11-15	3	8.6
	16-20	3	8.6
	> 20	7	20.0
Proficiency in the use of Moodle (LMS)	Excellent	10	28.6
	Average	20	57.1
	Poor	05	14.3

Table II.
Participant profile

Writing self-reflections was included as an assessment requirement in each of the assignments in each module. Specific guidelines were provided to write self-reflections as indicated below.

Guidelines to write self-reflections. As an assessment requirement, you need to write short reflections at the end of each of the stages of your learning process. After completing each stage, recall the learning/assessment activities you were engaged in. Make self-critical notes on your feelings, ideas, successes/failures and problems that may have arisen, related to each activity.

Write a short reflection (a single page) focussing on the following:

- Analyzing the importance of the activity/activities.

- How this experience has affected you/others?

- What were the issues arisen and how those were overcome?

- What were the successes/failures?

- What impact this experience had had on you?

- Could you have done certain things in a different manner, and if so, how?

Your reflective notes are your own ideas. The important thing is to write your reflections clearly and meaningfully.

Semi-structured focus group discussions were conducted with the participants during mid-course and end-course, with 10 active participants at each instance. The list below indicates the questions asked during the focus group discussions.

Focus group discussions:
- What were your expectations when you joined the OEReL online course, and to what extent and how these expectations have been met by you?

- What factors facilitated/hindered your OEReL process?
- What are the key challenges you faced, and what are the strategies adopted to face those challenges?
- What are the strengths and limitations of the OEReL course?
- Any suggestions for improvements?
- How prepared are you to integrate OEReL in your current practices, and in what ways?

The five modules in the OEReL course comprised 14 discussion forum activities leading to the assessment tasks. For the content analysis of the threaded discussion forums, an individual discussion post, demarcated by the participants themselves as an individual "message," was considered as the "unit of analysis" (Garrison *et al.*, 2001). Each message was analyzed, classified and coded according to the indication of three presences – cognitive, social and teacher presence, based on the CoI framework as explained in Table III.

A total of 910 messages that were posted in the 14 discussion forums were analyzed and coded in the manner indicated in Table III. Having discussed and agreed upon the coding and categorizing strategy, each message was analyzed by two researchers to maintain the reliability. During the coding, it was also determined whether there was an indication of more than one type of presence, within a single "unit of analysis," i.e. a single message.

Findings and discussion
How did peer-facilitated discussions affect the OEReL process among educators?
During each discussion, knowledge constructions among the participants was very clearly observed where they shared and build up on their understandings through dialogue. The specific guidelines provided by the instructors in each task (see Figure 2) and criteria in the assessment rubrics (see Table I), compelled them to post their individual drafts for peer review and post critical and constructive feedback to their peers, which in turn supported them all in their learning. This implies the significance of well-designed tasks to arrive at a collaborative resolution in a "CoI" (Garrison and Arbaugh, 2007), and enhance knowledge construction in online learning (Salmon, 2000).

Element	Code	Explanation	Indicators
Cognitive presence	CP	The extent to which the participants are able to construct meaning through sustained communication	Sense of puzzlement; information exchange; connecting ideas; apply new ideas
Social presence	SP	The ability of participants to project their personal characteristics into the community, thereby presenting themselves to the other participants as "real people"	Emotions; risk-free expression; encouraging collaboration
Teaching presence-1	TP-I	Design of the educational experience; facilitation and direct instruction, by the instructor	Setting curriculum and methods Sharing personal meaning; focussing discussion
Teaching presence-2	TP-S	Facilitation and direct instruction by the students	Sharing personal meaning; focussing discussion

Table III.
Strategy adopted for data analysis

The findings of the detailed analysis of the discussion forum messages are presented in Table IV.

A very clear observation was that all three presences – cognitive, social and teacher occurred in most of the messages (see Table IV). Following are a few examples of coded messages, indicating the occurrence of multiple presences within a single unit of analysis:

What a colorful concept map! **(SP)**.

You have identified the key concepts and shown their relationships **(CP)**.

I have some comments to improve it further: The question given to us is to develop a concept map about "Openness in Education" not about "OER based e-Learning." So you have to change your main theme. Build your key concepts and related concepts around the main theme linking them in a logical order **(TP-S)**.

Hope you will do a better job in the next version. Hurry up!! Tomorrow is the deadline!!! **(SP)** (#M1-Dl-G2).

Good work! Seems that you have almost completed the task **(SP)**.

