Video as a learning tool: An off-campus experience in learning with media technology

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Abstract

With the advanced development of technology, educational research has focussed on exploring the relationship between technology and learning. For example, "learning from technology" research emphasizes the effectiveness of instructional media. The focus on "learning with technology", views technology as a learning tool which allows students to create their own knowledge representation, and throughout the process, learning is supported and enhanced (Reeves, 1998). A further view of technology usage focuses on "students as designers", (Carver, Lehrer, Connell, & Erickson, 1992; Jonassen, Carr, & Yueh, 1998). The paradigm has shifted from using technology as an instructional approach to allowing students to use technology. In this paper, the organization of an off-campus project-based learning experience is reviewed as an example of emphasizing students learning with media production. Post-camp questionnaires and interviews showed that "learning with media production" has enhanced meaningful learning.

Keywords

learning with technology, students as designers, media production, knowledge representation

Learning with technology

Traditionally "learning from technology" treated technology as a teaching tool as opposed to a learning tool. On the contrary, "learning with technology" treats technology as a partner in the teaching and learning process with the explicit purpose of supporting student thinking (Jonassen, Howland, Moore, & Marra, 2003). Similar to the "learning with technology approach", "students as designers" was conceptualised. Students were asked to design instructional materials and throughout the process, students would understand the content deeply, and then design and produce their own knowledge representations. As a result, a powerful and meaningful learning experience may be generated (Reeves, 1998). In the "students as designers" approach, students make use of multimedia construction software to design and produce their knowledge representation (Reeves, 1998). It should be clarified that if students are designers, technology will act as a learning tool only while knowledge representation is the main production process and learning is the outcome. We should refine the definition of technology, explore the concept further and process of knowledge representation and investigate how the concept and process could foster meaningful learning. The role of media may provide an alternate approach in understanding "learning with technology" as a concept and process of knowledge representation, and its relationship to student learning.

Technology and media

From a theoretical perspective, Kozma (1994) suggested the attributes of media might include a medium's technology, symbol systems and processing capabilities. Technology is defined as the physical, mechanical or electronic capabilities of a medium while symbol systems are sets of symbolic expressions for information communication. Kozma (1994) suggested an interactionist perspective to regard "learning with media" as a complementary process within which representations were constructed and procedures performed, sometimes by the learner and sometimes by the medium.

Reeves (1998) clarified the distinction between the two concepts. Media is defined as all means of communication, regardless of its format. Generally speaking, media includes symbol systems as diverse as print, graphics, animation, audio and motion pictures (Reeves, 1998). Technology is defined as any object or process of human origin that can be used to convey media, which includes phenomena as diverse as books, films, television and the Internet. Reeves (1998) further classified media as the symbol systems that teachers and students use to represent knowledge, and technology as the tool that allowed the sharing of their knowledge representation with others.

From this definition, it is clear that students should first learn the media symbol systems, then represent their learned knowledge with the media symbol systems, and finally communicate and share their represented learned knowledge to each other through technology. With the perspectives of media symbol systems and knowledge representation, it can provide a model to link technology and students learning.

In this paper, it is argued that:

i. media plays an important role for student learning
ii. students make use of media symbol systems to produce a knowledge representation on a specific topic
iii. production of a knowledge representation will enhance thinking skills and deep learning on a specific topic.

Learning with video media

Video is one of the most familiar and yet controversial media, which was developed after the invention of television. Ever since the invention of television, a number of researchers have been exploring the TV effect or its instructional function in teaching without any significant findings. However it is an unarguable fact that students spend a significant amount of time watching TV or video (Buckingham, 2003). Recently, the educational research about video has shifted from an instructional approach to a "learning with video technology" approach. Various video projects are then designed as classroom or community activities for subject-based or learning beyond the classroom (Buckingham, Grahame, & Sefton-Green, 1995; Buckingham, Harvey, & Sefton-Green, 1999; Green, 2003; Gauntlett, 2003; Davidson, 2004; Theodosakis, 2005). All these video projects share a similar rationale:

- Students have great passion for video production.
- Students have grown up with television and are familiar with the video symbol system.
- Students can produce a video representation on a specific topic as a video outcome.
- They all focus on a project-based approach.
- Video production equipment is becoming less expensive, more powerful and more accessible to students.

Because students are fascinated by video media and are familiar with the symbol systems, and can easily access the equipment, teachers will not find it difficult to implement video projects in classrooms for students learning. This will shift our attention to a new direction of research in relation to technology, media and learning.

