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Media Analysis and Production: Developing Multiliteracies in Technology-Enhanced Environments

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Abstract

The transformation of our lives through new technologies and globalisation presents educators with the challenge of helping students to develop the skills and competencies that will enable them to function successfully in this dynamic society. This article reports on a single-case pilot study conducted to trial and evaluate an educational program and support resources. The purpose of this research was to explore whether this educational program implemented within a technology-rich environment, incorporating teaching and learning strategies based on constructivist approaches, supports the development of multiliteracies. A Grade 10 English class in a high school in New South Wales, Australia participated in the educational program that involved the analysis, construction and evaluation of media and news items. The study addressed the question of how the participation in a media analysis and production curriculum unit, influences the development of multiliteracies. Students' understanding and use of key media, information, visual and technological concepts, as well as their understanding and use of technology were explored. The findings suggest that the implementation of such a program can assist students in developing multiliteracies and that most students found the experience of digital video construction motivating. Based on the findings from the pilot study the educational program and resources were revised and refined prior to the implementation of the study across multiple cases in the subsequent academic year.

Keywords: multiliteracies, digital video, media, technology, pedagogy

Introduction

The transformation of our lives through new technologies and globalization presents educators in the 21st century with the challenge of helping students to develop skills and competencies to enable them to function successfully in this society. It has been argued that new types of literacies need to be cultivated to ensure education is relevant in today's society (Kellner, 2000). Students' literacies must be developed to "reflect the diversity of social, technological, cultural, linguistic and economic contexts of which they form a part." (Ludwig, 2003, p1). Kellner (2000) and Semali (2001) suggest that these new types of literacies include such literacies as media literacy, computer or technology literacy, visual literacy and information literacy.

In Australia, high quality education that meets the challenge of equipping students with the skills needed to participate in a globalised community is the aim of the Adelaide Declaration on National Goals for Schooling in the Twenty-First Century, devised by the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) in 1999. The basis for these goals is the development of competencies in a range of literacies that will "enable all young people to engage effectively with an increasingly complex world." (p.1-2). Educational outcomes in Australia are being redefined to include an expanding view of literacy.

A pilot study was conducted in an effort to determine whether an education program in media analysis and video production could support the realisation of such outcomes. The pilot study was designed as a trial and evaluation of the educational program exploring whether the implementation of teaching and learning strategies based on constructivist approaches within a technology-rich environment supports the development of multiliteracies. The study involved investigation of students' understanding and use of key media, information, visual and technological concepts. A Grade 10 English class participated in the educational program that involved analysis, construction and deconstruction of various forms media and news related issues. The culminating activity involved student groups creating a digital video news item about their school community.

Constructivism, multiliteracies and multiliteracies pedagogy

The notion of new types of literacies has led to the development of a framework that supports the incorporation of multiliteracies through a pedagogy in which students are active in the meaning-making process (New London Group, 1996). This is analogous to constructivist notions of learning which advocates the students' active construction of knowledge and meaning (Jonassen, Peck and Wilson, 1999).

Multiliteracies and constructivist learning theory provide useful frameworks for the study of how multiliteracies might be supported by technology.

The call for 21st century education to rethink the definition of literacy has come from many within the field (Anstey, 2002; Harste, 2003; Kellner, 2000, New London Group, 1996; Tyner, 1998; Unsworth, 2002; Zammit and Downes, 2002), with the New London Group, for example, arguing that "the multiplicity of communications channels and increasing cultural and linguistic diversity in the world today call for a much broader view of literacy than portrayed by traditional language-based approaches." (1996, p.60). We can no longer think of being literate as having control over the written word either through reading or writing (Zammit and Downes, 2002). The terms multiliteracies or multiple literacies are now being used when discussing this expanding domain of literacy. Being 'multi-literate' should be seen as the ability to locate, compose and comprehend – analyse, evaluate, synthesise and apply – a variety of multi-modal texts in a range of social contexts (Zammit and Downes, 2002).

