Meaning representation in video outcomes of inquiry project

Abstract

As student assignments and assessment evolve to keep pace with the technological developments, students have the opportunity to express their knowledge in a wider range of forms. The current study aims to examine the meaning representation in videos produced by secondary school students as part of a non-written inquiry project. The content of the video outcomes in the inquiry project, student interviews, and reflection essays written by the six participating students who were of different academic achievement levels were analyzed to better understand their meaning representation using videos. Five types of literacies used by the students in their video outcomes for meaning representation were identified: text, action, narration, cinematography and acoustics. The findings also showed that there were three types of meaning representations with different characteristics: drama, documentary and photo story. The components identified to be required for meaning representation in video were attitude towards video representation, choice of inquiry topic, organizational skills, and data management. The findings informed us of the possibility of diversified use of literacies for meaning representation in different genres of videos. The findings also alerted us of the need to equip students with necessary attitude and skills for better meaning representation. Nevertheless, the need to support learners to present meanings well with videos is suggested.

Keywords: meaning representation; literacies; videos; inquiry projects

1. Introduction

Further to the multi-million dollar success stories of the top grossing films such as Monsters Inc., The Phantom Menace, Shrek, and Harry Potter, there is another list of important films and videos created by our children, the most influential thinkers of the future (Theodosakis, 2002). This study takes the opportunity of a new education initiative which involves students in creating videos during their inquiry work in real-world setting, to examine the literacies and genres involved in student-generated videos and to study the meaning representation of their inquiry work with videos.

At the beginning of the 21st century, the rapid societal development, advances in technology and demands in the knowledge-driven economy has contributed to the paradigm shift in learning. Learning nowadays is characterized by its experiential and applicable nature in knowledge building, and the teacher-centered school system has

also changed to a learner-based system (Bransford, Brown, & Cocking, 2000). Discussions on teaching and learning have evolved from a teacher-dispensing knowledge approach to a learner-experiencing-and-understanding approach (Biggs & Moore, 1993; Marton & Booth, 1997), as well as from a teacher-centred approach to inquiry by learners (Anderson, 2002; Harlen, 2006; So, 2003).

The recent development in information technology has also led to expectations by educators that there are new ways of learning and intact potential for changing the nature of school education. The advances of digitalized information technology has provided new possibilities to use educational materials in flexible and accessible ways that were not possible before (Jonassen, Wang, Strobel, & Cernusca, 2003). Authentic learning with the inquiry approach and the digital technology of video generated by learners which signify learners' meaning representation is the potential area of development in school education. During which the students capture, edit and generate their own video to present their learning outcomes and demonstrate the value of authentic learning with digital technology. Visual literacy, which is a complex of knowledge, capacities and skills, plays an important role in this information age and should be a skill to be passed on to students (Yeh & Cheng, 2010). However, the ways and characteristics that meaning is made through the use of video in students' tasks are novel to teachers and educators and are unexplored by researchers.

Based on the new education initiative in the Hong Kong senior secondary schools which requires students to work on non-written mode inquiry project, this study explores how students use different literacies for meaning representation in videos outcomes of their inquiry projects. Since the research questions focus on examining different types of literacies used for meaning representation, the genres and characteristics of video outcomes, the key components affecting the meaning representations, how coherent are the interpretations of meaning of the videographers and the viewers, the literature review on student-generated videos, literacies for meaning representation in videos and visual meaning representation in inquiry projects are discussed in the subsequent paragraphs to better understanding the concepts of the main components about meaning representation with video in the current study.

1.1. Student-generated videos and the genres used for meaning representation

Inexpensive and easy to use digital cameras and editing software have enabled educators to explore the use of digital video as a serious tool for teaching and learning (Theodosakis, 2002) with classrooms turning into studios, teachers into producers and students into filmmakers. The use of digital video in the teaching and learning at

primary and secondary education is its contemporary relevance to young people and its potential use as a fresh communication medium (Kearney & Schuck, 2006). Studies investigating the effects of student-generated digital videos have been conducted in Australia, the UK and the USA. Reid, Burn, and Parker (2002) examined student-generated digital video products by students in the UK for the quality of film-making, the final product, and what the students had learnt about generating video. Levin (2003) described the value of production of video products by high school history student in the US with the forge of link with the community by meaningful engagement with the world outside the classroom. In the work with very young children, Potter (2005) found that they can also utilize the video medium to create a range of sophisticated and rich representations, and children are operating in a medium that is familiar and culturally closer to their experiences of life outside the school than is usual with the school curriculum.