Towards a model of learning with video production

Buckingham, Grahame and Sefton-Green (1995) regarded learning as within a specific social context. Under the social dimensions of media learning, students — as frequent viewers of television — may be fluent 'readers' though they are not yet ready to become the 'writer'. These frequent readers may have 'passive' knowledge about media production. In order words, they are familiar with the video symbol system and this passive knowledge has to be made active in order to be used. There should be a transformation from the 'passive' knowledge that is derived from viewing or reading to the 'active' knowledge that is required for production or writing. Obviously, it is impossible for students to learn from watching television and Buckingham, Grahame and Sefton-Green (1995) emphasized that learning had to involve a dialectical relationship between doing and analysing or between 'practice' and 'theory'.

Simply 'reading' and 'writing' of the media is not enough for meaningful learning. Students should learn to reflect on their reading and writing, and the constructed meaning should be socially produced and circulated. Buckingham, Grahame and Sefton-Green (1995) named this reflection as conceptual understanding that cannot be divorced from the social context. The conceptual understanding helps to provide a model of knowledge representation, as it is about reading, writing and reflection on a specific topic that is a socially produced knowledge representation (Buckingham, Grahame, & Sefton-Green, 1995).

Jonassen, Carr and Yueh (1998) suggested that a "students as designers" approach shares a similar theoretical framework with Buckingham, Grahame and Sefton-Green (1995) and lays the groundwork for a new learning model of "learning with media technology". Technology in this model is treated as a knowledge construction tool. Learners should take the role as designers for interpreting and organizing their personal knowledge. Sharing a similar viewpoint, Carver, Lehrer, Connell and Erickson (1992) listed some major thinking skills that learners needed to use as designers: including project management skills, research skills, organization and representation skills, presentation skills and reflection skills. Students should actively engage in

interpreting the external world and reflecting on their interpretations to create their own view of the subject, or a conceptual understanding of the subject.

If we implement video as a learning tool in classroom activities, we are asking the students to interpret, organize and represent their knowledge construction in a video representation (Jonassen, Carr, & Yueh, 1998; Buckingham, Grahame, & Sefton-Green, 1995). Throughout the video production activities, the students will learn thinking skills necessary for success in a video project, and at the same time, they will construct their interpretation of a specific topic, which is the subject knowledge, or have a conceptual understanding of a specific subject and will engage in deep learning.

In summary, technology alone does not enhance students learning, as technology is only a tool to convey different media. Media is a form of communication that has its own symbol systems (Kozma, 1994; Reeves, 1998). Students producing a media outcome will experience the process of media production involving analysis, evaluation and reflection, and the outcome is socially constructed and circulated (Buckingham, Grahame, & Sefton-Green, 1995). Video is one of the media that can enhance students learning through "learning with video technology" approach. The approach is to treat video as a partner for learning a specific subject or topic. As students have grown up with with the video symbol system, they can easily access powerful but simple video production systems. It should not be too difficult for students to produce a video knowledge representation of specific subjects or topics going through the process of analysis, evaluation and reflection (Buckingham, Grahame, & Sefton-Green, 1995). As a result, students should have a deep understanding of the subject or topic, and would develop some major thinking skills that are essential skills for learning.

Implementation of learning with video technology: An off-campus learning experience

Starting from 2003, a Digital Video (DV) camp has been organized each year enrolling a selected number of full time students of the Hong Kong Institute of Education, a teacher training institution in Hong Kong. The objective of the DV Camp in 2003 and 2004 was to place the students in an off-campus authentic environment under a designed project-based approach for students learning with video technology. The students were given tasks in the camp and under the guidance of tutors, the students completed the tasks, produced a video outcome and presented to all other students in the camp. Through the media production process, the students had constructed their knowledge in video production (Hung, Keppell & Jong, 2004).

In the DV Camp 2005, the objectives and the tasks have been re-designed in order to find out what the students would learn besides video production knowledge under the "students as designers" approach. Carver, Lehrer, Connell and Erickson (1992) have suggested that students would learn some major thinking skills as designers, including: project management skills, research skills, organizational and representation skills, presentation skills and reflections skills. Theodosakis (2005) shares a similar argument that involving students in video production activities, students would have a chance to solve problems, budget, schedule, analyse, research, plan, imagine and communicate their ideas to others, etc. The video production activity promotes the students to be better thinkers, better communicators and problem solvers (Theodosakis, 2005).

Adapted from the thinking skills proposed by Carver, Lehrer, Connell and Erickson (1992) and Theodosakis (2005), it is assumed that through the project-based video production activities in an off-campus environment, students will gain the generic thinking skills including: creativity, project management, problem solving, presentation, communication and collaboration. The project also investigated whether the students are familiar with the video symbol systems, and what problems they would encounter during the knowledge representation process.

