

Quality of learning outcomes in an online video-based learning community: Potential and challenges for student teachers

This study investigates the learning outcomes of 25 student teachers in an online video-based learning community (VBLC). Data were drawn from the student teachers' written comments and feedback recorded in the VBLC and the post-course interviews. Based on the Structure of Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982), the majority of comments and feedback were classified as uni-structural, but more sophisticated responses could also be found. The interviews revealed that the student teachers benefited from the opportunities of peer interaction and self-reflection. The study thus makes suggestions for further improvement of the operation of the VBLC.

Keywords: professional learning community; teacher learning; use of video

Introduction

In most teacher education programmes, student teachers learn teaching theories, methods, and techniques in lectures or tutorials, which include the viewing and analysis of teaching segments of some experienced teachers. With the use of video, student teachers are able to share experiences (Brophy, 2004; Lee & Wu, 2006), and to review, analyse, and synthesize specific examples of teaching in authentic classroom settings (Rich & Hannafin, 2009). However, Conkling (2007) states that learning to teach is not limited to replicating the practices of a more experienced teacher, though access to exemplars of teaching practice is essential to beginning teachers. Moreover, whether the video from a teaching "expert" is highly relevant to the student teachers' own context and classroom situation can often be a major concern.

Harford and MacRuairc's (2008) qualitative study illustrates that viewing video clips of peers' teaching practices and discussing the observed behaviours in a learner-centred group help the promotion of peer collaboration and reflective skills. Zhang, Lundeberg, Koehler and Eberhardt's (2011) study, which examined the use of videos published specifically for the purpose of teacher education, teachers' own videos, and peers' videos produced by twenty-six K-12 science teachers, found that watching one's own teaching video was regarded as the most helpful means of getting the teachers engaged in reflection on their practices, followed by peer videos and finally published videos. One of the affordances of the use of video technology is the possibility of watching their own video multiple times and the feasibility of watching the video an unlimited number of times is likely to trigger detailed analysis (Tan & Towndrow, 2009).

It has been argued that commenting on one's own video would result in less critical judgments, thus reducing the potential opportunity of professional development (Seidel, Stürmer, Blomberg, Kobarg, & Schwindt, 2011). In cases where some teachers are extremely critical of their own performance, it is reported that peer groups can offer emotional support to help them focus on the major issues concerning teaching (Zhang et al, 2011). Previous studies thereby emphasize the need to set up a learning community with guidelines on conversing about the video clips shared within the community (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Sherin & van Es, 2009).

Student learning community in teacher education

Creating a learning community is pivotal in most professional development programmes (Little, 2002). Research has illustrated that it is possible for student teachers to create a community of inquiry and higher levels of learning to improve teaching and learning (Kanuka & Garrison, 2004; Miller & Ewing, 2000). Such a learning community, developed out of existing communities of interest and work-based networks, is engineered in a way to provide members with a platform to share knowledge and to discuss different facets of their practices (Loiselle, St-Louis, & Dupuy-Walker, 1998; Wenger, 1998). In this way, students can go through a more in-depth and sophisticated learning, which features more than simple processing (Belenky, Clinchy, Goldberger, & Tarule, 1986; Chickering & Gamson, 1987).

As examined by Garrison and Cleveland-Innes (2005), an online environment with well-thought-out and well-planned interaction can activate students' cognition and stimulate higher-level learning. Furthermore, a close and strong community not only helps improve student teachers' teaching, but also provides emotional and interpretive support among the members (Jonassen, 1999; Lave & Wenger, 1991).

Despite the positive results of these studies, educators still face challenges to make optimal use of video technology and maximize the student teachers' learning outcomes in an online learning community. Some of the concerns which have surfaced in previous studies

include the participation rate, the flow of interaction and the quality of written responses given by peers (So, Hung, & Yip, 2008; So, Pow, & Hung, 2009). In other words, it seems to be obvious that having students observe and discuss each other's practice in a learning community framework can help them learn more effectively, as they are given the chance to interact with each other, which in turn fuels critical reflection among themselves. Yet there has been little discussion on how participation and peer interaction within an online video-based learning community can be strengthened to ensure positive learning outcomes among student teachers. Thus, it is crucial to examine how student teachers participate and interact within the online video-based learning community and their learning outcomes in a more rigorous way with a larger sample size than the previous studies (So et al., 2008; 2009) in order to generate solutions to address the challenges.