Furthermore, Shewbridge, and Berge (2004), as well as Schuck and Kearney (2006) reported their investigation on the pedagogy evident in the use of student-generated digital video in Australian classrooms. Research by Leijen, Lam, Wildschut, Simons, and Admiraal (2009) also showed that students can select specific fragments for further reflection or detailed observation when they edit and view their video work, Though there is a growing body of literature which is useful in developing understanding of the nature of learning through student-generated digital video, further exploration of key components that are essential to one's meaning representation in video will help to enrich the related literature. Some of the researchers (Cook, 2009; Kress, Jewitt, Ogborn, & Tsatsarelis, 2001) have also found that students have used different formats and genres in their videos to present their ideas: film, documentary. Hull (2003) also found students in Northern California of the USA used themselves and their communities as the subjects of digital stories that reconstruct past events and inspire plans for social change.

However, the process of meaning-making and composition of digital videos do not obviously resemble the fixity of print (Burn & Durran, 2007) and there is not much discussion and systematic analysis in the literature about the genres used in the video outcomes of students.

1.2. Literacy for meaning representation in videos

Moving into the digital world, text-based learning platform is becoming less important (Kress & Van Leeuwan, 2006). In our global information society, teaching students to read and write only with letters and numbers is not sufficient (Gainer, 2010).

With the facilitation of technology development, the learning platform has been shifted from reading text in traditional, printed based forms to "reading" images on a computer screen (Kress, 2004). A wide range of elements such as image, sound, movement, light, color and interactivity often supplement the printed word and contribute to the ways in which meaning is made (Beavis, Bradford, O'Mara, & Walsh, 2008; Kress, 2004).

The ways that generate, communicate, and negotiate meaningful content through the medium of encoded text within contexts of participated in discourses (e.g. blogging, music video, podcasting, etc.) beyond traditional texts are named as literacies (Lankshear & Knobel, 2006). Luke, Freebody, and Land (2000) suggested that literacy is the sustained and flexible mastery of a repertoire of practices with the texts of traditional and new communications technologies via spoken language, print and multimedia. Literacy is the way to present the meanings with the ability to make the message using a wide range of technologies, including camera, camcorders and computers (Hobbs, 1994).

The changes in technology, media, and society require the development of literacy to empower learners to adequately read multimedia messages and produce multimedia themselves in order to be active participants (Kellner & Share, 2007). Examples of literacies that can be used for meaning representation and communication includes language, images, gestures, gaze, body posture, sound, writing, music, speech, etc. (Kress & Van Leeuwen, 2001). One of the most popular ways to use literacies for meaning representation is through video. In working with digital video, there involves literacies talking about ideas, setting scenes, influencing people, emotional expression, and pulling music into it (Kearney & Schuck, 2006).

The launching of YouTube in 2005 marked a new era as it provides a platform for learners to produce, share and contribute visual knowledge (Jenkins, 2005). Besides, the development of Web 2.0 has facilitated the use of video for meaning representation (O'Reilly, 2005). Thus, these recent advances of digitalized information technology have provided new possibilities to use educational materials, especially for videos production, in flexible and assessable ways. This does not only open up a new horizon of meaning representation beyond traditional text in the rapidly changing environment of the computer age, but also shed lights to research about learning with different literacy for meaning representation in video.

1.3. Meaning representation and interpretation of inquiry video outcomes

Learning technologies can support student inquiry by expanding the range of questions that can be investigated, the types of information that can be collected, the

kinds of data representations that can be displayed, and the products that students can create to demonstrate their understanding (Krajcik, Blumenfeld, Marx, & Soloway, 1999). Research on digital video production nowadays no longer only focuses on discussing benefits of literacy, but it also involves student active learning, experiential learning and authentic learning (Kearney & Schuck, 2006; Schuck & Kearney, 2008). The pedagogy associated with student-generated video is student-centered and students are often encouraged to engage in ill-defined and authentic tasks, a valuable experience matching the complexity of the real world, which is an important component in inquiry project work, should be advocated in the contemporary school education (Koehler & Mishra, 2005). As claimed by Shewbridge and Berge (2004), video can provide students with a medium for exploration and discovery in a wide range of subject areas. Thus, whether video production can be a medium for learning is of interest of educators.