In turn, it is argued that literacy practices must go beyond the traditional and comprise new curricula and pedagogies that are relevant and meet the challenges of contemporary society (Kellner, 2002; Unsworth, 2002). The New London Group (1996) argue that literacy pedagogy needs to account for an increasingly diverse global, culture and linguistic society; and the increasing variety of forms of text brought about by information and multimedia technologies. They proposed a framework, which they termed multiliteracies pedagogy, which aims to provide students with the opportunity to become "active designers" (p.64) or active meaning-makers. They point out that "meaning-making is an active and dynamic process…" (p.74). Their pedagogical framework describes different modes of meaning – linguistic (delivery, vocabulary, transitivity, nominalisation, information structures, local and global coherence relations), visual (images, page layout, colours, screen formats), audio (music, sound effects), gestural (body language, feelings, behaviour, gesture), and spatial (environmental, architectural spaces) interconnected by multimodal design (dynamic relationship between modes of meaning). They advocate that these modes of meaning should be supported by situated practice (immersion in meaningful authentic learning environments), overt instruction (interventions and scaffolding by teachers and other experts), critical framing (placing learning within broader contexts, critiquing, extending and applying it) and transformed practice (reflection and implementation of understandings developed).

The concept of multiliteracies has been explicitly to technology use and the implications for education (Kellner, 2000). Kellner (2000) proposes that, in order to access, interpret, criticise and participate in a changing society, education needs to be restructured to combine the development of print, media, computer, and information literacies. He advocates that students be involved in the active construction of

meaning through a collaborative, problem-solving approach that enables students to read across a variety of semiotic fields and synthesise a combination of media forms. Smolin and Lawless (2003) also advocate that "[t]eachers must expand their student's technological, visual and information literacy as well as provide them with a sense of intertexuality, or the ability to make meaning from a variety of texts." (p.570).

Multiliteracies and multiliteracies pedagogy concepts of meaning-making, actively designing, situated practice, and authentic learning fit well with constructivist learning principles. The basic tenet of constructivist learning is that the learner actively constructs knowledge through authentic, meaningful learning experiences (Bonk and King, 1998; Jonassen, Peck and Wilson, 1999; Morrison, Lowther and DeMeulle, 1999; Roblyer and Edwards, 2000). Jonassen, Peck and Wilson (1999) in promoting the use of technology to engage students in meaningful learning succinctly explain the assumptions of constructivist learning methods as:

- Knowledge is constructed resulting from activity, experience and context
- Meaning is the perception of the world according to the knower and is unique to them based on their experiences. This results in multiple perspectives on the world. Meanings can be shared with others
- Knowledge building requires reflection and articulation on the part of the learner.
- Knowledge is distributed across contexts influenced by the communities we belong to.
- Meaning must be assessed for viability within the learning community.

They assert that the goal for education is to support meaningful learning through "active, constructive, intentional, authentic and cooperative learning." (p.7). The key element here is that of authentic learning is students' engagement in activities that resemble and relate to real life context.

The constructivist-learning model also supports collaborative group work. Writers in the constructivist-learning field discuss learning as an interactive, social-dialogic process (Gabler and Schroeder, 2003; Jonassen et al., 1999) where meaning is made within a social context through collaboration with others (Morrison et al., 1999; Roblyer and Edwards, 2000). The proposed project utilises a collaborative approach to learning with students collaborating in the development of digital video.

Building on the key literacies

Students in today's society need to be literate across multiple areas. Zammit and Downes (2002) propose that a multiliterate individual is one who is "literate in several modes" (p.27) with the ability to develop, demonstrate and apply concepts, skills and understandings across key learning areas. In a review of past studies relating to the field, six areas relevant to this study have been identified – multiliteracies, media literacy, technology literacy, information literacy, visual literacy and technology-enhanced learning.