Quality of learning outcomes

One of the prevailing approaches to illustrate the quality of learning outcomes is the Structure of Observed Learning Outcomes (SOLO) taxonomy. Chick's (1998) study found that the SOLO taxonomy is an effective tool to evaluate the structure and complexity of learning outcomes. Previous studies have made successful attempts in applying the SOLO taxonomy for the purpose of assessing student outcomes in the areas of science (Minogue & Jones, 2009; Brabrand & Dahl, 2009), technology (Padiotis & Mikropoulos, 2010; Schrire, 2004), teacher

education (Dudley & Baxter, 2009; Holmes, 2005), and essay writing (Boulton-Lewis, 1994; Munowenyu, 2007). Not only can the SOLO taxonomy help assess student performance, but it can also be utilized to promote deeper learning as shown in Lucander, Bondemark, Brown, and Knutsson's (2010) study.

In addition, the quality of learning outcomes within an online learning community can be measured by actual grades or scores awarded by instructors, or by self-perceived attainment (Richardson & Swan, 2003; Shea, Li, & Pickett, 2006). A review of the literature has led to the postulation that a combination of the SOLO taxonomy and the measurement of self-perceived achievements can construct a comprehensive view of student learning outcomes for a renewed understanding and discussion of online learning communities.

Methodology

Objectives of the study

The main objective of the study was to explore how an online video-based learning community (VBLC) supported the learning of teaching in a Postgraduate Diploma in Education programme. The study attempted to answer the following research questions:

- How do student teachers participate and interact in the VBLC?
- What is the quality of learning outcomes in the VBLC?
- Is there any relationship between the quality of comments given by community

members and the subsequent feedback offered by the video producers?

- In what ways can the operation of and learning outcomes in a VBLC be improved?

Participants

Ethical approval was obtained from the institutional Ethics Committee before the study began.

A total of 25 student teachers enrolled in the teaching method course of a core primary subject, General Studies, in the two-year part-time Postgraduate Diploma of Education (PGDE) at a teacher education institution in Hong Kong were then invited to participate in the study. Informed consent was given by the participants. The majority of the participants were university graduates with limited teaching experience in local primary schools. The medium of instruction used in the course was Chinese supplemented with reference materials in English for reading and discussion. During the course, the student teachers were grouped into seven learning communities based on the topics they were teaching, which comprised two to four members, to upload, share and comment on each other's digital teaching videos.

Design of the study

The VBLC, established on the foundation of a digital video database and an online discussion platform¹, was first designed with the intention of helping student teachers acquire

¹ Video-Based Learning Community designed and developed by the Centre for Learning, Teaching and Technology of the Hong Kong Institute of Education: <http://www.lttc.ied.edu.hk/vbhc>

knowledge of good teaching practices by reviewing teaching episodes and making comments and suggestions among community members (So et al., 2008; 2009). To address privacy and ethical concerns, the VBLC is password controlled and public access is restricted. During the 10 sessions in the teaching method course, the student teachers served as both video producers (VPs) and community members (CMs). They were required to complete two tasks. First, each student teacher needed to upload a digital video of 15 to 30 minutes recording their classroom teaching to the VBLC. Some video-recording tips were provided to guide them how to record their own teaching videos to minimize the disturbance to pupils and to assure stability and appropriate light exposure, that is, by placing the cameras on tripod stands at the corner and by the window side of the classroom. Second, members in the same learning community made comments on and suggestions regarding their peers' teaching videos. The 'mark-in/mark-out' function on the VBLC platform allowed them to capture a certain part from the teaching video that they would like to comment on. For example, pressing the mark-in button at the 5th minute of the teaching video and pressing the mark-out button at the 9th minute of the teaching video would capture a 4-minute teaching episode. VPs were also encouraged to give feedback in response to peers' comments. Inter-community communication was also welcomed. Instruction and guidance were provided to the participants. There was monitoring throughout the whole process with no interference to participants' work.