Technology and different symbols systems can act as tools to share knowledge with others (Reeves, 1998). In framing what one's shoot, one make the mental selections transparent (Goldman, 2004). Video meaning presentation is an alternative to written presentation which can help students demonstrate their understanding of a specific topic (Buckingham, Grahame, & Sefton-Green, 1995). Video production process is about turning the intangible into the tangible (Theodosakis, 2002), and involves critical-thinking, general observation, analysis, and perspective-making skills to demonstrate the understandings of the learners (Bell, 2005). This shows that the benefits of student-generated digital video fit well with students' inquiry project (Schuck & Kearney, 2004). As a result, participating in projects which allows students to use their own ways to present their ideas may facilitate the inquiry work.

Though video is one of the best tools to use to demonstrate perspective (Goldman, 2004), it is a challenge for students to hold a clear picture in their mind of what they want to communicate and then to guide their video towards that vision (Theodosakis, 2002). Hence, it is not possible for us to view video without asking the following questions: whose perspective is being represented in this video? Is it the videographer's perspective? Is it the perspective of those being videotaped? Or, is it the perspective of the viewers who annotate and interpret and interpret the video? A video culture is one where members of a community are confronted with questions about whose perspective is being presented. Thus, how meaning representation occurs in the video outcomes of inquiry projects and the interpretation of meanings by videographers as well as viewers remains unexplored in the literature.

Figure 1 shows the conceptual framework of the study which examines the meaning representation in student-generated videos of the inquiry projects with reference from the literature search which informs the design as well as the data collection and analysis

process of the study.

<<Insert Figure 1 here>>

2. Method

In this paper, we explore students' development of meaning representation through the production of video outcomes from their inquiry projects. This exploration is examined under the assumption that the video outcomes might use different literacies, and there are different characteristics of video outcomes. This assumption helps to formulate the first two research questions. We also cogitate that there are components required for better meaning representation and this becomes the third research question. Finally, we speculate the consistence of meaning representation of the video producers and the meaning interpretation of viewers and this turns into the fourth research question, which refers to the data triangulation of the interview data. The analysis is based on the following questions generated to guide the research direction:

1. How different types of literacies are used for meaning representation in inquiry projects?
2. What are the genre and characteristics of video outcomes produced for meaning representation?
3. What are the key components that affect students' meaning representation in the video outcomes of the inquiry project?
4. How coherent are the interpretation of meaning by the videographer and the viewers?

2.1. Background of the study

Starting from September 2009, a new secondary school curriculum has been put into practice in Hong Kong. The primary change of the new curriculum is related to subject choice and assessment methods. Liberal Studies, a new subject, has been introduced as one of the core subjects in this new secondary school curriculum. In addition to paper-and-pen tests, students are required to submit an independent inquiry project report, either in written or non-written mode, as one of the final outcomes for assessment in Liberal Studies within the three-year study of their senior secondary education. The written mode requires a report, while the non-written mode can be a presentation in a form other than written mode (e.g. video, websites embedded video, etc.). The implementation of the non-written mode inquiry project triggers a shift from

traditional literacy learning to inter-disciplinary literacy learning fit for education in the 21st century.

Since the non-written mode inquiry project is new to secondary school education in Hong Kong, schools have been involved by the Education Bureau and Teacher Education Institute in a pilot study to investigate how students learn with visual meaning representation in the process and production of non-written inquiry projects. This pilot study required students to work on an inquiry project for a period of six months and a 2-minute video was expected as outcome.

<<Insert Table 1 here>>

2.2. Intervention - The inquiry project

The teacher provided support to students' inquiry work by delineating the stages of inquiry project within the six months. The stages of inquiry project comprise of inquiry proposal, written proposal, video shooting, and video outcome. In order to prepare students with the necessary skills in the technologically challenging tasks for the use of school intranet, video equipment and editing software, a television producer who has related expertise was invited to work closely with the class teacher to be supervising teachers in equipping students with skills for expressing themselves via visual tools and producing video. Comments and suggestions on students' work were provided by the supervising teachers throughout the different stages of the inquiry project.

Inquiry proposal to formulate an inquiry question - The students were guided to formulate an inquiry question through various tasks. They were also guided to express themselves visually to report a contemporary issue in the community, which is ill-defined and authentic. A story based on three pictures of the community, and questions for inquiry were required for verbal presentation as the outcome of the first stage of the inquiry project. The photo files created were stored on the school intranet site. Since the students do not have much experience and knowledge in using video to work with the inquiry projects, the use of photos served to help them structure meaning representation beyond traditional text in this first stage of the inquiry project.

