Online Learning Communities in Teachers' Professional Development: A Systematic Review[1]

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Abstract

This paper aims at contributing to an understanding of using online learning communities in teachers' professional development in the context of lifelong learning. To investigate that, this study is designed as a systematic review. Research questions of this study are indented to reveal what the most repeated keywords combining with learning communities and/or teachers' professional development are, what the main characteristics of participants are, what the trends and difficulties in published works on teachers' professional development are. The results have been discussed in the context of learners and learning and it is aimed to map the studies on learning communities in teachers' professional development in the context of lifelong learning. It was found that online learning communities was also used under different names such as community of practice, computer-mediated communication and participatory media frequently. Researchers mostly used discussion boards as online communities. The other specific platforms to build an online communities were found to be learning management systems including Moodle, WebCT and D2L, Facebook groups and asynchronous platforms such as blogs. When the trends and difficulties in the published works on online learning communities in teachers' professional development were investigated, it can be said that using online learning communities to provide a constructive space for both collaborative learning and reflection on teaching, using an asynchronous space in addition to synchronous one, and getting support from peers if participants provide support were the trends.

Keywords: lifelong learning, online learning communities, systematic review, teachers' professional development

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Introduction

Secondary students tend to have serious difficulties with math, while secondary math teachers are inadequately supported to enhance their students' math competencies (Stylianides, 2016). In this case, on one hand, teachers are asked to develop their competencies to support and enhance their students' competencies. On the other hand, teachers are not supported enough for their own development. In the light of that finding, it can be seen that teacher education or teachers' professional development should be on-going and dynamic after their graduation. When it is offered regularly, it provides both the acquisition of knowledge and the development and updating of existing knowledge or skills (Odabaşı & Kabakçı, 2007). Professional development is described as the learning of a person in his or her professional role. Thereby, teachers' professional development is the growth of a teacher by increasing his or her knowledge and practices in teaching and examining that teaching competencies systematically (Glatthorn, 1995). There might be different ways of increasing teachers' knowledge and practices in teaching. Odabaşı (2003) stated that those ways as organizational development, instructional innovation and developing teaching skills.

In 2009, the OECD's research showed that 55% of teachers in OECD countries, who participated in the survey, needed professional development in different subjects including subject matter they teach, innovative teaching methods, and assessment. Moreover, in another study with similar findings, it was found that 78% of participants needed professional development of teachers (Ceylan & Özdemir, 2016). Even if teachers mentioned that they needed professional development, they could not also attend those courses based on different reasons. Teachers listed the factors that prevented their participation in professional development in Kaçan (2004) as financial problems with 76.3%, their course load with 55.9% and political pressures with 42.8%. In a more recent study, Köseoğlu et al. (2020) found that teachers could not attend professional development courses because their teaching/working hours (26%) overlapped with those courses and they also stated that there was not any professional development courses for their needs (19%). In addition to these, some other reasons were adult responsibilities (13%), fees of the professional development programs (9%), and lack of administrative support (7%). Last but not least, another reason why teachers did not attend professional development courses was that teachers thought that they did not benefit from the last professional development course they participated (Köseoğlu et al., 2020). Butler et al. (2004) criticize those traditional approaches that teachers could not benefit and propose more collaborative models. For them, traditional approaches in teachers' professional development are one-stop workshops where teachers are provided with knowledge and resources related to their subjects and pedagogy. In contrast, collaborative approaches in professional development refer to the learning communities that teachers collaborate, solve problems, reflect, and co-construct knowledge about teaching.

Could online learning communities be a solution for that problem regarding their nature of providing both flexible and collaborative environment? An online learning community is basically defined as a group of people interacting in an online environment. A virtual or online community is defined as "a group of people who interact online on a regular basis and share common goals, ideals, or values" (Owston, 1998, p. 60). Those groups become "communities" when they interact with one another and stay together for a period of time to form a set of customs, or when they come to rely on one another to achieve certain goals (Wilson & Ryder, 1996). For this reason, it can be said that online learning communities have some characteristics to be called as a community and those are listed as having a purpose, been

supported by technology and been guided by norms and policies (Preece, 2000). Charalambos, Michalinos and Chamberlain (2004) later added new characteristics for successful online communities as consisting of people who cannot meet facetoface due to geographical and time constraints, having tasks clearly defined and participants having a clear understanding of the expectations, easy access to technology and tools and ongoing interaction and mutual support among its members.

