

Student Teachers' Perception of the VBL System to Enhance Technology Integration Competencies

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Abstract. The purpose of this study was to investigate student teachers' perceptions of the video-based case learning (VBL) system to enhance their technology integration competencies. A self-developed questionnaire was used to gather student teachers' perceptions regarding the system's main components and overall benefits. At the end of student teaching, ten participants were invited to complete the questionnaires and follow-up interviews. These results indicate that the VBL system combining video cases, guiding questions and discussion forums was able to promote in-depth thinking about technology integration in instruction. Moreover, student teachers perceived an increase in field observing skills. However, it did not appear a higher increase in their abilities, willingness, and confidence of using technology in the teaching field. Furthermore, student teachers expressed a high expectation of video quality and efficient use of the system. Accordingly, recommendations and further research were provided so as to maximize the system's benefits.

Keywords: student teaching, technology integration, video-based learning, video cases

1 Introduction

In today's information society, it is necessary for future teachers to know how to use technology effectively to facilitate student learning. In Taiwan, the Ministry of Education has specified "Instructional Media and Operations" a required course for pre-service teachers. In addition, many teacher education programs have offered an elective course "Computers and Instruction" so as to enhance pre-service teachers' technology competencies. In our teacher education program, students are required to take one of the two courses mentioned above. We, as teacher educators, have also developed and employed a web system to promote our students' technology integration competencies and have obtained favorable results (Chang & Hsu, 2010; Chang, Hsu, & Kao, 2009). However, it turns out to be quite a different situation when these students finish their university coursework and participate in the internship program as student teachers in secondary schools.

With insufficient field teaching experience, student teachers normally feel "shocked" when faced with such an authentic and complicated situation the first time.

In addition, the length of an internship for teacher preparation in Taiwan lasts only six months. Besides teaching, student teachers need to practice many other skills, such as school administration, class management, student guidance, and so on. Student teachers also have to prepare a national qualification examination usually held one month later after the internship program. Although the internship program with field teaching experience offers student teachers a good opportunity to examine theories learned from the university coursework as well as to put theory into practice (Dexter & Riedel, 2003; Hernandez-Ramos & Giancarlo, 2004), it becomes a real challenge for them to continue growth in technology integration competencies within so many constraints mentioned above.

To help student teachers' growth in technology integration, we have developed a video-based case learning (VBL) system based on previous research (Cannings & Talley, 2002; Harris, Pinnegar, & Teemant, 2005; Hsu, 2004; Rickard, McAvinia, & Quirke-Bolt, 2009). The system has the following characteristics: (1) the system collects video cases regarding technology integration into subject teaching from our former student teachers; (2) the system displays guiding questions for each case's video clip to stimulate reflection and discussion; (3) the system provides a discussion forum where student teachers can share as well as exchange ideas and opinions with their peers. We have also invited some student teachers to use the VBL system during the fall semester of 2011, and conducted an evaluation survey and follow-up interviews at the end of the internship. This study thus reports the evaluation results, and accordingly provides relevant suggestions at the end.

2 The Internship Program

Having completed university coursework required for teaching certificates, our students need to succeed in internships in secondary schools before they are allowed to take the national teacher qualification examination. According to Taiwan's regulations, an internship program lasts 6 months, that is, either from August to January, or from February to July. During that period, student teachers practice in cooperating schools under the guidance of their mentors. Considering the internship program as a formal course, we require our students to return to our campus for 4-hour professional development courses every two weeks. Usually we offer five classes of the internship program in the fall semester. Each class has about 12 student teachers under the supervision of a university professor.

Our goal of the internship program is to assist student teachers in reflecting and exploring the relationships between theory and practice, and further developing their own teaching belief and feasible strategies. For the 4-hour campus course, student teachers meet with their class supervisor and share their field experience with other classmates. In addition, for professional growth in secondary subject teaching skills, there are group meetings arranged for student teachers who teach the same subject areas so that they can share their practical teaching experience as well as discuss their teaching problems. All together, there are only four blocks, that is, 8 hours of group meetings, with each block lasting about 2 hours. Indeed, the number of subject

teaching meetings is limited in contrast with 36 hours of a semester. However, it is difficult to allocate more meeting hours since the time schedule is quite tight.