Written proposal to refine the inquiry objective and questions - During the verbal presentation, students received critical and constructive feedback from the supervising teachers. The feedback aims to help students bridge the gaps between meaning representation by the videographers and interpretation by the viewers as described in the literature (Theodosakis, 2002). Afterwards, a written proposal including the objective of the inquiry, proposed questions on an issue or people, data collection methods and

expected difficulties of the project was required to be submitted through the school online platform as the outcome of this stage of the inquiry project.

Video shooting for data collection - Guidance was provided to students on theme conceptualization, inquiry question formulation and data collection methods during this stage. This is to equip students with the literacies for meaning representation in videos which include language, images, gestures, gaze, body posture, sound, writing, music, and speech (Kress & Van Leeuwen, 2001). Videos and multimedia data collected were stored on the school intranet site.

Video outcome to present project findings - Students analyzed and interpreted the data collected for the video outcome. The final 2-minute videos presented to the whole class and supervising teachers were regarded as the final products of the inquiry projects.

2.3. Participants

A class of 38 students aged 14-15 in the first form of their senior secondary education was involved in this study, doing inquiry projects which required video outcomes. Six students (3 girls and 3 boys) were selected randomly according to their academic performance to be involved in an in-depth analysis. They were of high, average and low academic abilities. In this article, they were renamed so that their confidentiality can be protected, Jessica and James were of high academic ability, Andy and Fanny were of average ability, while Mandy and Kelvin were from the low academic ability group. Table 1 lists students' academic abilities and topics of their inquiry projects.

2.4. Data collection and analysis

There are different ways to collect data for the analysis of this study including video outcome, reflection essay, and interview. The data collected from different sources are for answering the different research questions, and for triangulation of the data.

2-minute video outcome – The students were required to submit a 2-minute video outcome at the end of the inquiry project. Content analysis of the video outcomes to explore students' performance of literacies was conducted, and the analysis was based on the different literacies used by the students. The literacies refers to meanings that are made and interpreted through representational and communicational resources including language, images, gestures, sound, etc. The data provides answers to the first and second research questions on the types of literacies used by the students in the inquiry

video outcomes, and the genres and characteristics of video outcomes produced for meaning representation. The analysis of the videos also helps the interviewer to make assumptions of the meaning of selected scenes. The coherency of the meaningful representation and interpretation during the interview will help to answer the fourth research question.

1-page reflection essay - The students were required to write their thoughts about what they had learned and what could be done better in the inquiry project work. The coding process identified categories and make connection with student reflection for description of their properties. Analysis of these reflections helped to uncover the key components required for meaning representation in the video outcomes asked in the third research question.

20-minute student interview - The interviews were carried out with each of the six students after their submission of the video outcomes. During the interviews, the interviewer, who is an expert in the area of teaching and learning of video technology, watched the video outcomes together with the students. Assumptions of the meaning of selected scenes were made and checked with the students to see if they agreed with the interviewer's interpretations. Further clarifications were invited from the students no matter whether they agreed or disagreed with the interviewer's interpretations. This helped to answer the last research question on how coherent the meaning representations of the videographers and meaning interpretation of the viewers with the videos. The interviews were audio-taped and transcribed for analysis, and the coding process included matching viewer's interpretations and students' meaning representations for recognition of matched / partially matched / mismatched in the extent to which they agree with each another's interpretation. The dialogue of interviewers and students were analyzed to see whether the meanings that the students presented in the video were similar to the interpretations of the viewer.

3. Results

3.1. Characteristics of video outcomes

3.1.1. Types of literacies used for meaning representation in inquiry projects

The analysis of the literacies used in the video outcomes helped to answer the first research question about how different literacies have been used by students for representing their ideas and understanding in their inquiry task. The literacies used are: text, action, narration, cinematography and acoustics (Figure 2). Table 2 shows the literacies used with description of its meaning representations, with all six students

using each of them at least once.

Bell (2005) claimed that since students generally used the traditional written and spoken word to present their ideas, using videos and literacies to present ideas can be a challenge to them. However, the meaning representations in videos would also show students' observation, analysis, critical thinking and perspective-making. Observation refers to what the students observe in daily life and during the inquiry project. Students used pan shots, behavior or words (decorations) to show what they observed. Analysis refers to the inquiry results of the students. Interacting subtitles and interviews were frequently used by students to show their analysis. Critical thinking was needed in the editing, rearranging and logical format in the presentation of ideas. Editing techniques like fast-forwarding, zoom in and zoom out showed students' critical thinking and their mental path. Perspective-making shows audience the directions and topics that the videos are getting into. Our analysis on students' videos focused on how students use the different literacies for the coding of their ideas.