An online learning community can provide a setting for constructive, exploratory, and collaborative learning (Cho, 2016). Online learning communities can help learners in distance learning programs feel more connected to their instructors and peers (Snyder, 2009) because it is well known fact that learners in distance learning programs feel more isolated and lonelier. It is also possible that online learning communities increases learner- learner, learner-instructor, learner-learning material interactions in distance learning.

Beyond that, learning communities have also been seen as offering valuable opportunities for authentic and personalized learning (Duncan-Howell, 2010) in the area of teachers' professional development. A successful online learning community for teachers increases communication, collaboration, and support among participants (Booth, 2011) and teachers develop an awareness of community, increase their subject and pedagogical content knowledge, and improve their teaching practices (Blitz, 2013). Evidence from studies of online teacher communities suggests that they offer great potential for professional learning, relationship building, and emotional support (Shelton & Archambault, 2018). Lastly, Li, Zheng and Zheng (2020) found that participants showed a positive perception of using online learning communities in teachers' professional development. Also, their satisfaction was higher with the professional development.

Despite the high use of online learning communities in teachers' professional development, there is still gap between literature and practice on how to design effective online communities and sustain them, especially considering the cultural differences in multicultural communities (Li, Zheng & Zheng, 2020). Creating and sustaining online learning communities in teachers' professional development is different from just integrating technology into traditional professional development courses or programs. Rather, it is an opportunity to think differently about professional development approaches as technology provides teachers multiple opportunities to thinking, reflecting, sharing, collaborating and problem-solving (Lock, 2006).

Problem Statement

To sum up, based on the arguments above, it can be seen that the literature is still in its infancy on teachers' professional development in online learning communities, especially in the context of lifelong learning. Identifying essential concepts and factors regarding designing and sustaining an online learning community is critical at the current stage. Because, although there are literature reviews available for teachers' professional development (Spilker et al., 2020; Phuong et al., 2018) and online learning communities (Hung et al., 2015) separately, there is a need for conducting reviews including both concepts together.

Aim and Importance

This paper aims at contributing to an understanding of using online learning communities in teachers' professional development in the context of lifelong learning. For this reason, it is critical to contribute to an understanding of using online learning communities in teachers' professional development to identify important concepts and factors regarding designing and sustaining an online learning community.

To accomplish this, the current study began with the formulation of research questions. The following are the study's research questions:

1. What are the distribution of the publication year and most repeated keywords combining with learning communities and / or teachers' professional development in the context of lifelong learning?

2. What are the main features of participants in the experimental research studies including career levels such as pre-service or in-service teachers and the number of participants?

3. What are the trends in publications on teachers' professional development, including group size of online learning communities, research methods, data sources, courses and platforms, interactions?

4. What are the difficulties in publications on teachers' professional development?

5. What do the common findings say to us about the research of learning communities in teachers' professional development in the context of lifelong learning?

Method

According to Petersen et al., (2008) this study is structured as a systematic literature review with five steps.Those steps are:

- Description of research questions
- Searching for relevant published research
- Screening of those research
- Coding of them
- Analyzing and mapping the data

Gusenbauer and Haddaway (2020) conducted a recent review in which they evaluated the retrieval performance of 28 well-known databases for evidence synthesis and concluded that, some databases, such as Google Scholar, are useful for cross-checks, while they are not suitable for reviews. For this reason, SCOPUS, Web of Science and Science Direct databases were selected among the principal sources they listed. Those databases were scanned because they are the most inclusive ones and the researcher can access them on campus. After searching the databases, 16 studies in Scopus, 7 in Web of Science and 6 in ScienceDirect were found and after scanning through the studies, 17 studies in total related to the research problem were determined and are shown in Figure 1.

(TS= ("teacher education" OR "teacher training" OR "teachers' professional development") AND TS= ("online learning communities" OR "online community of practice" OR "digital learning communities")) AND LANGUAGE= (English) AND DOCUMENT TYPES: (Article)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI
Timespan=Last 5 years

To answer the research questions, categorization criteria were created, and the studies were coded using those criteria. Those criteria include the publication year of the study, keywords, participants' characteristics whether they are in-service or pre-service teachers, group size, the research methods, data sources, platform used for interaction, how participants interact with, and the trends on that topic. Criteria were determined to answer research questions.