In view of insufficient arrangement of professional development in subject teaching for the current internship program, we attempt to create a platform for student teachers so that they may have opportunities to extend their discussion about teaching practice beyond their meeting hours. Furthermore, we intend to use videos to capture authentic teaching so that student teachers can observe them repeatedly, and their discussion may be more focused and productive with supporting evidence (Santagata & Angelici, 2010; Shepherd & Hannafin, 2009). In addition, the focus of the videos selected is on technology integration in classrooms to encourage student teachers' use of technology in the teaching field. Finally, many studies have demonstrated the importance of reflection on internship experience to promote professional growth (Kaminski, 2003; Zeichner & Liston, 1987). Therefore, guiding questions are created besides the videos to engage student teachers in deep reflection.

3 The VBL System

To meet student teachers' urgent needs of practical knowledge on subject teaching as well as professional demands of reflection and collaboration, we have developed a web system called "video-based case learning" (VBL) system (Chang, et al., 2012). Its web site is <http://163.13.149.30/vbl>. The focus of subject teaching is on technology integration into instructional practices. The system provides authentic teaching videos of a variety of subject areas for student teachers to observe, with guiding questions as a basis for discussion to promote their reflection. Fig.1 shows the diagram of the VBL system, and Figs. 2 and 3 display computer frames of the title page and the login page.

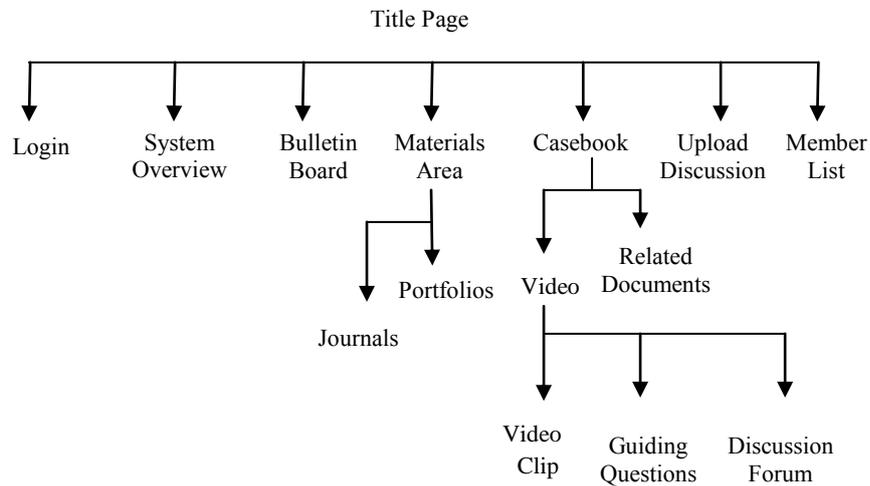


Fig. 1. Diagram of the VBL system



Fig. 2. The title page



Fig. 3. The login page



Fig. 4. The casebook page



Fig. 5. The video page



Fig. 6. The discussion forum



Fig. 7. Display of a topic in the forum

The cases in the casebook were collected from our former student teachers in field teaching for final evaluation at the end of their internships. We only selected the cases which demonstrated the use of technology in classrooms. The cases were categorized by content areas, as shown in Fig. 3. In addition to videos, the system also included related teaching documents for each case, such as teaching beliefs, lesson plans, slides, handouts, worksheets, feedback and reflection reports, and so on. These documents can be accessed by hyperlinks, as indicated in Fig. 4.

A case's video originally lasts a class period. However, we only picked up three parts from the video according to different activities carried out in that period. That is, a case has three video clips. A clip lasts about 5 minutes. On the right side of the video player are three questions regarding the video clip to stimulate reflections. For example, the case "Christmas" is an English lesson for junior high schools, with three clips entitled "warm up", "guided reading", and "group competition". Fig. 5 shows the video page of the "Christmas" case. Below are questions for the "warm up" clip:

- (1) What are the characteristics of the PPT slides used in the video clip? Do you think it can be linked to the next activity of "guided reading" successfully?
- (2) What were good skills that the teacher demonstrated when she encouraged and prompted students to answer questions? What are other good skills that you suggest the teacher to use?
- (3) Please discuss other things that you observe, and put down your comments or reflections.

Just below the video player, there is a discussion forum for the video clip. Student teachers must log into the system before they can leave their comments in the forum, as shown in Fig. 6. Also they can view the content of a topic in the forum, and then write a response to it, as indicated in Fig. 7.