You have nicely gathered number of criteria to evaluate the OER material given. And also described the relevance, effectiveness and importance of selected criteria on evaluation **(CP)**.

However your answer would be more comprehensive if you evaluate the OER material (Video) by using the identified criteria **(TP-S)**.

Good luck for your final submission **(SP)** (#M2-D3-B1).

It was quite evident that while cognitive presence and social presence have played a major role in the knowledge construction process, the teaching presence of students in facilitating their peers too was highly significant. It was also interesting to note that a majority of messages had a common pattern – starting with a phrase with social presence, then cognitive presence and/or teaching presence, and ending with social presence again. Apparently, there was a complementary relationship between all three "presences," establishing the interdependence of the three elements (Garrison and Arbaugh, 2007).

Module no.	Disc. forum	No. of active participants (I+S)	Total posts	CP No.	CP %	SP No.	SP %	TP-I No.	TP-I %	TP-S No.	TP-S %
1	1	22	99	94	95	43	43	5	5	41	41
	2	18	90	66	73	35	39	12	13	16	18
	3	14	56	38	68	32	57	3	8	16	42
2	1	15	84	77	92	52	62	5	6	26	34
	2	12	60	41	68	35	58	5	8	19	32
	3	13	66	50	76	42	64	2	3	27	41
3	1	11	66	38	58	41	62	4	6	21	32
	2	11	37	29	78	19	51	2	5	11	30
	3	11	95	53	56	48	51	7	7	25	26
4	1	11	76	57	75	41	54	4	5	18	24
	2	11	64	50	78	30	47	2	3	12	19
	3	11	45	31	69	20	44	5	11	15	33
5	1	11	35	23	66	27	77	6	17	9	26
	2	11	37	27	73	26	70	5	14	15	41
Total	14		910								

Table IV.
Analysis of discussion forum messages – module-wise

Since the main purpose of these discussion forum tasks was to enhance knowledge construction through peer-facilitation, the instructors' intrusion during the dialog was minimal, other than setting-up of the task with specific guidance, provision of resources, focussing discussion and commenting when necessary. Hence, the teaching presence of instructors (TP-I) was a small percentage. However, it was clear that teacher presence of students (TP-S) played a key role in peer-facilitation, as evident by the very descriptive and constructive feedback provided to each other. This is in accordance with the CoI model which acknowledged facilitation becoming a shared responsibility among instructors and students (Garrison *et al.*, 2001) enhancing a change of the traditional roles of instructors and learners. It augmented participants becoming more autonomous and self-regulated learners as well as collaborators in the knowledge construction process.

Further, the structure of the forum discussions had allowed "meta-cognitive awareness" (Garrison and Arbaugh, 2007) among the participants as they became aware of changes in their thinking and conceptual understandings through the discussions. Since the concept of OER was novel to a majority of the participants, forum discussions within the course design that were directly related to authentic issues in the adoption of OER by educators, assisted them to gradually build up their knowledge, involving a deep learning supporting a more higher order thinking process.

What factors supported the peer-facilitated discussions in enhancing OEReL?
The participants' responses revealed that the SBL pedagogical design adopted in the course, individual and group learning and assessment tasks, support of OER as learning resources, specific tutor guidance and the peer support extended to each other extremely facilitated their learning. Following are some quotes to support these findings:

[…] the design adopted – SBL liked it very much […].

[…] the consistent structure in the modules contributed to ease of navigation which also helped facilitate my learning experience […].

[…] I am happy about reading the resources […] as they are very relevant and interesting […].

[…] I have been able to improve, due to the constructive feedback given by the facilitators […].

[…] peer reviews in the discussion forum are a great learning resource […].

The following quotes further elaborate how the participants valued peer-discussions and their impacts on them:

[…] the best part of this is collaborative learning that takes place through the discussion with peers. Earlier I had some doubts that when allowed collaborative learning whether you will be totally influenced by others and your own creative thoughts may not come to work. But after start following the course I found that belief is not correct […].

[…] due to my family commitments I could not learn this module as I did in earlier Modules. Because of my internal motivation to complete this course, I finally hurried to complete my assignment and I felt so lonely, learning alone. I could not participate in discussions and post my assignments to get peer feedback. I also could not give feedback to others. However, I followed all the discussion posts, posted by others and got some valuable insights in drafting my assignment. This is the beauty of online learning, having all discussions posts stored and can be retrieved even at a later stage for the learners who have missed the opportunity of communicating and collaborating in the stipulated time period. In addition I also felt the value of communication and collaboration in an e-leaning situation which is crucial for meaningful learning […].