Limited empirical work has been reported in the field of multiliteracies. However, some studies show promising results. For example, opportunities to engage in multimedia composition can have a positive influence on the development of multiliteracies in adolescent girls (Chandler-Olcott & Mahar 2003) and that changes in teachers' perceptions of literacies had a positive effect on students and provided more balanced opportunities for students to acquire multiliteracies (Gallego & Hollingsworth, 1992)

Research related to specific literacies can further inform multiliteracies investigations. For example, it has been reported that scaffolding and authentic learning tasks and instruction are important in promoting information literacy skills (Schutz, 2000; Wolf, Brush & Saye, 2003) and that training in information literacy should reflect students' experiences (Hepworth, 2003). Here, the concept of authentic learning is linked to the need to scaffold or support students with structures and guides through the learning tasks.

The studies focusing on visual literacies often relate to viewing and interpreting visual texts rather than on skills development in relation to student producing visual texts. Cognitive learning styles can influence the learners' responses to non-verbal visual texts. Studies conducted have found that a variety of approaches to viewing and representing visual texts implemented had a positive impact on learner attention and understanding (Begoray, 2001); and there is no relationship between visual learning and attention to visual material (Mendelson 2004).

There have been conflicting views reported regarding student participation in media literacy curriculum. In some aspects, media literacy skills of students showed improvement after participating in a media-literacy curriculum prompting researchers to conclude that it the quality and quantity of student writing may be improved and students may be taught to read the media (Emery & McCabe, 2003a; Hobbs & Frost, 2003). However, other researchers (Quin & McMahon, 1993) reported both strengths and weaknesses in student performance meeting media analysis objectives and suggest that this could be remedied through teaching strategies enabling student to apply knowledge to the world in which they live.

The integration of technology and media literacy instruction may lead to the development of technological literacy. Emery & McCabe (2003b) report that while the technological literacy of the participants varied, it did show some improvement over the period of their project. In particular the students' ability to use

technology to meet the outcomes of the Media literacy project became more sophisticated. They add that relationships became more egalitarian and there was evidence of a more cooperative approach to learning.

There has been a plethora of studies conducted evaluating the benefits of technology in education (Oliver & Omari, 1999; Sherry, Bilig, Jesse & Watson-Acosta, 2001; Mize & Gibbons, 2000; Franklin & Ali, 2003; Ringstaff, Yokam & Marsh, 1996; Hopson, Simms & Knezek, 2001; Fluck & Robertson, 2002). The belief is that technologies will provide students with tools that will engage students in the learning process and result in more meaningful learning. Improvements in behaviour and attendance, achievement and motivation, collaboration amongst students, independence in learning, achievement of higher-order thinking skills and scores in national tests in schools have all been attributed to classrooms enriched with technology (Ringstaff et. al., 1996; Hopson et. al., 2001; Fluck & Robertson, 2002). More specifically, fewer studies have investigated the potential outcomes of the use video production in the school environment. Kearney and Schuck (2003) report that an emphasis on pedagogical issues is instrumental in providing positive outcomes for students in this area. The use of video production can have a positive effect on student achievement in media studies and in more general English curriculum outcomes (Clayton, 2002; Luchs & Emery, 2004; Yildiz, 2004). Clayton (2002) reported her students experienced improved marks, increasing fluency in technical language and greater understanding of the roles of film directors and editors. However, she also found that communication and group collaboration skills were not common across classes.

Building from this literature base, by investigating student digital video production in relation to information, visual, media and technological literacies, this study aimed to specifically address:

- The nature of learning processes students draw upon through in a multiliteracies environment and the outcomes of these processes.
- The utilisation of the tools in a technology-enhanced environment to develop these literacies, make meaning and construct knowledge.

In addressing these issues the study aimed to demonstrate critical learning outcomes of multiliteracies and the integration of a range of technology tools that can be utilised as resources and supports.