For student teachers to upload their own teaching video, we recommended the YouTube system since it was popular, reliable and easy to operate. After student teachers had uploaded their video to the YouTube system, they then set its sharing function. In so doing, they could embed the video into our system by leaving a message in the upload discussion forum and specifying the location of the video. The message page not only displayed the text but also broadcasted the video. Furthermore, a login member could write a response after watching the video. Figs. 8 and 9 demonstrate how it works. In short, our system intended to create an environment where student teachers could share their ideas with their peers who taught the same subject area. Moreover, their discussion was supported by evidence disclosed in videos and other teaching artifacts.



Fig. 8. The upload discussion page



Fig. 9. Display of a upload topic

3 Method

3.1 Participants

Since the VBL system was not available until August 2011, our internship program schedule officially set in June did not include the system's usage. To reduce the effects of alteration to a minimum, we only ask two groups of student teachers to use the system. These two groups were under the supervision of the researchers. One group had 12 student teachers whose subject area was English; the other group had 15 student teachers in different subject areas including 6 Business, 5 History, 3 Guidance and Counseling, and 1 Civics. All together, there were 27 participants consisting of 20 females and 7 males. Furthermore, more than half of the participants were graduate students

3.2 Instrument

A questionnaire was designed to measure student teachers' perception of the VBL system in terms of five facets: the casebook, the video clips, the guiding questions, the discussion forum, and the overall benefits. Table 1 displays the statements included in each facet. Using a 5-point Likert-type scale, the questionnaire contained 26 items and the score on each item ranged from 1 (mostly disagree) to 5 (mostly agree). A higher score indicates a more favorable perception of the system. In addition to those items, the questionnaire included 6 open-ended questions. The first five questions invited participants to provide opinions or suggestions regarding cases, teaching materials, videos, guiding questions, and discussion forums. The last question encouraged participants to write more about their personal experiences in using the

VBL system. Ten participants completed the questionnaires at the final session of the internship program.

To gain more understanding about participants' perception of the VBL system, we also arranged follow-up interviews after the administration of questionnaires. The interviews encouraged participants to talk about (1) how they studied the cases, watched the videos, and wrote comments; (2) what features or functions should be added or modified regarding the VBL system; (3) how the system should be implemented in internships to maximize its benefits; and (4) what they had learned or obtained from using the VBL system.

3.3 Procedure

Since it was too late to include the VBL system in our internship schedule, we had to find extra time for its implementation. As mentioned before, to minimize such disturbance, only 26 student teachers participated in the study. Our plan was to have them stay for about fifty-minute longer during the first three sessions when they returned to our university campus. In other words, participants had three more hours of meetings in subject teaching than the rest of student teachers. The implementation process of the VBL system is described as follows:

- (1) At the end of the first session, we invited two groups of participants to stay longer and introduced the VBL system to them. Then we asked the English group to study the English case and the other group to study the Civics case, and then to write comments in the discussion forum before our next meeting.
- (2) In the next session, we separately led the group discussion of the specific case designated last time. The third session followed the same pattern as the previous one.
- (3) As scheduled in the internship program guide, the fourth session invited student teachers to express their teaching beliefs and strategies about their subject area.
- (4) In the following three sessions, participants took turns showing their field teaching demonstrations by using videos.
- (5) At the end of the final session, we asked participants to complete the questionnaires of the VBL system as well as participate in the follow-up interviews.

4 Results

Since not every participant had a commitment to the VBL system, we only selected those with a higher degree of involvement to report their perception of the system. As a result, ten participants completed the questionnaires and interviews. Their subject areas were 6 English, 2 Business, and 2 History.

4.1 Results from the Questionnaire

About the Casebook

As indicated in table 1, the overall score of the first section was 4.04. The mean scores on most items were equal to or above 4.00. For example, the casebook's screen design and its operation were good. Furthermore, the participants had a positive attitude towards the cases and their documents, and thought that they were valuable resources. A participant stated that "the video cases exhibit a lot of good teaching demonstrations. I think it is great!" The lowest score appeared on item 4. That means the participants did not agree that the number of cases was adequate. Many statements in the open-ended questions also indicated an inclusion of more cases with various topics and diverse applications, or even with in-service teachers' demonstrations.