Participants

Students who voluntarily enrolled for the DV Camp 2005 needed to complete an application form with a 100-word description expressing their opinion on the relationships between digital video and teaching and learning activities. Thirty-three (33) application forms were received and all were accepted to join the camp organized at the end of June, just after the term break. One participant did not turn up in the camp due to personal reason. In comparison with the participants in DV Camp 2003 and 2004, this year more than half of the participants (19) are students from the Postgraduate Diploma in Education programme, while 13 of them are from the Bachelor in Education programme. Among these participants, ten major in Business Studies, nine major in Information Technology, six from Mathematics and the remaining are from Language, Physical Education and Creative Arts. These 32 students were asked to divide into six groups and each group should have at least one boy, one girl, one PGDE and one BEd student. It was expected that this diversity would assist their learning.

A simple content analysis of the 100-word description written by the participants suggested that 80% of the applicants felt that instructional video should arouse students' motivation and make teaching more active and interesting in the classroom. Only five applicants mentioned students could learn with video production, and expect students could learn problem solving, planning and management skills throughout the video production process. The analysis supports the belief that most of the participants can be grouped under the "learning from video production" approach. Therefore, it is meaningful and challenging to promote the "learning with video production" as the camp objective.

Design characteristics

The main design objective of DV Camp 2005 was to create an authentic environment for students to take on the role of working in a simulated TV station. All produced video outcomes would be broadcast in the camp and all the participants would be the audience. The best video programme was selected by the participants, and prizes were then awarded.

Meaningful tasks

Various tasks were designed for the students to engage, and students were free to develop a story for their tasks. For the video story they had developed, they needed to prepare a production proposal, a story outline and a storyboard. Critical comments would be given to the group proposal and story outline in order to guide the students to engage in the research, analysis, evaluation and reflection process during the video knowledge representation. Through the prolonged production, evaluation and refinement process, deep learning would be facilitated. Brief task requirements and corresponding learning objectives are listed in Table 1.

Table 1: Tasks of DV Camp and their corresponding learning objectives

Tasks	Objectives
1. Initial draft of video proposal	• To learn how to draft a persuasive video proposal: objective, angle and treatment
2. Produce one-minute self-introduction video	• To be familiar with the video camcorder and non-linear editing system • To present a story through a visual production • To provide an opportunity for students to form groups
3. Refine the initial draft of the video proposal	• To refine the objective, angle and treatment based on critical feedback from tutor • To draft the story outline
4. Refine story outline and develop story board from story outline	• To refine story outline based on critical comments from tutor • To understand shot composition, shots continuity and how to draw story board from story outline
5. Shooting and editing	• To learn how to convert paper proposal and story board into video: video representation • Foster team collaboration and problem solving capability among the groups
6. Group presentation and voting	• To learn how to present a video outcome to an expected target audience • To learn how to evaluate a video outcome

Evaluation

Some evaluation strategies were applied to evaluate the project. The objectives were to determine:

- whether the students would enhance specific thinking skills after learning with video technology; and
- the process and difficulties in relation to video knowledge representation.

Pre- and post-camp questionnaire

Participants were asked to evaluate their media production knowledge on a five-point scale before and after the DV Camp.

In the post-camp questionnaire, students were required to select from a list of thinking skills and identify the skills that had been used during the learning with video production process.

Video ethnography

A video camcorder was used to record the major process of the production throughout the camp. It was expected that throughout the tasks, discussion and production process, the thinking skills would be observed and recorded by the video camcorder. Any difficulties encountered would also be recorded.

Interviews

Instant group interviews were conducted during their task-based activities. Students were asked what they were doing and what they had learned during the process. At the end of the camp, one student from each group was selected to conduct a focus interview in order to find out their role in the group and what they learned throughout the process.

Data, analysis and discussion

Questionnaire

A total of 31 pre-camp questionnaires and 28 post-camp questionnaires were returned. 24 participants evaluated their production knowledge before and after the camp, 15 (63%) participants indicated that their media production knowledge was enhanced after the DV Camp. The self-evaluation about the media production knowledge indicated more than half of the participants did perceive an enhancement of media production knowledge after the camp.

In Question 2 of the post-camp questionnaire, participants were asked to select the thinking skills that they had used in the camp. The result is listed in Table 2.