Educational Program

The educational program – called *Making News Today* -- used in the study was designed to integrate multiliteracies concepts and digital video news production (Lockyer, Brown, and Blackall, 2003; Brown and Lockyer, 2006). The program involves students working through a range of activities that incorporate

an analysis, construction and deconstruction learning design. Analysis activities, link with the situated practice and overt instruction factors of multiliteracies pedagogy by involving students studying various forms of news media and the way news stories are presented. During construction activities students create an outline that could serve as the basis for a newspaper article; use raw footage, source documents from an event that was actually broadcast on the news and student groups constructed their own version of this story; work in groups to create their own digital video news story engaging in the news process from beginning to end. During deconstruction activities, which move students to the transformed practice area of multiliteracies pedagogy, students present, view and critique stories constructed, from the raw footage, to other groups' stories as well as with the actual version of the story and also present view, and reflect on the process and product of their own digital video news story.

The purpose of each activity and the stage of the learning design into which they fit are outlined in the following table.

Component of Learning Design	**Activity Name**	**Purpose**
Construct	Introduction	Demonstrate students' existing understandings of media, information, visual and technology concepts
Analyse	You & The Media	Consider and identify their media habits. Then compare class results.
Analyse	Crossing Media	Analyse the way different media present news stories and begin to understand the way the stories are constructed
Analyse	TV Media	Analyse the way news stories are presented across different television broadcasts and begin to understand the way the stories are constructed for television
Analyse	News Process	Gain an in-depth understanding of the steps taken by journalists when creating a news story
Analyse Construct Deconstruct	Wild Vision	Begin to put the steps of the news process into practice and gain experience with filming equipment
Analyse Construct Deconstruct	Real Stories	Draw all previous learning together through the construction of own digital video news story.
Construct	Wrapping It Up	Demonstrate any changes in the students' understandings of media, information, visual and technology concepts

Table 1. Purpose of activities

The program is illustrated in Diagram 1 using a learning design graphical sequence (Oliver, Harper, Hedberg, Wills, Agostinho, 2002). The learning activities undertaken by the students are represented down the centre (boxes) with the resources (triangles) and supports (circles) for each activity down each side. Arrows between the activities indicate the learning sequence the students move through in completing the program. A resource or support connected to an activity with an arrow indicates it is specific to that task. Resources and supports without arrows indicate more generalised items and are shown as be linked throughout all activities. Additional resources and supports specifically for teachers are described below but not represented in the learning design illustration.