Table 1. Descriptive data of the evaluation questionnaire

Items	Mean	SD
1 The Casebook	4.04	.92
1.1 Its screen design is easy to understand.	4.00	.94
1.2 It is easy to operate.	4.00	.94
1.3 The hyperlinks are accurate.	4.40	.97
1.4 The number of cases is adequate.	3.60	.84
1.5 The teaching subjects included are proper.	4.20	1.03
1.6 The cases are valuable resources.	4.10	.74
1.7 The cases' related documents are comprehensible.	3.80	1.03
1.8 The cases' related documents are valuable resources.	4.20	.92
2 The Video Clips	3.94	.89
2.1 Its screen design is easy to understand.	4.00	.94
2.2 It is easy to manipulate the video.	4.20	.79
2.3 The video runs smoothly.	4.10	.32
2.4 The video has high clarity	3.10	1.10
2.5 The videos are valuable resources.	4.30	.67
3 The Guiding Questions	4.05	.68
3.1 The questions are easy to understand.	3.90	.88
3.2 The questions match the focus of the video.	4.20	.63
3.3 The questions are helpful for video observation.	4.10	.57
3.4 The questions are helpful to stimulate reflection.	4.00	.67
4 The Discussion Forum	3.98	.95
4.1 It is easy to operate.	3.80	1.03
4.2 It is easy to read the messages in the forum.	3.60	1.07
4.3 Leaving messages in the forum promotes reflection.	4.20	.63
4.4 Reading other's messages helps inspire various ideas.	4.30	.95
5 The Overall Benefits	4.02	.68
5.1 The system can increase my abilities of applying technology in the teaching field.	3.80	.79
5.2 The system can increase my willingness of applying technology in the teaching field.	3.90	.57
5.3 The system can increase my confidence of applying technology in the teaching field.	3.70	.67

5.4 The system can increase my field observation abilities.	4.30	.67
5.5 The system can help me think deeply how to integrate technology into my instruction.	4.40	.52

About the Video Clips

As indicated in table 1, the overall score of the second section was below 4.00. In fact, the video clip’s screen design and its operation were good. The participants also considered the video clips valuable resources. The lowest score appeared on item 4, the video quality. In the open-ended questions, many participants also pointed out such problems. For example, the frame size of the video player was quite small, and a lot of video clips were taken by long shots. Sometimes, it was difficult to figure out what the teacher was doing in the classroom. Many complained about the video’s unclarity and noises. Some suggested increasing the length of a video clip as well as the number of clips.

About the Guiding Questions

As indicated in table 1, the overall score of the third section was 4.05. That indicates the participants considered the guiding questions relevant to the focus of the video clip. In addition, these questions were helpful for video observation or reflective thinking. Many statements in the questionnaire also indicate that the guiding questions were understandable and useful in catching the point of a video clip. However, a participant suggested that the questions be more open-ended to stimulate more discussions.

About the Discussion Forum

As indicated in table 1, the overall score of the fourth section was below 4.00. Although the participants rated the discussion forum high in terms of inspiring various ideas and facilitating reflective thinking, the forum’s display format and its operation received lower scores. Some participants complained in the questionnaire that it was inconvenient to read the messages in the forum since the screen jumped to another page when a topic was chosen. A participant further suggested that the system adopt the facebook format and allow the user to go straight reading and responding in the forum without screen change.

The Overall Benefits

As indicated in table 1, the overall score of the last section was about 4.00. Item 5 had the highest score 4.40. That means the participants highly agreed on the system’s benefit of helping them think deeply how to integrate technology into instruction. Another benefit, with a higher rating of 4.30, was an increase of field observation abilities. A participant pointed out in the questionnaire that “general speaking, the system is meaningful. For teachers, they not only obtain professional knowledge but also engage themselves in self reflections.” Another participant expressed that “ by observing the video cases, I have acquired many skills in using instructional media because I really lacked teaching experience prior to student teaching. Video-observing makes me think and seize some good ideas from the cases to be used in my own teaching.” However, the other three benefits were all rated below 4.00, namely, the abilities, willingness, and confidence of using technology in the teaching field. A participant suggested adding in-service teachers’ demonstrations to the casebook so as to increase student teachers’ confidence of using technology in the future.

4.2 Results from the Interviews

Experience with the Cases

One participant strictly followed the process of reading the lesson plan, examining the PowerPoint slides, viewing the video clips, and then studying the guiding questions. Whereas most participants went directly to view the videos and read the guiding questions so as to get an overall view of the teaching procedure. Then they went back to read the lesson plan and download the PPT slides. Some participants admitted that they would skip the lesson plan or other materials if they were busy. Still a participant stated that since she was teaching English, she selected the cases of English teachers and read their teaching beliefs and personal reflections.