<<Insert Figure 2 here>>

<<Insert Table 2 here>>

Text in a video was usually used as designs of meaning, and the meaning-making processes that the producers engaged in (Jewitt, 2008). According to Churchill, Lim, Oakley, & Churchill (2008), language-based text includes explanations and discussions, headings and sub-headings, subtitles, and labels, which can enhance the representational and communicative capacity of the video. In the analysis of the six video outcomes, text was found to be used by student for different purposes which included topic, clarification, questions, interaction with audience, remarks and decorations. Topic refers to the main theme of the inquiry, for example, Andy showed the title of his inquiry work "Investigating the Staff Room" both at the beginning and at the end of the video. Clarification involves description of what the scene is showing, just like the subtitles used in Jessica's video to clarify the queue entering the library. Questions are mostly posed to arouse audiences' thinking, as did by Kelvin to ask the audience to think about how to spend the time during retirement, which showed his perspective making about the issue of retirement. Interactions refer to the message from the video producer to the audience as a connection to the next scene. Fanny used interactions to remind the audiences not to focus on the previous scene. Remarks indicate the comments or self-reflections of the video producers, like Mandy reflected that care towards teenagers is important which represent her critical thinking. It was also found that text which was

not related to the topic of inquiry, but only for the sake of decoration was used. “The End”, “Special Thanks to …” were examples of decoration text. Students were found to use text most often as clarification and question in their videos.

Action denotes the actions that were performed by the characters in the video. It includes continuous behaviors of the characters, gesture and facial expression which show happiness, anger and sadness, etc. Behaviors of characters, like “teacher hitting on the table in Mandy’s video to imply anger”, were found to be used in all videos to represent the analysis of students’ inquiry tasks. In photos taken by Andy, audience can see that the teachers were preparing for lessons with information from their behaviors and the environment. Examples of gesture and facial expression include gestures with people holding the cup up around the table to imply “cheers” in Kelvin’s video and a frustrating face of a teacher in Andy’s video to imply aggravation of teachers. From the video analysis, gestures and facial expressions were found used mostly in the video by Fanny and Mandy with their observations as the purpose of meaning representation.

Narration is the verbal interactions in the video which helps the students tell the story and communicate with the audience (Kress & Van Leeuwen, 2006). From the video analysis, it is found that students used conversations between people, interviews and monolog for meaning representation. In the work of Mandy, she used the conversation between the main character and her teacher to indicate her analysis of the situation, as well as her monologue to let the audience know the pressure of teenagers which shows her perspective. James used interview with the shopkeeper to investigate whether the restaurant is busy which involves analysis of the matter. Jessica also used interviews to show the reason for why students study in library.

Cinematography is the way in which the video producers set the camera to make the scene, e.g. pan shot, zoom-in, zoom-out and fast forward. Most of the students used camera movement in their video outcomes. For example, James’ camera went around the restaurant to illustrate the busy atmosphere which reflected his observation. Kelvin used a pan shot to take the audience to go around the park where the elderly used to spend time. Fanny zoomed into the day-dreaming girl to observe what she is writing. Jessica used zoom out to show the outside of the library from the viewpoint of the library door. James also employed the fast forward to show the number of people in the restaurant and illustrated the fast pace of people in the estate. These camera movements help to put forth the critical thinking of the students in the emphasis of messages to the audience and to present the analysis of the inquiry tasks.

Acoustics is audio effect in the video outcomes which can also help the representation of ideas. Most students used background music along with their video outcomes, but less likely with the use of sound effects. An example of sound effect in

Fanny's video was that she stopped the loud music suddenly to imply a change of topic from the presentation of the characteristics of a day dreaming person to the investigation of what the person usually writes about during daydreaming. This rearrangement and logical format in the presentation of ideas showed Fanny's critical thinking.

<<Insert Table 3 here>>

3.1.2. Genres and characteristics of video outcomes for meaning representation

Real world contexts, such as the news or advertising genres were commonly used by students to explore issues from multiple perspectives in the study conducted by Kearney and Schuck (2006). Besides, there were footage of both people and inanimate objects in students' video episodes, acting in dramas, events or episodes including interviews and general commentary.

The analysis of the videos revealed that there are considerable variations in the use of literacies among the six students. The number of times and details of how each literacy were used in students' video is shown on Table 3. By comparing and analyzing the differences in the use of literacies and the way students presented their meaning, the video outcomes can be grouped into three genres: drama, documentary and photo story (Table 4).