Table 2: Thinking skills used by participants in the DV Camp

Thinking skills that have been used in the DV Camp	Number of selection (%)
Collaboration	28 (100%)
Communication	23 (82%)
Creativity	23 (82%)
Problem solving	21 (75%)
Project management	19 (68%)
Presentation	14 (50%)
Leadership	12 (43%)

From Table 2, it appears that during the production process, more than half of the participants perceived using the thinking skills in collaboration, communication, creativity, problem solving, project management and presentation. It is interesting that all of them have mentioned using collaboration skills while only 43% mentioned the leadership skills. It seems that the participants are more concerned with teamwork, as opposed to leadership. The data suggests that participants emphasised collaboration and communication thinking skills, resulting in socially constructed media.

Interview

During the focus group interview, two questions were asked

i. What is your role in your team?
ii. What did you learn in the camp?

It was assumed that if the participants have used some thinking skills in the camp, they will explicitly mention the thinking skills in their response (Carver, Lehrer, Connell, & Erickson, 1992). With careful analysis of the responses from the focus group interview, and through analysis through the NVivo software, nine categories of thinking skills are mentioned and coded. The categories of thinking skills and number of coded passages are listed in Table 3.

Table 3: Categories of thinking skills and number of coded passages from NVivo

Thinking skills generated from focus group interview	Number of coded expressions
Collaboration	11
Project management	6
Problem solving	4
Leadership	3
Communication	3
Presentation	2
Creativity	2
Brainstorming	2
Reflection	2

During the coding, thinking skills were not defined but similar expressions were grouped into the most appropriate thinking skill category. For example, under the group collaboration category, similar descriptions about working together, compromise and teamwork, etc were coded. Here are some descriptions disclosed by the participants.

> Student C: At the very beginning I was not willing to raise my opinion. Then I found out after raising the opinion, our group would refine them together. The outcome is quite satisfactory, and it is better than individual thinking (DV Camp, 2005).
>
> Student D: We drafted the story outline together and during the process, different ideas came across and we had applied our collaboration skill during discussion (DV Camp, 2005).
>
> Student D: After presenting your idea, if others do not agree with you and suggest some other ideas, we have learned to compromise and incorporate different ideas together (DV Camp, 2005).

For project management, similar expressions related to division of labor, resources and time management have been grouped together. Here are some examples of expressions related to project management:

> Student C: Every member has a chance to be involved in shooting and acting. Playing different roles in the process has made us learn more (DV Camp, 2005).
>
> Student D: During the camp, I learn the importance of time management. I agree with Vincent's saying about the ratio between shooting segments duration and expected programme duration. Without time management, we have produced a 15 minutes shooting segment while the expected programme duration is one minute only. Because we have spent 15 minutes in shooting, 15 minutes in capturing video segment to computer, 15 minutes to sort out the OK takes and only little time was left for editing (DV Camp, 2005).

For the expressions about encountering a problem and then finding out a solution, it was categorized under problem solving.

> Student E: During shooting, I've learnt problem solving ability and shooting technique, which can only be learned from actual location shooting. For example in the restaurant, we have to choose the appropriate corner that gives a better lighting for shooting. Or for the ending scene, we wanted somebody to jump and disappear from the scene. We find it difficult to produce the effect, as the people at the background were moving. We encountered a lot of problems during shooting and we had to solve them on the location instantly (DV Camp, 2005).
>
> Student F: I have learned about problem solving. Most of the time, the shooting is out of our expectation, members raised a lot of ideas and we had tried to solve the problems together. During editing a lot of problems came out, such as how to manage the out of expectation video segments, as we had no time to re-take (DV Camp, 2005).

From the focus group interview, the most frequently mentioned thinking skills were collaboration, project management and problem solving. The result shows that the students have faced a lot of difficulties during the video production and they have used a lot of thinking skills to solve the problems they encountered. If they had not encountered the difficulties, their thinking skills would not have been stimulated and it would not have enhanced their project outcome. It supports the belief that students thinking skills will be enhanced during and after the video production process.

Analysis of video outcome: Knowledge representation

The six groups were guided to produce their own video topics in the camp. Although the video outcome cannot be compared to a broadcasting standard, some of the groups did produce a very good story demonstrating their understanding in the specific topic, indicating the use of some thinking skills and enhancement of deep learning.

For example group C produced a video about mobile phones. They used a docudrama approach reflecting some cases of using mobile phones in a nonsense way. The video ended with a person getting lost in a crowded street because he did not bring his mobile phone and hence could not find his way. The video outcome shows that the group did analysis, evaluation and reflected on how mobile phones are used in Hong Kong. They then shared their understanding of a socially constructed video representation. Without any prior training in video production, the group had managed to develop a video symbol system to represent their thinking, such as using a docudrama structure to illustrate different ways of using mobile phones.