Suggestions about the VBL System

In addition to an increase of cases and an upgrade of video quality, a participant suggested a need of setting up a procedure for the user to follow so as to get a more comprehensive picture of a case. Another participant proposed to add a brief introduction to each case's video demonstration, and believed that the guiding questions should be read before video observing. As for the "upload" function, a participant spoke frankly that it was too tedious to edit your teaching video, upload it to the YouTube system, make a connection to the VBL system, and then write a statement explaining what was going on in the video. It was much easier just to bring your teaching video to the class and play the video segments you want. At the same time, you could provide explanations as needed, and respond directly to the questions from your classmates.

Suggestions about System Implementation

As for the best time to introduce the VBL system, a participant indicated that the sooner the better. He suggested using the system at the beginning of student teaching to help them grasp authentic situations in the teaching field earlier. In fact, they did not have much time to use the system later on. However, another participant had a different point of view. She said that before the class began in September, student teachers were busy with school administrative affairs. Therefore, observing the videos did not make a lot of sense to them. After student teachers entered the classroom and watched the teacher teaching, they then had a good sense of these teaching videos.

As for the lower participation rate of the discussion forum, some indicated that the poor design of the forum led to inconvenience of leaving messages. Another participant assumed that the topics or issues to be discussed were the key. She explained that if the topics met student teachers' need, such as problems of using media in the classroom or unexpected occasions while using technology in teaching, more discussions would take place. Some suggested a good introduction of a case was important, such as its background or some key points to be noticed so as to join in a discussion more easily. Some proposed to observe and discuss cases at the same time in class meetings so that everyone got a chance to talk. Consequently more ideas would be gathered. However, a participant pointed out that some ideas just would not come out until you read the same case a second or third time. Therefore, she believed a need of some incentives to encourage student teachers' participation in the forum.

Personal Growth Using the VBL System

Some participants expressed that they had learned a lot from the discussion forum by discovering different points of view and obtaining various ideas and strategies. In

short, these video cases were considered as good learning models to them. A participant further shared her personal experience illustrating how useful the video cases were. While using the VBL system, she happened to see a video showing a student teacher got stuck in his teaching since a period of time was needed for a projector to warm up. Cleverly the teacher asked the students to read some paragraphs in the textbook instead of merely waiting and doing nothing. The participant did the same thing when she found an equipment problem of sound playing in the middle of her teaching demonstration. Such period of time was just long enough for other people to fix the problem, and she successfully performed all the activities as planned.

5 Discussion

The results of our study indicate that the video cases were valuable and useful to student teachers. These results are in agreement with previous research that video cases reappear teaching reality in authentic classrooms and provide pre-service teachers with vicarious learning (Chang & Hsu, 2010; Ertmer, Deborah, & Judith, 2003; Perry & Talley, 2001). Such teaching reality is very important especially to student teachers since they are going to teach in authentic classrooms pretty soon and yet many of them lack field teaching experience. Furthermore, these videos were teaching demonstrations by their predecessors in our cooperating schools. With a lot of similarity, student teachers may get a realistic picture of teaching in the field. Student teachers also recognized the benefits of the discussion forum to stimulate many ideas and different point of views. Hence, they acquired a variety of teaching skills and strategies useful for their teaching. Student teachers also acknowledged the importance of guiding questions to promote reflections as well as pinpoint the direction of video observing. These results are consistent with the studies by Chang (2011) as well as Santagata and Angelici (2010). One reason of providing questions is that a video contains such rich messages that a viewer may get lost easily. Another reason is that student teachers had few teaching experiences in the field, let alone using technology. Therefore, clear and specific guiding questions were considered as a scaffold. However, to avoid narrowing student teachers' perspectives, there were only two questions for each video. The third question was used to encourage them to discuss other things observed in the video.

Combing the characteristics of video cases, guiding questions, and discussion forums, it may be understandable that student teachers highly agreed that the VBL system helped student teachers think deeply how to integrate technology into instruction. Similarly, student teachers perceived that their field observing skills had improved. These results are consistent with the studies by Chang and Hsu (2010) as well as Rosaen, et al. (2010). The reason might be that the system offered student teachers opportunities to practice their observing skills with the aid of guiding questions. In contrast, student teachers' perceptions of the other three benefits were weaker. They were student teachers' abilities, willingness, and confidence of using technology in the teaching field. These results are in agreement with the studies by Chang, Hsu and Chen (2011) as well as Fitzgerald, et al. (2009). These studies claim that vicarious experience cannot replace direct experience, and experiential learning is

especially important for teaching. Hence, the use of video cases is necessary but not sufficient for professional growth in technology integration in teaching. What practical activities to be accompanied with the VBL system that fits well student teachers' developmental stages of using technology suggested by Taylor (2004) need further study