Figure 1

The Illustration of the Research Process
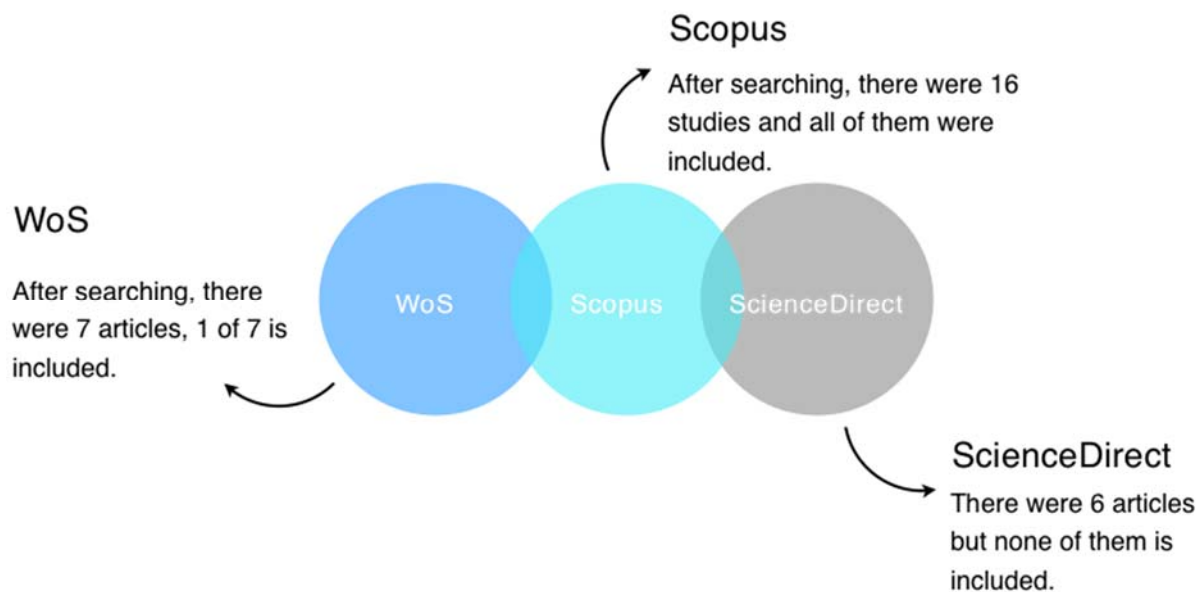
Findings

This part of the paper shows the published research studies on online learning communities in teachers' professional development regarding the mapping criteria. Criteria are the publication year of the study, keywords, participants' features, whether in-service or pre-service teachers, group size, research methods, data sources, the platform used for interaction, how participants interact with, and the trends on that topic.

Publication Year of the Study

The distribution of the publication years of the studies on online learning communities in teachers' professional development was asked in RQ1 and it can be seen in Table 1. Based on the finding, it can be seen that the number of the studies on the research on online learning communities in teachers' professional development distributed differently and it is hard to say if there is a trend regarding publication year.

Table 1

The Distribution of the Publication Year in the Published Researches

Publication year	2016	2017	2018	2019
Number of the studies published	7	2	7	1

Keywords

After investigating the distribution of the keywords regarding RQ1, "online learning communities" was the most repeated keyword (6) as no surprise. However, it was also used under different names such as community of practice (5), computer-mediated communication (1), Facebook-mediated communication (1), and participatory media (1). For this reason, we can accept its frequency as 14. Following that, teacher education (6) was the most frequently used keyword in online learning communities in teachers' professional development research. It was also used in other names related with teacher education including teacher as knowledge creators (1), teacher's engagement and participation (1), and teacher self-efficacy (1). Apart from these two keywords, which were also the search terms for this research, any frequency was not found regarding keywords.

The other keywords related to online learning communities in teachers' professional development research were; interactive learning environments (1), pedagogical issues (1), partnership (1), collaborative learning (1), and innovation, culture and technology (1). Based on these keywords, it can be seen that online learning communities emphasize collaboration and they are mostly used in partnership building in the context of professional development.

Finally yet importantly about keywords, they also provide us with some information about the methods used in the research on online learning communities in teachers' professional development include case study (1), teacher action research (1), and micro-ethnography (1).