> Student C: During shooting, we worked out the story outline together first. If there were some other ideas suggested, we would incorporate into the story outline…. Every member had a chance to be involved in shooting and acting. Playing different roles in the process made us learn more
>
> (DV Camp, 2005).

As indicated by student C, group C showed good collaboration, project management and communication skills throughout the video production process, and their video outcome was socially constructed as knowledge representation and deep thinking on the usage of mobile phones has been enhanced.

In group A they had drafted a ghost story proposal at the very beginning.

> Student A: As no one suggested any idea, I then told a funny ghost story. It was unexpected that all of them accepted the story as the story outline
>
> (DV Camp, 2005).

The group was then questioned about the objective of producing a ghost story: do they want to prove the existence of a ghost, or do they want the audience to be afraid of a ghost etc? Then they discussed again and refined their video proposal and story outline. Through the prolonged discussion, the group developed deep thinking about the message behind a video story. Finally, the objective of the video is to point out that a ghost story is generally developed from rumour and misunderstanding. The group did have a thorough discussion and reflection on a very simple funny story and developed their thinking into an outcome as a knowledge representation. They are familiar with the video symbol systems such as the structure of a news story, interview and how to present a story in video with a commercial break.

> Student A: For example the most interesting part is the commercial break in between the story. During our discussion, tutor's mobile phone rang and it stimulated us to make use of the ring tone to produce a commercial break.
>
> I regard brainstorming as the most important skills, and story outline is the collaborative outcome of group discussion. The collaborative contribution will speed up the process of scriptwriting
>
> (DV Camp, 2005).

Creativity, collaboration and brainstorming are the main thinking skills developed by the students during the process. From a mobile phone ring tone they then developed a commercial break. Throughout the interview, brainstorming and collaboration have been emphasized, thus reflecting that these are the most important thinking skills developed from the video production activity.

The mobile phone ring tone has explored another area for video editing. Nearly all the six groups have made use of the MP3 music uploaded from the mobile phone for background music during editing. The implication is that the students are familiar with the mobile technology, showed great creativity in story telling and performed great problem-solving ability to produce video outcome with existing resources.

Implications

> Learning is no longer encapsulated by time, place, and age, … Teaching is no longer defined as the transfer of information; learning is no longer defined as the retention of facts. Rather, teachers challenge students to achieve deeper levels of understanding and guide students in the collaborative construction and application knowledge in the context of real-world problems, situations, and tasks
>
> (Kozma & Schank, 1998, p. 2).

Nowadays education school students are in a cross road between a traditional school setting and active constructive learning. Education reform has suggested a direction to learn beyond the classroom, across-subjects learning, project-based learning and integrating technology in teaching and learning (Education Commission, 2000). Compared to fixed time and place classroom teaching, an off-campus project-based video production experience may provide an opportunity for student teachers to reflect on what they have

learned and how they are going to teach. "Learning with video production" may need further input in its conceptual framework and further research findings to support its effectiveness; however, it does appear to have potential. The DV Camp project illustrated that learning with video production may provide an opportunity for students to engage in collaborative knowledge construction and application knowledge in the context of real-world problems, situations and tasks. The integration of "learning with video technology" into curriculum may suggest a way for students to negotiate the crossroad.

Conclusion

With the implementation of an off-campus project-based learning experience with video media, participants demonstrated that they could produce knowledge representation on a specific topic, facilitate thinking skills in terms of collaboration, creativity, project management and problem-solving. Through the process of production and the analysis of their video outcome, deep learning did occur among the participants. The off-campus learning environment and experience provides a good example of cross-disciplines project-based learning with video media. The students from different major subjects and programmes could collaborate and produce video representations through their familiar video symbol systems and the socially constructed knowledge representation could be shared and presented to each other by means of technology. The project shows that learning with technology is not restricted to learning with computing related technology such as production of multimedia courseware or websites; it can also be focused on video media. The project also indicates that different disciplines and programmes of students can be grouped together under a project-based approach. It provides a direction of research about integrating across-subjects authentic learning environments and the learning outcome is not restricted to a traditional subject-based performance.

> Additional to the core subjects, students need to know how to apply these skills by thinking critically, applying knowledge to new situations, analysing information, comprehending new ideas, communicating, collaborating, solving problems, and making decisions…. Education moves from being purely academic, to where students can make a connection between the classroom and their own lives
>
> (Carew, 2004, p. 6).

Although it was not be the main objective of DV Camp 2005, the students' performance and engagement did demonstrate that a new learning model is gaining momentum. How to maintain the momentum between classroom/off-campus, subject-based/project-based, knowledge instruction/knowledge construction might be the new frontier of student learning in the digital 21st century.

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