Data collection

The level of involvement, the flow of the comments and feedback, as well as the content of the comments and feedback shared in the VBLC were collected from the online discussion platform. Most comments were in Chinese and some were in English. Nine participating in-service student teachers were chosen randomly to attend individual interviews at the end of the course, so as to explore the perceived learning outcomes. 12 open-ended questions were asked in the interviews to better understand the conditions conducive to student teachers' learning about teaching with the learning community. These included questions regarding three main aspects: 1) achievement or usefulness of the tasks and quality of comments or feedback; 2) competence and willingness to give comments and feedback; 3) difficulties encountered in giving comments or feedback, and technical difficulties.

Data Analysis

The comments and feedback which appeared in the VBLC were first classified into different categories based on their content. The Structure of Observed Learning Outcomes (SOLO) taxonomy developed by Biggs and Collis (1982) was then used to evaluate the quality of the comments and feedback collected. This taxonomy is designed to describe the nature of performance displayed by learners (Biggs & Collis, 1982). According to this model, students'

learning outcomes are classified into five levels, and the order is listed as follows:

- (1) *Pre-structural*: No understanding of task is achieved.
- (2) *Uni-structural*: Use one or few simple and obvious aspect(s) of the task.
- (3) *Multi-structural*: Understand several aspects of the task, but cannot connect them to the whole.
- (4) *Relational*: Integrate the significance of the parts into the whole.
- (5) *Extended abstract*: Re-conceptualize the whole at the relational level to a higher level of understanding, and generalize original understanding or a new idea in another field.

Apart from these standard rubrics, the interviews administered after the course permitted the researchers to explore the learning outcomes from the learners' perspectives. These interviews were audio-taped and transcribed into English for coding and discourse analysis by means of the qualitative data analysis programme NVivo8. Coupled with the written responses on the online platform, the data gave a more complete picture of the student teachers' learning outcomes in the VBLC. To ensure the reliability of the data coded, two researchers coded the whole data set independently, and the inter-rater reliability is satisfactory (Cohen's kappa = 0.82).

Findings

Interaction within VBLC

Distribution and content of comments and feedback

There were a total of 328 responses recorded in the VBLC (Table 1), of which 224 comments were given by the CMs (Table 2) and 104 pieces of feedback were provided by the VPs (Table 3). In other words, the VPs did not respond to every comment offered by the CMs.

The comments and feedback could be classified into seven categories according to the content of communication: *teaching design, teaching content, teaching technique, use of resources, pupil performance, classroom management, and personal opinion*. Specifically, teaching technique and use of resources both constituted 22.32% of the overall comments, while teaching design made up 20.54% of the total comments (Table 2), whereas most of the feedback fell into the category of personal opinion (44.23%) (Table 3).

[Insert Table 1 here].

[Insert Table 2 here].

[Insert Table 3 here].

Participation of different groups of learning communities

Figure 1 summarizes the inter- and intra-communication within the VBLC. Among the seven learning community groups, groups B, C and E tended to be more interactive, displaying a more active flow of comments or feedback among the community members. For example, in addition to giving comments to members of the same learning community, ST8 gave

comments to individuals of other communities (ST16, ST20, ST25), and these students also responded to him. He gave 7 comments to ST25 and two of which were responded to. Nevertheless, he was the only one who took part in inter-community communication. Also, the CMs in groups A, D, F and G were active in sharing comments, but the VPs rarely responded. Moreover, groups A and G had three members and two members, respectively. It therefore seems understandable that their comments and feedback were fewer than those of the other groups.

[Insert Figure 1 here].