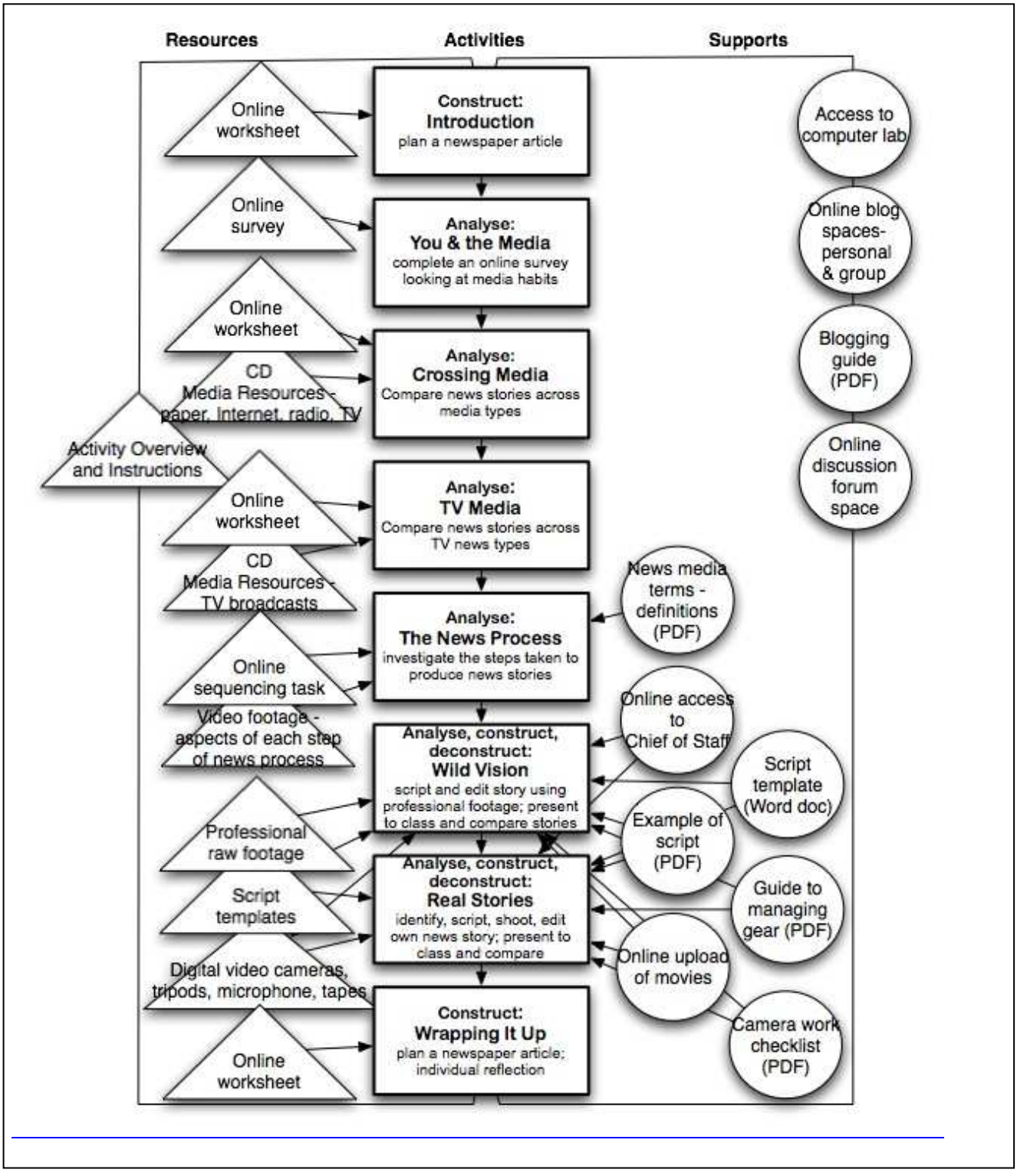

Diagram 1. Making News Today learning design.

Teachers and students have access to the *Making News Today* (http://makingnewstoday.uow.edu.au/) website that was specifically constructed to provide resources and support the overall program and specific activities. Through the website, teachers have access to downloadable copy of the curriculum unit document in both PDF and Microsoft Word format and have the ability to administer their class into activity groupings.

In terms of each activity, the **Introduction** activity allows students to demonstrate existing understandings of media-related concepts by completing an online worksheet which questions their interpretation of topical media events and the mechanisms used by the media to convey ideas. The **You and the Media** activity asks students to consider their own media habits by completing an online survey form that, once submitted by each student in the class, feeds into an automated analysis of the class responses. In the following two activities – **Crossing Media** and **TV Media** –students compare and contrast news stories in different forms (Internet, television, radio and newsprint) in terms of content, style, purpose and presentation. The **News Process** activity involves students exploring the typical steps taken by journalists in developing and producing a television news story. Students are supplied with a brief overview of the steps and a series of short videos from journalists discussing important points to remember.

The **Wild Vision** activity initiates the construction activities of the program with student groups supplied with professional raw footage of a news story and following the steps in the news process to construct their version of the story. An online script and feedback from the online news director (a member of the research team who was also a journalist) supports the construction process. A group journal (called a blog) was also provided for the student groups to track their progress. The culminating activity for the students – **Real Stories** – involves the construction of their own news story. In the final activity – **Wrapping It Up** – they repeat the **Introduction** task to provide some insight into students' individual learning over the course of the program.

Design

The case study method was used for this investigation in order to gain an in-depth understanding (Creswell, 1998; Creswell, 2003; Yin, 2003) of the processes and learning outcomes realised by the students involved in a curriculum unit based on multiliteracies. In a case study the case can be defined as the unit being investigated, for example, a program, an individual, a group of individuals, an event or activity (Creswell, 1998; Gillham, 2000; Merriam, 1998; Yin, 2003). In this study, the class involved in undertaking the educational program formed the case being investigated.