<<Insert Table 4 here>>

Jessica and James presented what they learned from the inquiry in the videos. They gave some background of the topics to the audience at the beginning of the video and used interviews to collect further information. There is a balanced use of both photos and video with motion to present their ideas. The number of narrations and cinematography used was in between the other video outcomes. Action, like behaviours and gestures, was the lowest while the average portion of video used is highest among the others. Since the videos started with some observations of the places/events to be investigated and ended with interviews with analysis of data collected and reflection of views, these video outcomes are classified as "documentary" with reference to the classification by Cook (2009) that "documentary" video productions allow learners to seek creative ways to represent the seemingly hidden world of learning.

Fanny and Mandy's video outcomes were similar in their structure and way of representation. Their stories were represented in the form of drama with actors' motions and dialogues. They had the highest number of narrations, behaviours and gestures among all the videos. The number of acoustics was also the highest. The literacies used

and the number of video scene was higher than in the other four videos. Moreover, as all of the scenes were created and set by the students, what was presented in the video was the perspective making of the video producer, and might not be a reflection of the real life. Since young people often play dramatic roles in the videos that they make (Burn & Durran, 2007) and "drama" is used as a media for multimodal teaching and learning (Kress et al., 2001), these two videos are identified as the "drama".

The video outcomes of Kelvin and Andy mainly consisted of photos, which represented their observations during the inquiry project. Though the video of James have a high proportion of video time, there is no continuous action and narration in it to make it either a documentary or drama. It was found that the ratio of scenes with actions and narrations in their videos was the lowest when compared with the other video outcomes. The number of cinematography was also low because the video outcomes were mainly composed of photos. The main media for meaning representation in these two video outcomes were text and fixed actions. Therefore, these videos are described as using "photo story" in meaning representation.

3.2. Key components to achieve meaning representation

The analysis of the videos outlines the varied literacies used in meaning representation with different genres of video outcomes. Further details about students' work were collected though interviews and self reflection essays. During the interviews, the students shared the meaning of different scenes in their video outcomes. In the reflection essays, their experiences of the video production process were reviewed. From these two sources, attitudes towards video representation, choice of topics, organization skills and location of information were found to be the key components in representing meanings in the video outcomes of the inquiry project.

3.2.1. Attitude towards video representation

The motivation of the students to participate in the process of producing video outcomes varied from low to high. Andy could be classified as having low motivation as he said that he did not want to participate in this kind of project again in the reflection essay. The following two quotes from the reflection essay and interview reflected the varied attitudes held by students.

> "I did not want to work on the video outcome project. When I found that I was chosen to be involved in the research, I was not happy about that." [*Andy*]

> "When I finished the video outcome, I was really happy about it. I started to have some interest in making videos by myself" [*Jessica*]

Kelvin and James did not show resistance to the video production process, while Jessica, Fanny and Mandy all had high motivation. Mandy realized that it was fun to make videos. Both Jessica and Mandy claimed that they developed an interest in making videos, and all three of them shared in the interviews that they are willing to work on videos in future projects. Thus, it was also found from Table 2 that the number of literacies used in videos is higher among students with high motivation.

It is apparent that the students with higher motivation were more likely to think that using videos to present their meaning was fun when compared with those with lower motivation. Students in Ayres's (2002) research who see learning with technology as important and have high motivation perceive the video making process as relevant to their learning needs. Shewbridge and Berge (2004) also stated that video production is hard work, but it's fun, and students find the experience exhilarating and inspiring, educators should harness this power and create imaginative learning opportunities for their students.

3.2.2. Choice of topic

Though Shewbridge and Berge (2004) found that one of the video's greatest strength is its ability to motivate student to explore their topics by themselves, unfamiliar topics and unwise choices of the inquiry topic affected the quality of idea presentation. It is shown in the research by Schuck and Kearney (2004) that students show higher levels of motivation when they design and implement a task of their own making, rather than one designed by the teacher. Below shows the views of two students (James and Fanny) on the choice of topics:

> "Originally, I wanted to use the busy life in the eatery to show the busy and fast-paced life of people in Lung Hang Estate. But I later found that the working population that works in Lung Hang Estate is not that high…… I had chosen a wrong direction. " [*James*]

> "My original topic was "Driver Chan of Line 80K". However, the bus company did not allow me to conduct interviews with him. I had to change the topic suddenly. My teacher then asked me to choose a topic with interview subjects who are easy to access." [*Fanny*]

James suggested that the extent to which he can demonstrate understanding of a specific topic depends on whether he knows the topic well. Although he wanted to focus on the busy life in Lung Hang Estate, he found during his visit that most of the people there were elderly or housewives. He was unfamiliar with the Estate and thus made a wrong assumption about it. As a result, it was difficult for him to make a video which presented the idea of "busy life" well. Fanny suggested that using a topic that can be easily accessed in the daily life situation can help meaning representation, as the audience can understand it without much interpretation. Therefore, choosing a topic that is familiar to both the audience and the producers can facilitate the meaning representation in the video outcomes. In other words, the student generated videos fit well with the authentic nature of inquiry projects.