These findings confirm the fact that in a CoI, social presence lays the base for a high-level academic dialogue, while the teaching presence created through course design, structure and leadership provided by the instructor impact on deep and meaningful interactions of learners, through which cognitive presence can be developed (Garrison and Arbaugh, 2007).

What factors hindered the peer-facilitated discussions in enhancing OEReL?
The key hindering factor that had affected all participants was the time constraint in completing the tasks within the stipulated timeframe per a discussion. According to the course structure, each discussion was to take place within one week, during which the participants had to engage in an individual activity referring to the learning resources, and post a draft submission for peer review, and post constructive comments to at least two peers (see Figure 1). A majority could not adhere to this timeframe due to their various commitments as full-time academics, as evident by some comments stated below:

> […] I am sorry I am late. This is because I was away […] and returned only last night (very late). Most of the time there was no electricity there and had very limited internet connectivity and thus could not log-in among the many family commitments […] Hopefully some of you will give a few comments […].

> […] I am so late for submitting this assignment as I was engaged in other urgent and important matters. As S mentioned "better late than never" even though I prefer to be never late! So I am back again. I know you all are very busy and if you have time please go through my draft (actually a final!) and give your suggestions. Really appreciate your concern […].

Dissatisfaction with the clarity of some resources provided to support the expected tasks in certain modules was identified as a hindering factor by some participants:

> […] I was not very satisfied with the reading resources given in this section. Although the resources were good, I could not grasp the main aspects, clearly and easily […] I had to search many more resources to get a thorough understanding […].

In addition, technical issues affected the smooth run of the course and the participants' learning process:

> […] I too was trying frantically to upload the Assignment till 2.00 am this morning. Finally gave up. Now I tried and managed. Some serious problem with the server, I think […].

> […] you are not alone. Same problem – the server is not so stable – changing all the time and making us getting frustrated! But don't give up […].

Addressing such issues, often the discussions had to be extended and to be flexible with the deadlines too, in order to allow the participants to engage in a meaningful discussion. This stresses the essential need of the teaching presence and social presence of the instructor during the learning process by way of supporting them overcomes the hindrances.

What challenges were faced by participants in the peer-facilitated discussions?
As revealed by data presented in Table III, the number of participants who actively contributed in the discussion forums has gradually decreased from the first module to the others, and the total number of messages posted has also reduced to some extent. There were certain instances of high number of posts in the discussion forums

(e.g. 3-3 = 95; 4-1 = 76), implying a high interaction even among a small number of participants. Conversely, there were also some instances of very small number of posts in the discussion forums (e.g. 3-2 = 37; 5-1 = 35; 5-2 = 37), indicating lesser interactions. This observation could be related with the complexity of the tasks required in each of these modules.

As described earlier, the major challenge faced by the participants was the expected workload within the stipulated time, which was a common grievance reflected upon by almost all:

> […] finding time was a challenge (to all of us I suppose) and it takes more than the stipulated time […] I think the facilitators have underestimated the time required to carry out this type of higher order activity which needs time to read, think, analyse and reflect points […].

> […] here is my draft assignment. I am so late to post my assignment and hope there is some body to give me feedback. I am really sorry to say I still could not give you feedback. I will try […] though it is late, learning is not restricted for assignment submissions […].

In addition, some participants faced confusions in understanding certain task requirements that necessitated additional instructor and peer support. Apparently, the "cognitive load" (Sweller, 1988) that was placed upon the participants who were full-time academics, had been quite challenging. However, their commitment and motivation in facing such challenges, especially with peer support, and completing the course fulfilling all requirements of the five modules can be commended.

In order to support and motivate the students who faced numerous challenges during the learning process, the instructors continuously communicated with the learners guiding and motivating them, yet without disturbing the peer discussion. This was done through a separate News Forum included in all the modules, in addition to the peer-discussion forums. Figure 3 indicates an example of such a forum.

