

DEVELOPMENT OF A VBL SYSTEM TO ENHANCE STUDENT TEACHERS' TECHNOLOGY INTEGRATION COMPETENCIES

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Abstract

To promote student teachers' continuous growth in technology integration competencies, we have developed a video-based case learning (VBL) system by adopting the ADDIE model. The cases in the system were collected from former student teachers' field teaching at the end of their internship. In addition to videos, the cases included related materials such as lesson plans, slides, worksheets, and so on. In short, our system intends to create an environment where student teachers can share their practical teaching knowledge with their peers, and their discussion is supported by evidence disclosed in the video. We have also conducted a formative evaluation and accordingly modified the system based on the evaluation reports. Currently, we attempt to collect more information about the VBL system so that its future use will bring more benefits.

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 favourable results [1,2]. However, it turns out to be quite a different situation when these students complete their university coursework and go on an internship as student teachers in secondary schools.

Student teachers normally feel "shocked" when faced with such an authentic but complicated situation the first time. In addition, the length of an internship for teacher education programs in Taiwan lasts only six months. Besides teaching, student teachers have to practice many other skills, such as class management and so on. Student teachers also have to prepare a national qualification examination usually held one

month later after their internship. Although the internship program with field teaching experience offers a good opportunity to test theories learned from the coursework as well as to put theory into practice [3,4], it becomes a real challenge for our student teachers to continue growth in technology integration competencies within such a short time constraint.

To meet the needs of student teachers, we have developed a video-based case learning (VBL) system by adopting the ADDIE instructional system development model [5,6]. We have also conducted a formative evaluation and accordingly modified the system based on the evaluation reports. Currently, we attempt to collect more information regarding the VBL system's function, operation, and implementation so that its future use will bring more benefits to student teachers.

2 Secondary school internship

Having completed required coursework, our students need to succeed in "secondary school internship" before they are allowed to take the national teacher qualification examination. According to Taiwan's regulations, the internship program only 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. Our teacher education program considers the internship program as a formal course, and our students are required to return to our campus for 4-hour professional development courses every two weeks. Usually we have five classes of the internship course in the fall semester. Each class has about 12 student teachers under the supervision of a university professor.

It is our tradition that university supervisors all work together to determine the syllabus of the internship course. The goal of the internship course is set 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 subjects so that they can share their practical teaching experience and discuss their teaching problems. All together, there are only five blocks (10 hours) of group meetings, each block lasting about 2 hours. Indeed, the number of such

meetings is limited in contrast with 18 weeks of a semester. However, it is difficult to allocate more hours of group meetings since the time schedule is quite tight.

Considering insufficient arrangement of professional development in subject teaching for the current internship course, we attempt to create a network 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 and store authentic teaching so that student teachers can observe them repeatedly and their discussion can be more focused and productive, with support of evidence [7,8]. Finally, many studies have demonstrated the importance of reflection on internship experience to promote professional growth [9,10]. Therefore, more opportunities must be provided to engage student teachers in deep reflection.

3 Method

This study adopted the instructional system development model of ADDIE because it applies a systems approach ensuring that learning systems and the required support materials are continually developed in an effective and efficient manner [5,6]. Below is a listing of the ADDIE phases and a description of tasks to be performed.

(1) Analysis: Identifying needs and constraints of the system by reviewing related literatures, examining relevant web sites, as well as conducting interviews with student teachers, in service teachers, and university supervisors.

(2) Design: Specifying objectives, and determining layouts of video cases, ways of stimulating reflection, formats of discussion, patterns of user-interface, and structures of data.

(3) Development: Selecting video cases, converting and editing videos, creating reflection questions, constructing a database, and integrating the whole system.

(4) Implementation: Introducing the system to university supervisors and student teachers, and specifying the procedure of using the system. For example, student teachers may be encouraged to watch videos of student teaching by their seniors, and to post comments in discussion forums after reading reflection questions or to provide feedback after reading a comment. Afterwards, student teachers may upload their videos of field teaching so that their peers are able to analyze the video before they go for a group meeting.