3.2.3. Organizational skills

Carver, Lehrer, Connell, and Erickson (1992) suggested that organizational skills are needed when learners work as designers in the video production process. Chen and McGrath (2003) also found that the students' organization of knowledge can be developed when they act as designers of hypermedia documents. The organizational skills required for knowledge representation in video outcomes by the six students in the present study are arranging the sequence of the scenes, gathering information, and selecting appropriate information.

During the interviews, the students were asked why they organized the video outcomes in the way they did. Fanny explained how the sequence of scenes was arranged to represent her ideas, while Kelvin realized that a better sequence in the video might lead to a better presentation of the ideas.

> "The sequence of the interviews is to let the audience know even the excellent students will daydream……the "stop" scene is used to make a contrast to what is previously shown in the video." [*Fanny*]

> "I think I should show the pictures in a better sequence……I didn't think of the sequence of the representation and made it messy." [*Andy*]

Information gathering skills is another organizational skill affecting students' presentation of ideas (Vockell & Van Deusen, 1989). In the interview, Jessica and Kelvin commented that what they had put into the video was not enough to express what they wanted to say. Kelvin and Jessica said in the interview that:

> "Originally I wanted to show the loneliness of the elderly by showing a photo in which they are seen having to celebrate Moon Festival with people who are not their family members. However, the message turned out to be the exact opposite of what I wanted to present" [*Kelvin*]

> "I do want to show the self-study room has a good atmosphere for students to study. However, as the information collected is not enough to prove this point, I did not put it in the video." [*Jessica*]

The inappropriate selection of information by Kelvin led to a confusing message about the topic for the audience. However, it seemed that the information provided in the video was not enough to show the loneliness of the elderly. It made the audience think that the elderly were happy eating with many people around them. Thus, this directly affected what students wanted to tell in the video. In Jessica's case, it was found that she could not find the answer for why the self-study room was good for study, but it was actually because of her inappropriate selection of information that she was not able to present this idea.

3.2.4. Data management

Management of data collected is another component that affects the meaning representation of the video outcomes. Jessica and Fanny came across this problem during the production of the video. The dislocation of the video clips directly affected the representation of their ideas. The following quotes are extracted from the interviews.

> "Reasons for why students do not study at home cannot be revealed in the video outcomes……the interview part was lost during the production process." [*Jessica*]

> "I had taken a lot of photos and videos before. But I found that there were problems in the server at school, so the data was lost. At the end I just had two days to retake all the photos and videos" [*Fanny*]

These two students claimed that they experienced loss of data during the production process of the video outcome. This could be the result of technical problems with the computers and lack of knowledge about backing up files.

Therefore, the management of data is an important factor influencing knowledge representation.

3.3. Coherence of meaning representation and interpretation of the videos

The ability of students to present meaning with videos was investigated during the interviews. This was investigated by matching the students' presentations and the viewer's perceptions and understanding of the scenes, illustrating the coherence of meaning representations and interpretation. The interviewer, who is an expert in the area also played the role of the "viewer", made some interpretations about the scenes in the videos and discussed them with the students. Not all the students agreed with the interpretations. The extent to which the students agreed with the viewer's interpretations was classified into "matched", "partially matched", and "mismatched".

The ideas of Fanny and Mandy presented in the video outcomes were found to match the interpretations made by the viewer. For example, the viewer asked if Fanny wanted to present 'love' as the most frequently appearing topic in the daydreams of teenagers. Fanny replied by saying that she wanted to tell that people daydream about love very often. The coherence in meaning representation and interpretation is not surprising because of the effective use of literacies in Fanny's video as reported in the analysis of types of literacies used in each video outcome (Table 2 and 3), for instance, the use of zooming into a daydreaming girl to uncover what she is writing, and the use of sound effect of the sudden stop at Fanny's video for the change of topic from the characteristics of a daydreaming person to what the person usually writes about during daydreaming. In Mandy's video, even though the video outcomes did not obviously show the message "care can help ease the pressure of teenagers", the audience could grasp this message from the video by watching the monologue used in Mandy's video to show the feelings of the main character and the self reflection of the videographer at the end of the video..