Participants

Denscombe (2003) provides guidance for case selection in explaining "[t]he most common justification to be offered for the selection of a particular case is that it is typical" (p.33). As such, schools which had either a disproportionate technology infrastructure to that of the average state-supported school and/or had high academic achievement entry criteria were excluded from the list of possible settings. The list comprised schools in the south east of New South Wales Australia. The English faculty of the schools on the resulting list were approached and invited to participate in the study.

A public school with a 1000 student publication agreed to implement the study within a Grade 10 class the third term of the academic year (July through September). The case comprised a mixed-ability class of 25 students and two teachers who shared the teaching responsibility for the class.

Prior to the commencement of the project, the researchers met with the teachers to obtain some background information about the school and the class and to provide teachers with information about the research and discuss each aspect of the educational program. The journalist/researcher team member provided all the teachers from the English department with a brief training session on camera techniques and filming principles prior to commencement of the program.

Data Collection

"The important aspect of case study data collections is the use of multiple sources of evidence." (Yin, 1993, p.32). Four types of data gathering techniques were used during this study: journals, interviews, artefacts and observations.

Students were asked to complete two types of journals throughout the study: (1) an individual journal (Personal Blog) with reflections about their learning throughout the project; and, (2) a group process journal (Group Blog) for student groups to record ideas, planning, steps taken, group roles and problems and solutions for group activities within the program. Semi-structured group interviews were conducted with mid-way through and at the conclusion of the program. Artefacts were also collected. This included any worksheets – both on- and off-line, and each group's scripts and completed digital video news products. Interviews with the teachers were conducted prior to the commencement of the program, at the mid-way point and again at its conclusion. All interviews were audio recorded, transcribed verbatim and reviewed for accuracy of transcription.

Additionally, a member of the research team recorded observations, by way of field notes, during visits to the class at least two of the four lessons per week. The researcher took on the role of participant-observer

assisting to facilitate the implementation of the program, at the request of the teachers' due to their inexperience with technology, as well as recording the field notes.

The table below shows which data collection methods were used to address specific research questions

Question	**Data**
What is the nature of the processes for students who engage in the analysis and production of media?	Observations Interviews Journals (blogs)
What learning outcomes, associated with multiliteracies are achieved through engaging in media analysis and production?	Online activities Interviews Journals (blogs) Work samples/artefacts

Table 2. Data collection as relating to specific research questions

Data were reviewed, analysed and coded to identify emerging themes arising from the research questions and literature relating to the multiliteracies of interest to this study – such as media, information, visual and technology. The results are presented according to the themes.

Findings

The findings presented provide an overall context of the case and the results based on each research question. The class involved had four lessons per week, of approximately one hour per lesson. There were no computers in the English classroom and thus arrangements were made to use the 18 computers in the library. The class had not previously utilised technology for English lessons in that academic year and the teachers indicated that, when they did use technology, it was mainly for word processing purposes.

As much of the program involved students working in groups, the teachers were asked about their philosophy and experience of group work. According to the teachers they used a reasonable amount of group work with their students. They indicated that "brighter students" tended to stick together for group work and that, in an attempt to overcome this they tried to split the groups and assign particular roles to students. Three of the activities in the program involved students working individually, three in pairs and two in groups of four or five. For the activities involving pairs the teachers allocated students to another student, but for the tasks involving the small group (4-5 students) the students were allowed to self-select their groups.

The school had one digital video camera available for use which was shared amongst the whole English department. One of the teachers provided their personal digital video camera and the research team loaned a camera, tripod and microphone to the class and provided digital videotapes for each group.