Since student teachers perceived the video cases as valuable resources, they certainly expected more cases with different subject areas, topics, and applications to be included in the VBL system. Hence they could find more useful materials whenever necessary. Furthermore, student teachers also had high expectation of video quality. For video data reduction, we converted all the videos into the FLV format. Accordingly, the video's quality was affected. In addition, the videos were taken in real classrooms. It was difficult to get rid of noises or other interferences. Finally, the person in charge of video recording in the classroom usually lacked professional techniques or experience, and occasionally needed to take care of other things at the same time. As a result, video quality varied. There are two ways to make up for the problem of poor quality. One is to adopt another video format with higher resolution; the other is to use video editing packages to remove noises and add subtitles (Chang, Hsu, & Kao, 2009).

It is relatively easy to deal with the technical problems such as improvement of video quality and modification of display format of the discussion forum. However, it is much more complicated when the focus shifts from "state of the art" to so called "state of the actual" (Miller, 2009; Selwyn, 2011). From the interviews, it is easy to find that "time" was a great concern to many student teachers. For example, participants would go directly to view the video and left a message without examining related materials if time was short. A clear introduction for each video case was suggested to save case exploration time, and case discussion was recommended to be performed straightly in class meetings instead of the system's forum to gather more ideas immediately. Similarly under the time pressure, student teachers hesitated to use the upload function since it would take too much time and efforts. Therefore, besides "perceived usefulness" of the system, efficient use of the system is expected since student teachers are often occupied with so many things that they need to get things done easily and quickly. In other words, we should take "efficiency" into serious consideration while designing and implementing the system for student teachers.

To increase student teachers' use of the VBL system in such pressure situations, some suggestions are provided based on the evaluation report:

- (1) Modify the casebook's display format so that the user can get familiar with a case in a short time. For example, add a brief description of a case besides its title, and reorder its documents into the following sequence: teaching belief, lesson plan, video, PPT slides, worksheet, feedback and reflection so as to direct the user to read important information prior to video observation.
- (2) Introduce the VBL system early in the orientation meeting held in the middle of June so that student teachers can have more free time to use the system before the internship program begins in August and before secondary school courses start in September.
- (3) Invite the professors in charge of the "subject teaching practicum" courses to post key issues as well as to lead discussion in the forums so as to encourage more participation. Student teachers need to complete the "subject teaching

practicum” course before going to the internship program. Therefore, they know the professor quite well and the professor is able to identify these student teachers’ current needs in subject teaching.

- (4) Encourage the university supervisors in the internship program to monitor their student teachers’ participation in the VBL system and to include the system’s case discussions in group meetings of subject teaching.
- (5) Provide incentives for student teachers’ higher quality of participation in the VBL system so as to encourage more student teachers to use the system actively and effectively during the internship period.

6 Conclusion

Our study investigated student teachers’ perceptions of the VBL system to enhance their technology integration competencies. We found that the system combining video cases, guiding questions and discussion forums is able to promote in-depth thinking about technology integration in instruction. Firstly, the video cases of former student teachers’ teaching demonstrations may make up for their insufficient experience of field teaching, and increase their observing skills in the field. Secondly, the guiding questions seem helpful to student teachers for grasping the main points of the video. Finally, the discussion forum offering good opportunities to exchange ideas can stimulate different views and self reflections. Therefore, we believe such system is beneficial to student teachers.

We also found a high expectation of video quality and efficient use of the system. We recommend a careful editing and handling of the teaching demonstration videos to clearly reveal the teaching processes. Furthermore, we think “time” is a big concern for student teachers to use the system. Accordingly, relevant suggestions are provided regarding system design and implementation so as to increase the use rate of the VBL system and at the same time, to engage student teachers in deep learning. More empirical studies are needed to investigate the effects of such modifications.

Finally, the VBL system alone is not able to produce a higher increase in student teachers’ abilities, willingness, and confidence of using technology in the teaching field. Opportunities should be provided for student teachers to practice their technology use in the classroom. Accordingly, more issues need to be addressed. For example, what activities are suitable? When is the best time to perform? How are these activities integrated into the VBL system? In short, more challenges occur when a system is actually implemented in real settings.

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