However, not all the interpretations made by the viewer matched the students' intentions. The intentions of Andy, Jessica and James were partially matched. For example, it was assumed that the pan shot made by James in his video had some meaning for the viewer. However, James claimed that he just wanted to make the video less boring to watch. Moreover, the viewer did not quite understand the scenes that Andy posted in his video (e.g. the discipline teachers' room). Clarification and explanation of the content of the picture were needed for a better understanding of the video as a whole. Thus, the interpretations of the viewer were partially matched with the students' original ideas of presentation in their video outcomes. The meaning

representations of these three students were not as well presented as those classified as "matched".

Nevertheless, Kelvin's meaning representation did not match the viewer's interpretation prior to the provision of further explanation. It was interpreted by the viewer that the elderly people in the video were happily celebrating Moon Festival in the home, but Kelvin had a totally opposite interpretation of the use of the photo. He wanted to use the photo to show that the elderly people were so pitiful that they could not celebrate Moon Festival with their family – a message that the elderly people were pitiful and lonely without family. Thus, the points of view of the viewer and the producer regarding the message shown in the video were totally mismatched.

The above analysis also shows that the meaning representation with the video genre of drama by Mandy and Fanny with the use of narrations and cinematography was clearer than other genres of documentaries used by Jessica and James, as well as the photo-stories with mainly photos produced by Andy and Kelvin..

4. Conclusions

The analysis of how different literacies and genres are used in the student-generated videos in the current study found that using videos as meaning representation with the inquiry project is possible among secondary students in Hong Kong. The meanings and ideas presented and communicated in the videos by way of diversified use of different literacies by students in this study were categorized as text, action, narration, cinematography and acoustics. Although some researchers have provided comprehensive lists of literacies (e.g. Beavis, Bradford, O' Mara, & Walsh, 2008; Kress, 2004; Kress & Van Leeuwen, 2001), the categorization resulted from this study is more organized and contains detail description of each literacy, which is useful for better understanding of the video outcomes and developing students' ability in meaning representation with videos. Besides, it is identified in the analysis that the literacies used also involved students' observation of the phenomena, analysis and critical thinking of the issues, and making of perspectives that demonstrated the understandings of the learners in the inquiry project.

The three genres of video outcomes, drama, documentary and photo story, produced by the students in the present study, with more frequent use of conversations between people in the "drama" video outcomes; less cinematography and direct record of interviews as the inquiry results with the "documentary" video outcomes; and the use of motionless photos, text and screen arrangement for meaning representation in "photo story", informed us of the possibility of diversified use of literacy in different genres of

video outcomes.

The key components to achieve meaning representation in video outcomes identified in this study were attitudes towards video meaning representation, choice of topic, organizational skills and data management which can act as either facilitators of or hindrances to meaning representation. This finding is different from the students in the study conducted by Schuck and Kearney (2006) that their movie-making skill development was emphasized. This alerted us of the necessity to support students for better meaning representation to equip them with necessary skills and attitudes, rather than the simplified basic toolset on skill training.

Previous literature has shown that student-generated digital videos can support meaning representation (Schuck & Kearney, 2004), and students can make their mental selections transparent (Goldman, 2004) through videos. However, not all students' representations of meaning matched perfectly with the viewer's interpretations in this study. The evidence that the meaning interpretation between the videographers and the viewer did not always match well in some cases warranted further research to support learners to bridge the gap.

Though the analysis of the six video outcomes provided useful insight for our understanding of students' meaning representation with video outcomes, the findings of this small pool of subjects may not be able to reflect all the genres that exist among other students. Future research in employing a larger sample size will help to affirm if the literacies and genres discovered in our study are able to generalize to a larger population and in different context.

Another limitation of this study is the focus on studying literacies and genres that students used in inquiry results of the video outcomes. Based on research studies to show students' ability to inquire and discover more in the process of video production (Koehler & Mishra, 2005; Shewbridge & Berge, 2004), further research could be directed on the study of the underlying reasons and rationale of students' use of literacies and genres.

Last but not the least, though it is found that interview is effective to examine the coherence of meaning representation and interpretation and to determine students' ability to present meanings in this study, it is time consuming for teachers to do so in evaluating students' video work. Therefore, the exploration and development of means should be the future direction of research focus to better understand the meaning representation and interpretation of videos.

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