Of the 25 students who agreed to participate in the project, 22 students completed the **Introduction** baseline activity and 23 students completed the concluding **Wrapping It Up** activity. Although it was a required regular activity within the program, only 20 students made at least one entry into their personal blog. All news groups made at least one entry into their group blog for the **Wild Vision** activity and five out of six groups made an entry for the **Real Stories** activity. Five out of six groups completed their story for the **Wild Vision** activity and all six teams completed a digital video news story for the **Real Stories** activity – although some were not of the requested length (i.e., one minute twenty seconds). All student groups participated in focus group interviews mid-way through and at the conclusion of the project – although not all group members were present. Both teachers participated in an interview at the conclusion of the project and were interviewed together.

Student experiences

The research question related to the students' experience was:

> What is the nature of the experience/process for students who engage in the analysis and production of media?

The data showed that as the students progressed through the program their motivation and enthusiasm increased. They reported that the hands-on nature of the program – the authentic learning environment – such as being able to use the cameras and editing software increased their motivation for learning and enabled them to learn more. One student explained in a blog entry, "Overall this whole media task has been fun…because it was more hands-on." While another student, in the post-program group interviews, related to the authenticity of the a tasks,

> *If we just did this in English with writing down how they do it… I don't think we'd take it is as much… The more hands-on approach helped us learn more instead of just like the basic writing all the time…yeah you get more out of it.*

The teachers supported this in the post-program interview, "The hands on is the best thing…yeah they really enjoyed that."

Classroom observations suggest student motivation seemed to increase toward the end of the program. This is linked to many students reporting that they found the initial analysis activities uninteresting and

struggled to see connection between those activities and the construction activities as evidenced in a student blog entry, "We didn't know what it was leading up to…we didn't know we were going to start our own news program after we got the basics done."

However, in the post-program interviews students reflected that they now understood the necessity of the early activities. "Yeah but now we've done the final news report they're all little steps in helping you do it. You sort of get the point after it."

There were a few technical issues experienced by the students throughout the program. The data indicated that one of the major issues was a lack of equipment – video cameras in particular. There were only two digital video cameras available to be shared amongst six 'news teams'. Many student groups expressed frustration as they were waiting for extended periods of time for a camera to be available and often when they did obtain access the batteries were flat. This was clearly expressed by students in their blog entries as well as through the interviews at the conclusion of the program.

> *The end of the wild vision task is goin to b hard coz [sic] the cameras are all bien [sic] used and we only have until tomorrow to get it done and we really need a camera so that we can put our footage on to the computer. Or if we did get the camera it would probably be dead. Like the battery was always flat.*

Observations highlighted that working across a network with video footage also created some problems for students. As file sizes were quite large a number of groups experienced difficulty loading footage onto computer or saving project.

Students reported that more instruction in the use of equipment and software would have been beneficial as expressed by one student, "And, um, the cameras we didn't really know how to use properly…So I think they should have done more like training, how to use the cameras." Another student commented in the post-program interviews on the use of the video editing tool, "iMovie, we didn't really know how to use it for a while."

While the teachers indicated in the pre-program interview that they had previously utilised group work as a teaching and learning strategy it is evident from the data that the students' experiences working in groups for this program were mixed. Some students had problems with group dynamics; others enjoyed the ability to collaborate with others. For example, one student commented in the individual blog, "Had many team problems, not getting along having fights, 2 many members away at a time." Another student,

however, described the group experience in a more positive light, “I got to work as part of a team and I would say that overall it made English periods this term more enjoyable.”

The teachers also indicated that all students seemed to contribute to the activities when their experience with group work in the past had been that one or two students did all the work. One commented in the post-program interview that

> *I think it made them far more accountable for what they were supposed to be doing in their particular group… which is far more difficult to do in a classroom when you’re doing group work. You know you definitely get people who dominate groups and they tend to take upon the whole task and they’ll do it but in this particular on they couldn’t do that.*

Learning Outcomes

The analysis of the learning outcomes achieved through engagement in the educational program was undertaken in terms of a range of literacies.