While, the participants appreciated this support, some mentioned it would have been better to include these posts by instructors too, within the peer discussion forums, rather than in a separate news forum.
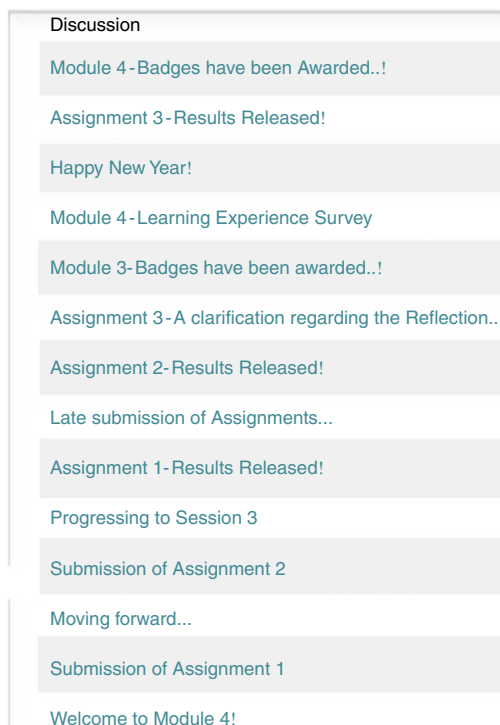
Overall, the findings reaffirm the significant of role of instructors in cultivating the three presences within a peer-facilitated environment, by enabling learners to engage with the content in a meaningful manner through appropriate course design, structure and leadership (Garrison and Arbaugh, 2007).

Conclusions

Peer-facilitated discussion forum activities incorporated in the OEReL course were found to be very effective in facilitating the participants in their knowledge construction process. In addition to understanding the content more effectively, the peer-discussions have helped them to assess each other's work as well as self-assess their work and further improve. Peer-facilitated forum discussions had created an opportunity for learners in meaning-making together through social negotiation, where facilitation became a shared responsibility among instructors and learners.

The three elements – cognitive presence, social presence and teaching presence have played a major role in knowledge construction in OEReL. While cognitive presence and social presence were found to be the most indicative, teaching presence of students in facilitating their peers too was significant. A complementary relationship between cognitive presence, social presence and teaching presence was observed, where the three elements have interacted in supporting knowledge construction.

Discussion
Module 4 - Badges have been Awarded..!
Assignment 3 - Results Released!
Happy New Year!
Module 4 - Learning Experience Survey
Module 3 - Badges have been awarded..!
Assignment 3 - A clarification regarding the Reflection...
Assignment 2 - Results Released!
Late submission of Assignments...
Assignment 1 - Results Released!
Progressing to Session 3
Submission of Assignment 2
Moving forward...
Submission of Assignment 1
Welcome to Module 4!

Figure 3.
Sample of a news forum led by the instructor

The SBL design that used authentic scenarios, individual and group learning and assessment tasks with OER integration and specific instructor guidance were found to be the most supportive factors, while time constraints due to workload was the main challenge that hindered the discussions. Peer-facilitated forum discussions can be creatively used in a meaningful manner for knowledge construction, through carefully orchestrated, well-structured and pedagogically sound OEReL environments.

References

Akyol, Z., Ice, P., Garrison, D.R. and Mitchell, R. (2010), "The relationship between course socio-epistemological orientations and student perceptions of the community of inquiry", *The Internet and Higher Education*, Vol. 13 Nos 1-2, pp. 66-68.

Annand, D. (2011), "Social presence within the community of inquiry framework", *The International Review of Research in Open and Distance Learning*, Vol. 12 No. 5, pp. 40-56, available at: www.irrodl.org/index.php/irrodl/article/view/924/1855 (accessed June 4, 2016).

Baran, E. and Correia, A. (2009), "Student-led facilitation strategies in online discussions", *Distance Education*, Vol. 30 No. 3, pp. 339-361.

Cape Town Open Education Declaration (2008), "Cape Town Open Education Declaration: unlocking the promise of open educational resources", available at: www. capetowndeclaration.org/read-the-declaration (accessed June 4, 2016).

Ching, Y. and Hsu, Y. (2013), "Peer feedback to facilitate project-based learning in an online environment", *The International Review of Research in Open and Distributed Learning (IRRODL)*, Vol. 14 No. 5, pp. 258-276, available at: www.irrodl.org/index.php/irrodl/article/view/1524/2655

COL (2011), "UNESCO-COL guidelines for open educational resources (OER) in higher education", available at: http://oerworkshop.weebly.com/uploads/4/1/3/4/4134458/2011.04.22.oer_guidelines_for_higher_education.v2.pdf (accessed June 4, 2016).

deNoyelles, A., Zydney, J.M. and Chen, B. (2014), "Strategies for creating a community of inquiry through online asynchronous discussions", *MERLOT Journal of Online Learning and Teaching*, Vol. 10 No. 1, pp. 153-165, available at: http://jolt.merlot.org/vol10no1/denoyelles_0314.pdf (accessed June 4, 2016).