Involvement of individual student teachers

Table 4 shows the number of comments given by the CMs to the VPs and the response rate of these comments from the VPs. Nearly 80% of the student teachers participated to varying degrees in the VBLC. Out of the 224 comments, ST8 and ST15 contributed 46 and 24, respectively. Not only was ST8 keen to offer comments, but he was also willing to respond to the feedback he received. ST6 and ST20 who both offered 16 pieces of feedback were the most active members in giving feedback. There were six student teachers who merely replied to comments from their peers. On the other hand, there were 13 who did not give any feedback at all, but they did offer comments to other CMs. However, ST11 only gave feedback, and no comments were made on her peers' videos. ST16 and ST20 gave more comments than feedback. To have a better picture of their involvement in the VBLC, they

were classified as inactive, partially-active and active members based on their overall participation.

An inactive member refers to a participant who merely uploaded the videos and did not make any comments or provide any feedback. Five student teachers (20%) were found to be in this category.

Those (40%) who made comments to more than one, but not all, of the counterparts in their respective learning communities, and who gave replies to none or less than half of the comments given by their peers, or those who were simply active in either offering comments or responding to peers' feedback, are seen as partially involved in the VBLC.

Those (40%) who gave comments to more than one or all of the members in their respective learning communities, and offered feedback to more than half of the comments given by their peers, are seen as active members.

[Insert Table 4 here].

Quality of learning outcomes

To better understand the student teachers' learning about teaching through this VBLC, the quality of their learning outcomes was evaluated by both standardized rubrics, namely the SOLO taxonomy, and self-reported satisfaction or attainment.

Learning outcomes based on SOLO taxonomy

As reported in Table 1, there were a total of 328 comments and feedback posted by all the student teachers. In all, 13.72% of the remarks fell into the pre-structural level, followed by the uni-structural level (65.55%), the multi-structural level (5.49%), the relational level (12.20%), and the extended abstract level (3.05%). There was a tendency for the comments to be skewed towards the uni-structural level, whereas the nature of the feedback was mainly pre-structural and uni-structural. As many as 74.55% of the comments were identified as uni-structural, and their areas of concern were mainly teaching technique and use of resources (Table 2). Regarding the feedback provided by the VPs, 46.15% were uni-structural while 40.38% were pre-structural (Table 3). It is worth noting that most of the feedback concerned the personal opinions of the VPs.

Pre-structural level. At the pre-structural level, most of the comments and feedback are appreciation and explanations which are not directly related to the issues of teaching. The following example is a comment given by ST8 about a teaching episode of ST25. ST25 showed appreciation in the feedback and this feedback was also identified as being at the pre-structural level:

There was an exploratory learning atmosphere throughout the lesson. I guess it resulted from good lesson planning and teaching. (Comment given by ST8 on video 25)

Thank you for your appreciation and suggestion. (Feedback provided by ST25 on video 25)

Uni-structural level. In the study, comments and feedback from the CMs and VPs clustered at the uni-structural level (65.55%), manifesting that student teachers possessed simple ideas about teaching and were able to provide comments and suggestions to the video providers.

The following is the discussion between ST13 and ST8 regarding ST8's lesson video episode. Both the comment and feedback were identified as uni-structural. ST13 could comment on one relevant aspect of the teaching environment, but the comment is simple and does not show deep understanding of teaching.

The class is a bit noisy during the presentation. You may remind pupils to respect the presenter.

(Comment given by ST13 on video 8)

Yes. The class is quite noisy during presentation. The class should stop making noise and

listen to the presenter. (Feedback provided by ST8 on Video 8)

Multi-structural level. Apart from giving simple and direct comments and feedback, the CMs could also comment on several aspects of the teaching. The following is an example of a multi-structural level comment provided by ST18 in relation to teaching content:

The teacher used a public figure, the Hong Kong Chief Executive Officer, as an example to enhance pupils' learning motivation. The teachers presented the biography of the HK Chief

Executive Officer to lead pupils into the topic of Human Rights. This could help student teachers generate a deep impression and understand the context of human rights concretely.