Based on those findings regarding kewwords, it can be said that online learning communities emphasize collaboration and they are mostly used in partnership building in the context of professional development. However, as a researcher, it is seen that the platforms are missing in the keywords if they are a learning management systems including Moodle, WebCT and D2L, social media groups or asynchronous platforms such as blogs and wikis.

Participants

When the participants were investigated regarding RQ2, it can be said that 11 of 17 studies were conducted with in-service teachers, while four of them were conducted with pre-service teachers. One research used in-service and pre-service teachers together as a mixed group.

Based on those findings regarding participant characterictics, it can be said that researches on online learning communities in teachers' professional development have been mostly conducted with in-service teachers.

Table 2

The Distribution of the Participants in the Published Researches

Participants	In-service Teachers	Pre-service Teachers	Mixed
Number	11	4	1

Group Size of the Studies

Özkul and Aydın (2012) showed us three models in open and distance learning regarding the group size; (a) small courses with strong interactions up to 25 students, (b) small courses with weak interactions up to 50 students and (c) massive courses based on individual learning up to 300 students. When the group size of the online communities was investigated to see if there is a trend in group size of online communities regarding RQ3, it can be seen that researches were conducted with different group sizes equally, for this reason research on online learning communities in teachers' professional development does not get affected by group size. The data is shown in Table 3.

Table 3

The Distribution of the Group Size in the Published Researches

Group Size	Up to 25	Up to 50	Up to 300
Number	5	5	5

Apart from the studies mentioned above in the literature one study was conducted with 584 participants and another study did not mention the group size. Based on those findings regarding group size of the studies, it can be said that researches on online learning communities in teachers' professional development have been distrubuted equally.

Research Method

When the research methods of the researches on online learning communities in teachers' professional development were investigated to see if there is a trend in research methods regarding RQ3, it can be said that qualitative methods were mostly used in that area. The data is given in Table 4.

Table 4

The Distribution of the Research Methods in the Published Researches

Research Methods	Qualitative	Quantitative	Mixed Method
Number	10	4	2

Based on the findings in Table 4, it can be said that qualitative methods have been mostly used to design a research on online learning communities in teachers' professional development. Besides, when qualitative studies were investigated in detail, it can be seen that four of them were case studies, while two of them were ethnographies. Following that, four of the studies were designed as a quantitative research method and all of them were conducted by using survey method. One study did not mention the research method it used.

Data Sources

When the data sources of the research studies on online learning communities in teachers' professional development were investigated to see if there is a trend on how researchers collect data regarding RQ3, it can be seen that transcripts of the discussion boards were mostly used data sources for the researchers and it can also be seen that some researchers used more than one data sources. Detailed data is shown in Table 5.

Table 5

The Distribution of the Data Sources in the Published Researches

Data Sources	Frequency
Discussion boards	7
Document analyses	5
Survey	4
Observation	4
Interviews	4
Personal messages	2
Field visits	1

Based on the information above, the researchers mostly used discussion boards (7) as data sources. The others following that were document analyses (lesson plans, curriculum examples, and reflections of teachers) (5), surveys (4), observation notes (4), interviews (4), personal messages (2), and field visits (1).

Courses and Platforms

The courses for the professional development and platforms for the online communities of the research studies on online learning communities in teachers' professional development were investigated regarding RQ3 to see if there is a trend and the findings are shown in Table 6 and 7.

Table 6

The Distribution of the Course Content in the Published Researches

Courses for Professional Development	Frequency
Professional Development (The courses are about PD but they did not mention the content)	7
East Asian Studies	1
English	1
Reading	1
School Practice	1
Undefined	6

Based on the data in Table 6, it can be said that the course content, which researches conducted, was mostly related to professional development with its different aspects but the aspects like subject, pedagogic or technologic were not mentioned in the studies. Four of the researches defined the course subject well such as East Asian Studies (1), English (1),

Reading (1) and School Practice (1). The course content of the rest of the research studies (6) was not defined

Table 7

The Distribution of the Online Learning Communities (Platforms) Used in the Published Researches

Platform for the Online Learning Communities	Frequency
Online Platforms	8
Learning Management Systems	3
Facebook Groups	3
Asynchronous Platforms	2
Simulations	1

As Table 7 shows, online platforms (8) were mostly used in the researches on online learning communities in teachers' professional development. In each research study the purpose of these platforms were defined differently. For example in one study it was defined as a platform to share their knowledge, experience, documents, while in another it was defined as a platform for conversations between mentor teachers and mentee teachers. The other specific platforms to build an online communities were found to be learning management systems (3) including Moodle, WebCT and D2L, Facebook groups (3), and asynchronous platforms (2) such as blogs. Lastly, one research used simulations to build an online learning community for teachers.