(5) Evaluation: Consisting of formative and summative evaluation. Formative evaluation is present before implementation to make the system better by fixing problems or make up for shortcomings. Summative evaluation is used after a system has been implemented to collect feedback from the users. Accordingly, revisions are made as necessary.

On the whole, the five phases are ongoing activities that continue throughout the life-cycle of an instructional system and the process is not static and linear, but rather dynamic and iterative.

4 Results and discussion

We have followed the ADDIE model, and gone through the first three phases: analysis, design, and development. In

addition, we have conducted a formative evaluation. The results of the study are reported into three parts as follows.

4.1 Needs analysis

We have interviewed 15 practice workers and 9 of them are student teachers from our teacher education program. Preliminary analysis of the interview reports revealed that the great difficulties that student teachers encountered regarding technology integration into classroom teaching were not technical problems but deficient in content knowledge. Hence, the proposed system should emphasize a close connection between technology and content teaching.

4.2 The VBL system

A web system called “video-based case learning system” has been developed to meet student teachers’ urgent needs of practical knowledge on subject teaching as well as professional demands of reflection and collaboration. Its web site can be linked from <http://mail.tku.edu.tw/yfchang>. The focus of subject teaching is on technology integration into instructional practices. The system provides authentic teaching videos of a variety of teaching subjects for student teachers to observe with suggested questions as a basis for discussion to promote their reflection. Figure 1 shows the diagram of the VBL system, and Figures 2 and 3 display computer frames of the title page and the main menu page.

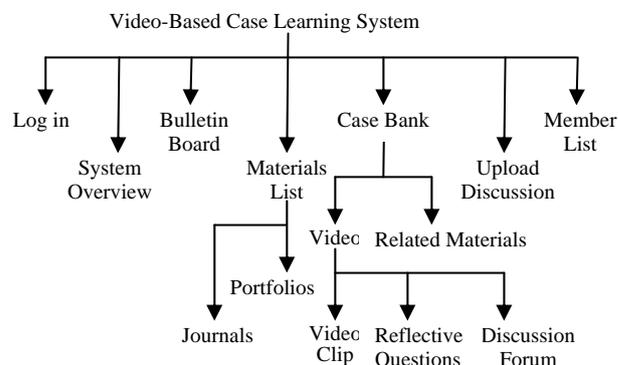


Figure 1. Diagram of the VBL system



Figure 2 The title page



Figure 3 The main menu page

The cases in the case bank were collected from former student teachers in field teaching for final evaluation at the end of their internships. The cases were grouped by teaching subjects. In addition to videos, the system included related instructional materials such as teaching belief, lesson plan, slides, handouts, worksheet, feedback and reflection report, and so on. These materials can be accessed by hyperlinks, as indicated in Figure 4.



Figure 4 The case bank page

A case's video normally lasts a class period. However, we cut it into three clips according to different activities carried out. Every clip lasts about 5 minutes. On the right side of the video play frame are three questions regarding the video clip to stimulate discussion and reflection. For example, the case "Christmas" is a lesson of the English curriculum for junior high schools, with three clips named "warm up", "guided reading" and "group competition" respectively. Figure 5 shows the video page of the "Christmas" case. Below are three questions for the "warm up" clip:

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



Figure 5 The video page of the "Christmas" case

Under the video play frame, there is a discussion forum for that video clip. Student teachers must log into the system before they can leave their comments in the forum. Also they can view the content of a topic in the forum, and then write a response to it, as indicated in Figure 6.



Figure 6. A response to a topic in the forum

For student teachers to upload their own teaching video, we recommend the YouTube system since it is popular, reliable and easy to operate. After student teachers have uploaded their video to the YouTube system, they then set its sharing function. In so doing, they can 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 displays the text but also broadcasts the video. Furthermore, a login member can write a response after watching the video. Figures 7 and 8 demonstrate how it works. In short, our system intends to create an environment where student teachers can share their ideas with their peers who teach the same subject. Moreover, their discussion is supported by evidence disclosed in the video.