It was good to arrange group discussion in order to let pupils listen to other pupils' opinions and to enrich pupils' perspectives on this topic.

The teacher was concerned with and paid attention to the needs of particular pupils during the group discussion, and answered the pupils' questions clearly. (Comment given by ST18 on video 17)

Relational level. In all, 12.20% of the comments and feedback among CMs was identified as being at the relational level, showing that these student teachers had a deep understanding of teaching and were able to demonstrate the connections between facts and the whole. The following example is a comment made by ST4 on teaching design.

The teacher prepared numerous teaching materials which could effectively attract pupils to make comparisons of the animal characteristics. If the teacher could encourage pupils to ask more questions and add group activities and short films in the class, it could enhance their learning interaction and create a joyful learning atmosphere. (Comment given by ST4 on video 5)

Extended abstract level. In all, 3.05% of the student teachers' comments and feedback reached the highest level of the SOLO taxonomy – extended abstract. These student teachers

were able to generalize teaching concepts and share their ideas with the CMs. The following comments on pupil performance were given by ST12 to ST14:

Asking pupils' personal opinions clearly raised their learning motivation and interest. I suggest that the time for group discussion and presentation could be increased. This could let every pupil share their comments, so as to enhance their thinking and communication skills.

(Comment given by ST12 on video 14)

An example of feedback at this level is shown as follows. ST16 responded to ST8's comment, reflecting on the teaching performance:

My method of concluding the lesson was going to every group to confirm that every group had a student who knew the answer to the riddle. With pupils' interest in guessing and searching for secrets in mind, riddles were used to enhance their learning motivation. By skillfully extending the time for thinking, the question would circulate in their brains and made them think for a longer time. At the same time, they're more likely to bear the answer in mind. I believe it is worth spending time on the task and pupils who made wrong assumptions will continue to seek the correct answers. Wasn't this worthwhile? Besides, this could shorten the distance between the teacher and the pupils. (Feedback provided by ST16 on Video 16)

Having classified the comments and feedback into different levels, the Pearson's chi-square test was run to determine if there was a relationship between the level of

comments and the level of feedback. According to the statistical test, there was a lack of significant association between the quality of the comments and the quality of the feedback ($\chi^2(20) = 21.21, p = .385$). In other words, a comment at a particular level did not necessarily elicit a piece of feedback at a certain level.

Perceived learning outcomes

Perceived learning outcomes were obtained from the interviews. In general, the student teachers shared openly their attitudes towards the use of the video database and the online discussion forum as a learning tool with respect to their learning experiences.

Learning from peers' experiences. By viewing lesson videos provided by the community members, the student teachers reported that they had more opportunities to study and learn from their peers. During the interview, most of the student teachers agreed that watching peers' videos helped them obtain concrete comments from their peers and learn from their peers' good teaching performances. Below are some of the comments from the student teachers:

I can watch peers' lesson videos repeatedly and would not bother them to teach again.

Moreover, I can adopt peers' good teaching methods by watching their lesson videos. (ST7)

I could observe other classmates' teaching online and they also provided comments on my teaching. This helps me learn from others to improve my teaching. (ST18)

Development of self-reflection and identification of effective practices. The majority of the student teachers noted that reflecting on their lesson videos made them become more aware of their inappropriate teaching behaviors, distinguish ineffective teaching methods, and identify areas of improvement in their teaching:

This is a good way to understand other classmates' teaching and learn their good teaching practice. Also I would notice my ineffective teaching behaviors and do a self-reflection on my teaching. (ST19)

This event helped me a lot... I would pay attention to good and bad aspects of my teaching when I repeated watching my lesson video. (ST7)

Ability to make judgment on peers' performance. The student teachers believed that they were able to offer comments to help their peers gain another perspective of their teaching:

I have the ability (to make useful comments), because I could raise some concrete opinions. (ST18)

I have the ability (to make useful comments). We could utilize the mark-in and mark-out function available on the online platform to capture the scenes that we wanted our course mates to pay attention to, and then we could give our comments, sharing or encouragement. In

this way, they would be aware of their practices...because I could raise some concrete opinions. (ST7)