Interactions

The data on how participants interact with others in the researches on online learning communities in teachers' professional development to see if there is a trend in the context of interactions regarding RQ3 and the finding is shown in Table 8.

Table 8

The Distribution of the Interaction Tools in the Published Researches

Interaction	Frequency
Discussion Boards	11
Synchronous meetings	3
Online Platform	2
Facebook Groups	1

As it can be seen above in Table 8, discussion boards were most frequently used in online learning communities in teachers' professional development researches as main interaction tools. Synchronous meetings (3), online platforms (undefined) (2) and Facebook groups (1) were the other tools that participants interacted with other participants in the online learning communities.

Trends

After analyzing the findings of the published works, trends in the use of online learning communities in teachers' professional development are mentioned below.

It can be said that there is a trend towards qualitative research (10 out of 16) in the studies on online learning communities in teachers' professional development. Data collection processes in the studies show collecting data from in-service teachers (11 out of 16) is trending. However, there are also studies collecting data from both in-service and pre-service teachers.

In the context of online learning communities as known as platforms researchers use, there is a trend of asynchronous platforms. Asynchronous platforms were defined differently in different researches, for example it was defined in one as a platform to share their knowledge, experience, documents, while defined in another as platform for conversations between mentor teachers and mentee teachers. Discussion boards were the most used tools to provide interaction among participants (11 out of 17). It also gets popular to use more than one tool for teachers to let them choose the most suitable one for themselves.

Difficulties

After analyzing the findings of the published works, difficulties in the use of online learning communities in teachers' professional development can be listed as;

- Even though online learning communities have high potentials in professional development, it could obstruct teachers' professional development when teachers have a fear to use the new forms of media and technology or they do not use technology for pedagogical purposes. For this reason, as it was mentioned before, providing teachers with multiple tools and technologies can help to solve these difficulties since teachers can choose the most suitable for themselves.

- It is hard to develop and sustain an online learning community. Therefore, a clear purpose and understanding of the expectation should be determined.

- Synchronous tools may not be suitable for teachers' reflections. Using an asynchronous tool in addition to synchronous one may be advantageous because those asynchronous tools provide teachers multiple chances to think, rearticulate and edit their responses.

Conclusion, Discussion and Implications

An online learning community is basically defined as a group of people who interact in an online environment. A virtual or online community is defined as "a group of people who interact online on a regular basis and share common goals, ideals, or values" (Owston, 1998, p. 60). Those groups become "communities" when they interact with one another and stay together for a period of time to form a set of customs, or when they come to rely on one another to achieve certain goals (Wilson & Ryder, 1996). For this reason, it can be said that online learning communities have some characteristics to be called as a community and those are listed as having a purpose, being supported by technology and being guided by norms and policies (Preece, 2000). Charalambos, Michalinos and Chamberlain (2004) later added new characteristics for successful online communities as consisting of people having time and space constraints to come together face to face, having tasks defined clearly and having a clear purpose and understanding of the expectations, easy access to technology and tools sand ongoing interaction and mutual support among its members.

Online learning communities have also been seen as offering opportunities for authentic and personalized learning (Duncan-Howell, 2010) in teachers' professional development. A successful online learning community for teachers increases communication, collaboration, and support among participants (Booth, 2011) and teachers develop an awareness of community, increase their subject and pedagogical content knowledge, and improve their teaching practices (Blitz, 2013). Evidence from studies of online teacher communities suggests that they offer great potential for professional learning, relationship building, and emotional support (Shelton & Archambault, 2018).

Despite the high use of online learning communities in teachers' professional development, there is still gap between literature and practice on how to design effective online communities and sustain them, especially considering the cultural differences in multicultural communities (Li, Zheng & Zheng, 2020). In other words, the literature is still in its infancy on teachers' professional development in online learning communities, especially in the context of lifelong learning. Identifying important concepts and factors regarding designing and sustaining an online learning community is critical at the current stage. This paper aims at contributing to an understanding of using online learning communities in teachers' professional development in the context of lifelong learning.