4.3 Formative evaluation

We have interviewed 3 student teachers and 2 teacher educators for the system's formative evaluation. Results are summarized into two aspects:



Figure 7 The upload discussion page



Figure 8. The content of a topic in the upload forum

(1) Strengths of the system include: The computer layout is well organized, the operation is easy and user friendly, the system runs smoothly, the cases provided by the system are relevant, and instructional resources can be downloaded and browsed easily. Furthermore, it is beneficial to provide reflection questions as well as a space where student teachers can exchange their opinions and arguments.

(2) Weaknesses reported from the interviews include: The characters on the web page are somewhat small, so are the video play frames. Hence, details of the video frame are not clearly identified. It is difficult to find the video clip's activity in the lesson plan. The clock time set by the system is incorrect.

To deal with the above weaknesses, we took follow-up actions as follows: (1) Enlarge the text size and hyperlink options to a certain degree while keeping the original design of main menu. (2) Frame the text corresponding to a video clip's activity by red lines in the lesson plan. (3) Fix the system's time setting.

5 Conclusion

We have developed a video-based case learning (VBL) system for student teachers to promote their competencies in technology integration into subject teaching. The system allows student teachers to share their practical teaching

knowledge with their peers, and their discussion is supported by evidence disclosed in the video. We have also conducted a formative evaluation. Accordingly, some revisions were made and the system was well recognized. In addition to collecting more information regarding the VBL system's function, operation, and implementation, we will expand the system's function of allowing student teachers to upload their lesson plans, handouts, and other related materials. Then we will implement the system in the "internship" course to examine its effects. Furthermore, to maximize its use rate, we will also try out the system in our teacher preparation courses.

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References

- [1] Y. F. Chang, C. C. Hsu, C. H. Kao. "Development of a VCS system for pre-service teachers to support technology integration into classrooms", *Proceeding of International Conference on ICT Teaching and Learning*, Hong Kong, China, pp. 50-60, (2009).
- [2] Y. F. Chang, C. L. Hsu. "The effects of applying a VCS system on pre-service teachers' competencies for technology integration", *Proceedings of Global Learn Asia Pacific*, Penang, Malaysia, pp. 1394-1401, (2010).
- [3] S. Dexter, E. Riedel. "Why improving preservice teacher educational technology preparation must go beyond the college's walls", *Journal of Teacher Education*, **54**, pp. 334-346, (2003).
- [4] P. Hernandez-Ramos, C. A. Giancarlo. "Situating teacher education: From the university classroom to the 'real' classroom", *Journal of Computing in Teacher Education*, **20**, pp. 121-128, (2004).
- [5] W. C. Allen. "Overview and evolution of the ADDIE training system", *Advances in Developing Human Resources*, **8**, pp. 430-441, (2006).
- [6] C. Peterson. "Bringing ADDIE to life: Instructional design at its best", *Journal of Educational Multimedia and Hypermedia*, **12**, pp. 227-241, (2003).
- [7] C. Shepherd, M. Hannafin. "Beyond recollection: Reexamining preservice teacher practices using structured evidence, analysis, and reflection", *Journal of Technology and Teacher Education*, **17**, pp. 229-251, (2009).
- [8] R. Santagata, G. Angelici. "Studying the impact of the lesson analysis framework on preservice teachers' abilities to reflect on videos of classroom teaching", *Journal of Teacher Education*, **61**, pp.339-349, (2010).
- [9] E. Kaminski. "Promoting pre-service teacher education students' reflective practice in mathematics", *Asia-Pacific Journal of Teacher Education*, **31**, pp. 21-32, (2003).
- [10] K. Zeichner, D. Liston. "Teaching student teachers to reflect", *Harvard Educational Review*, **57**, pp. 23-48, (1987).