However, not everyone was confident about making useful comments to others. Only half of the interviewees believed in their ability. Some of the student teachers found it difficult to offer comments, for example:

I felt that offering comments to group members was more difficult. Given that I am not professional, I could only give some superficial comments, like praising my course mates for their good performance in teaching. I also tended to give comments related to pedagogy and it was difficult to provide in-depth comments. (ST5)

Fostering confidence in teaching. The student teachers deemed that the digital video database and online discussion platform was a good tool for them to try to explore different teaching methods in the teaching practice. After receiving comments from the CMs, they gained more confidence in teaching as well as more teaching experience:

Through this sharing platform, I could practice and try different methods and learning activities related to teaching. Watching lesson videos on the digital video database not only reduces peers' embarrassment, but also shows the real classroom situation. (ST19)

This sharing platform is a good start for me to enhance my confidence in teaching from peers' experience sharing and it helps me grasp the idea of teaching. (ST1)

Discussion

The study by Gunn (2010) found that several students in her class showed resistance to keeping a reflective journal and to examining their beliefs about teaching in learning in their own lesson plans. The beginning of the twenty-first century heralds a shift in emphasis from learning with the focus on the individual to learning as part of a community (Kilpatrick, Barrett & Jones, 2003). An online learning community is one of the approaches to building a learning community through social networking and computer-mediated communication, with sharing via textual discussions (either synchronous or asynchronous), audio or video.

On one hand, there have been discussions on the use of social media or blogs, podcasts and wikis as constructivist learning tools to present opportunities for learners to participate actively in learning (Seitzinger, 2006). The study conducted by Loving, Schroeder, Kang, Shimek and Herbert (2007) found that most participants recognized the value of blogging, which blends personal journaling with social networking, as a platform for sharing resources and ideas and reflections on personal experiences. Murphy's study (2004) also reported collaboration in an online asynchronous discussion. On the other hand, video technology has been widely used to support student teachers' learning and teaching in teacher education via video clubs, with student teachers coming together to view their own practices and the

teaching of peers (Harford & MacRuairc, 2008; Sherin & Han, 2004; van Es & Sherin, 2008; Welsch & Devlin, 2006).

Hence, it is not surprising that the VBLC used in the present study established on the foundation of video and an online discussion platform generated positive results. The participation of the student teachers, in terms of the number of comments and feedback provided, can be seen as evidence of the value of VBLC in offering a platform for collaborative reflection. At the same time, as admitted by most of the student teachers, VBLC is an effective way to motivate the student teachers to give comments and feedback.

In lieu of the accomplishment achieved in using the VBLC for peer interaction and self reflection, there is room for further improvement in the operation of VBLC to enhance the quality of learning outcomes. This includes stimulating participation for peer interaction and reflection, as well as facilitating higher-level thinking about teaching practices.

Stimulating participation for peer interaction and reflection

The Internet and online technology provide student teachers with a platform for interactive discussion outside the classroom, allowing them to compose their thoughts in writing about teaching (Duffy, Dueber, & Hawley, 1998) by viewing teaching videos. In view of the fact that it is difficult for the student teachers to participate in all online discussions after class as expressed by the student teachers during the interviews, it might be wise to create time during

class to facilitate their work. This can construct an atmosphere for contributing to the VBLC among all the student teachers given the presence and mutual support of peers and the instructor in class. Though it is difficult to finish the task in class, student teachers can build on what they have done in class and continue with their work afterwards. It is important to note that this is different from the traditional face-to-face classroom interaction in which only one video is viewed by the whole class and student teachers can be exempted from voicing their opinions due to time limitations and class size. Another benefit of budgeting classroom time for this purpose, particularly at the start of the work, is that when technical problems arise, they are also likely to be solved by the in-class technician.