Garrison, D.R. (1997), "Computer conferencing: the post-industrial age of distance education", *Open Learning*, Vol. 12 No. 2, pp. 3-11.

Garrison, D.R. and Arbaugh, J.B. (2007), "Researching the community of inquiry framework: review, issues, and future directions", *Internet and Higher Education*, Vol. 10 No. 2007, pp. 157-172.

Garrison, D.R., Anderson, T. and Archer, W. (2001), "Critical thinking and computer conferencing: a model and tool to assess cognitive presence", *American Journal of Distance Education*, Vol. 15 No. 1, pp. 7-23.

Harris, N. and Sandor, M. (2007), "Developing online discussion forums as student centred peer e-learning environments", *Proceedings-Concise Paper, ASCILITE, Singapore, December 2-5*, available at: www.ascilite.org/conferences/singapore07/procs/harris.pdf (accessed June 4, 2016).

Jonassen, D., Peck, K. and Wilson, B. (1999), *Learning with Technology: A Constructivist Perspective*, Merrill, Upper Saddle River, NJ.

Lambert, J.L. and Fisher, J.L. (2013), "Community of inquiry framework: establishing community in an online course", *Journal of Interactive Online Learning*, Vol. 12 No. 1, pp. 1-16, available at: www.ncolr.org/jiol/issues/pdf/12.1.1.pdf (accessed June 4, 2016).

Naidu, S. (2006), *E-Learning: A Guidebook of Principles, Procedures and Practices*, Commonwealth Educational Media Centre for Asia, New Delhi, available at: http://cemca.org.in/ckfinder/userfiles/files/e-learning_guidebook.pdf (accessed June 4, 2016).

Naidu, S. (2010), "Using scenario-based learning to promote situated learning and develop professional knowledge", in Errington, E.P. (Ed.), *Preparing Graduates for the Professions Using Scenario-Based Learning*, Brisbane, Post Pressed, pp. 39-49.

Rourke, L. and Anderson, T. (2002), "Using peer teams to lead online discussions", *Journal of Interactive Media in Education*, Vol. 1, pp. 2-21, available at: http://jime.open.ac.uk/articles/10.5334/2002-1/ (accessed June 4, 2016).

Salmon, G. (2000), *E-Moderating: The Key to Teaching and Learning Online*, Kogan Page, London.

Salmon, G. (2002), *E-tivities: The Key to Active Online Learning*, Routledge, London and New York, NY.

Shea, P., Hayes, S., Vickers, J., Gozza-Cohen, M., Uzuner, S., Mehta, R., Valchova, A. and Rangan, P. (2010), "A re-examination of the community of inquiry framework: social network and content analysis", *Internet and Higher Education*, Vol. 13 No. 2010, pp. 10-21, available at: https://workstory.s3.amazonaws.com/assets/331144/reexamination_of_CoI_original.pdf (accessed June 4, 2016).

Sweller, J. (1988), "Cognitive load during problem solving: effects on learning", *Cognitive Science*, Vol. 12 No. 2, pp. 257-285, available at: http://onlinelibrary.wiley.com/doi/10.1207/s15516709cog1202_4/pdf (accessed June 4, 2016).

Tekiner Tolu, A. (2013), "Creating effective communities of inquiry in online courses", *Procedia –
Social and Behavioral Sciences*, Vol. 70 No. 2013, pp. 1049-1055, available at: http://
ac.els-cdn.com/S1877042813001584/1-s2.0-S1877042813001584-main.pdf?_tid=00dd6bc4-
0ca8-11e6-84e4-00000aacb35d&acdnat=l461782819_3d0db6f5f0be322ee992d8f2a98a31fd
(accessed June 4, 2016).

Vygotsky, L.S. (1978), *Mind in Society, the Development of Higher Psychological Processes*,
Harvard University Press, Cambridge, MA.

Xia, J., Fielder, J. and Siragusa, L. (2013), "Achieving better peer interaction in online discussion
forums: a reflective practitioner case study", *Issues in Educational Research*, Vol. 23 No. 1,
pp. 97-113, available at: www.iier.org.au/iier23/xia.pdf (accessed June 4, 2016).

Yin, R.K. (2003), *Case Study Research: Design and Methods*, 3rd ed., Sage, Thousand Oaks, CA,
available at: www.cosmoscorp.com/Docs/AERAdraft.pdf (accessed June 4, 2016).

Corresponding author
S.P. Karunanayaka can be contacted at: spkar@ou.ac.lk