To contribute to an understanding of using online learning communities in teachers' professional development, this study is designed as a systematic literature review and findings show the distribution of the published research on online learning communities in teachers' professional development regarding the mapping criteria. Criteria are the publication year of the study, keywords, participants' features whether they are in-service or pre-service teachers, group size, the research methods, data sources, platform used for interaction, how participants interact with, and the trends on that topic.

After investigating the keywords, "online learning communities" was the most repeated keyword (14) as no surprise. However, it was also used under different names such as community of practice, computer-mediated communication, Facebook-mediated communication, and participatory media. The other keywords related to online learning communities in teachers' professional development research were; interactive learning environments, pedagogical issues, collaborative learning, and innovation, culture and technology. Based on these keywords, it can be seen that online learning communities emphasize collaboration and they are mostly used in partnership building in the context of professional development.

Then, when the participants were investigated, it can be said that 11 of 17 study were conducted with in-service teachers, while four of them were conducted with pre-service teachers. One research used in-service and pre-service teachers together as a mixed group. For this reason, it is recommended for further research that online learning communities should be used with mixed groups including in-service and pre-service teachers together, so pre-service teachers can benefit more from in-service teachers in the context of their experiences, sharing and reflections.

After that, when the platforms to create an online community were investigated, online platforms were mostly used in the researches on online learning communities in teachers' professional development. They were defined differently in different researches such as defined in one as a platform to share their knowledge, experience, documents, while defined in another as platform for conversations between mentor teachers and mentee teachers. The

other specific platforms to build online communities were; learning management systems including Moodle, WebCT and D2L, Facebook groups, and asynchronous platforms such as blogs. Lastly, one research used simulations to build an online learning community for teachers. In this criterion, using a combination of synchronous and asynchronous tools is recommended because teachers may have different needs in terms of collaboration, technology, time, and content. While using synchronous tools allow teachers for collaboration and problem-solving, asynchronous tools allow teachers multiple chances to think, rearticulate and edit their responses when they reflect. Therefore, using dual or multiple spaces helps teachers to choose the most suitable one.

After analyzing the tools, which help teachers to interact with others, it can be said that discussion boards were most frequently used in online learning communities in teachers' professional development researches as main interaction tools. Synchronous meetings, online platforms and Facebook groups were the other tools that participants interacted with other participants in the online learning communities.

Lastly, when the trends and difficulties in the published works on online learning communities in teachers' professional development were investigated, using online learning communities to provide a constructive space for both collaborative learning and reflection on teaching, using an asynchronous space in addition to synchronous one, and getting support from peers if participants provide support were the trends. To sustain an online learning community and to find the suitable platform/tool which teachers are comfortable with are the difficulties of the online learning communities in teachers' professional development.

In terms of study limitations, the most significant limitation is that the review was conducted over the last five years, from 2015 to 2019. This could be expanded.

Based on the findings, the following design criteria are recommended for practitioners and researchers when to design and create an online learning community for teachers' professional development;

- It is hard to develop and sustain an online learning community. To do that online communities should have a clear purpose and understanding of the expectation. Negotiate the aim and objectives of the online learning community, clearly define assigned tasks and their timing for the tasks at the beginning as Marques, Loureiro, and Marques (2016) stated in their research.

- Online learning communities should have easy access to technology and tools as participant may not be proficient in technology.

- One size does not fit all. Mentors should be aware of that tools that work in one case may fail in another. So, when choosing appropriate tools for the community, community culture and different cultures should be taken into consideration.

- Use dual or multiple spaces/tools in order to address multiple learning needs, technological skills and comforts, and different demands on teachers' times.

- Asynchronous tools allow for reflection and story sharing, as well as multiple opportunities for teachers to think, rearticulate, and edit their responses, whereas synchronous tools allow for collaborative problem-solving in the moment. So, synchronous tools may not be suitable for reflection. deNoyelles and Raider-Roth (2016) also stated that in their study and emphasis that using multiple tools may be optimal.

- Mentors in the online learning communities tend to be more proactive than the mentees in terms of interactions including leaving comments in terms of the frequency and the length of the comment. So, mentors should be able to encourage peers to be also more productive as stated in Tang and Chung (2016).

- Teachers who provided online support tended to receive more online support, for this reason, all teachers should be encouraged to support peers.

- Encourage teachers to contribute more by increasing their confidence and valuing their participation.

Statement of Conflict of Interest

The author declares that there is no conflict of interest related to the publication of this article.

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