Facilitating higher-level thinking

There was a dominance of uni-structural comments and feedback among participating student teachers, and it is speculated to be a result of the frequent use of the ‘mark-in/mark-out’ function of the online platform. In other words, the student teachers chose a particular segment, which was often short in length, and focused on commenting on a specific aspect without further elaboration on their comments. This also explains, partly, why comments at the multi-structural level were infrequent in this study. As observed, the student teachers had a tendency to look for nuances in the teaching sequences, and this might have diverted their attention from assessing teaching from a more macro or comprehensive point of view. Hence,

a wiser and more appropriate use of the 'mark-in/mark-out' function should be introduced to help student teachers to capture a longer episode and to view the teaching videos from a wider perspective.

It is noted that the student teachers were more likely to give comments than to provide feedback. Besides, when responding to the comments given to their own teaching episodes, the VPs tended to offer simply personal opinion, and often their utterances were at the pre-structural and uni-structural levels, which accounted for nearly ninety percent of the total responses. This might imply that these student teachers lacked the skills or motivation to evaluate the comments offered by their counterparts critically and that they had difficulty attending to peers' comments, despite the fact that they were encouraged to reply to their CMs. Moreover, some student teachers in this study raised concerns about the usefulness of their comments and feedback to their peers. They realized that their comments and feedback might be purely approving and superficial. In view of students' ability to assess the quality of their comments and feedback by means of the SOLO taxonomy in a recent study (Lucander et al., 2010), it is considered that student teachers will be more aware of their written responses if they are given a set of standardized guidelines for evaluation.

Most of the interviewees voiced the opinion that the instructor should guide them in making comments and should have participated in the discussion, so that they knew where to start from and the standard of the comments expected from them. It has been shown in

Holmes' (2005) study that instructors are imperative to students' drive to learn and their participation in online learning. Conceivably, to work towards the goal of autonomous learning among students, involvement of instructors should be minimized to driving students to learn and participate. The suggestion in the previous paragraph to assign class time to provide support from the instructor in class would be helpful for the instructor to clarify the tasks and expectations, as well as for solving technical problems. Yet, as suggested in Holmes' (2005) and Zhang et al.'s (2010) studies, sample questions and questioning guidelines can be given to students from which they can generate their own questions to ask their peers and this seems more likely to elicit deep reflection. In the current study, out of the 200+ comments, only a few of them consisted of questions. Also, most of the questions were closed questions which are less likely to generate responses, not to mention deep cognitive processing. Therefore, an emphasis on cultivating questioning techniques to scaffold student teachers' work in a VBLC is justified.

Conclusion

To conclude, the VBLC with contribution of teaching videos from a group of student teachers in this study can potentially promote the learning of teaching among them through observation of peers' performance and collaborative reflection. Besides, documenting one's teaching practices in the form of video also enables student teachers to view and examine

their performance repeatedly and thus makes the tracking of one's progress in teaching possible. The student teachers in this study with the VBLC were in general satisfied with their learning outcomes. However, there are several areas which can be enhanced in order to run the VBLC more smoothly and effectively in the future in the teacher education context. First is stimulating participation in peer interaction and reflection by setting aside classroom time for participation with presence and mutual support of peers and the instructor in class. Second is facilitating higher-level thinking by the introduction of the SOLO taxonomy as ground for analysis and the use of open-ended questions to elicit higher order responses. This can be done by appropriate use of the mark-in and mark-out function to view teaching from a larger picture rather than looking for nuances in the teaching. All these aim at strengthening the observation, collaboration, enquiry and reflection among student teachers. It is hoped that this will inspire the student teachers and lead to actual changes in actions, which will ultimately benefit their students. Based on the suggestion by Zimmerman and Tsikalas (2005) that the impact of computer-based learning environments on students' motivational beliefs and self-reactions has been given relatively little attention, as well as the comment by Lee and Wu (2006) that the provision of feedback is often a necessary requirement for the stimulation of self-reflection, future research needs to be conducted on analyzing the data from the sociological aspects with the notion of reflection, critique and appreciation comments and responses among the learners.

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