Media Literacy

Students indicated the project facilitated them in gaining a better understanding of the process and effort involved in constructing a news story – the scripting and editing that is required, and the necessity for a news story to run for a set time. Many students expressed surprise at the fact that a news story runs only for one minute and twenty seconds. One student succinctly expressed this in the post-program interview, “Well I’ve learnt what it’s like to go through the news process like editing and all that stuff. I’ve learnt properly how to make news reports, how it has to have a limit of a minute 20 seconds.”

The teachers confirmed this in the post-program interview. One of them stated,

> The number of kids who said, that even something as simple as, ‘oh, does it only go for 1 minute 20 seconds…’ so just some technical things. You know getting them to go home and watch the news and so forth – they’re more aware of it.

Information Literacy

Evidence of student learning in terms of information literacy is noted in their discussion of information sources used to produce their final news stories. Most groups attempted to present multiple perspectives in their stories usually through at least two interviews. In the post-program interview one members of a group explained, “Getting different points of view. We got one from a student and one from a teacher. Just see how they feel and compare them.”

However, there was minimal evidence of the use of secondary sources. Only a few groups indicated that they had accessed secondary sources – Internet, posters around the school – to assist in the construction of their story. Blog entries and interview data showed that none of the students saw this as a limitation.

Another indicator of information literacy skills is the decisions made by students in relation to what was actually included in their final news stories. A number of groups showed evidence of critiquing the information gathered to determine what was most important and relevant. As one member of a group said, " We had to figure out what was most important to keep."

Students also reported learning that different perspectives could be presented depending on how the footage is edited. They indicated that they discovered that by leaving out or including certain pieces of information they could control the ideas that are presented by a news story.

Technology Literacy

Students had varying levels of experience and skill in terms of the use of technology. Observations, artefacts and post-program interviews provide evidence of students' technology literacy.

While the majority of students did not have difficulty using the computers for basic functions most indicated that they lacked experience with cameras, capturing footage and editing. They reported that they learnt how to use camera and filming equipment, load footage onto the computer and edit. This was noted in observations and is supported in post-program interviews.

Some students had used the digital video editing software, iMovie, in the previous academic year, while others were new to it. While there was varying degrees of experience with editing software most students indicated some level of learning of the program whether it was from basics or building on prior knowledge and skills. Those students with some previous experience reported learning such things as how to add and cut audio from clips.

Students made little use of technical supports supplied and either learnt how to use the technology from other students or by trial and error. This was evident through observations and is confirmed by the teachers in the post-program interview.

As evidenced from groups' final stories and their critiques of their stories, students learnt that consideration to visual aspects of filming such as correct lighting and camera shots are important. Students identified this in both their individual and group blogs. For example, one entry noted, " We had some trouble with lighting and things, as the sun kept moving around and made it either too bright or too dull to be shooting."

Some groups also made suggestions in how they could improve the visuals in their stories by re-filming, or assessing the environment more thoroughly and taking steps to remedy lighting issues such as shutting blinds or changing locations.

Conclusion

The learning outcomes realised by students through participation in this program suggests that engagement in an educational program that incorporates a multiliteracies pedagogy in a constructivist learning environment provides for the development of multiliteracies. Providing students with authentic and meaningful learning activities, such as digital video news construction, and supporting them with the necessary scaffolds (resources, templates, guides and key questions) should enable them to place their learning in broader contexts and reflect on and implement their understandings across multiple modes of meaning.

These findings have important implications for the design of educational programs broadly but also for the refinement of this particular program and future research exploring the efficacy of the program in developing students' multiliteracies. To further investigate the learning outcomes and student experiences relating to multiliteracies, the educational program will be revised and implemented across multiple cases.

It is evident from the findings that in revising this educational program for future implementation, the scaffolds or supports, in particular, provided to both students and teachers need some refining. Specifically, making the connection between all analysis, construction and deconstruction activities needs to be more explicit for students. Providing detailed, but concise guides for students is where scaffolding improvement are possible. Also, more training in the use of the website, filming equipment and editing software for both students and teachers would support their progress through activities.

Further research will also help to provide guidelines for the development and structure of similar interventions to meet multiliteracies learning outcomes in a range of educational settings.

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