UTILIZING MULTI-MODAL LITERACIES IN MIDDLE GRADES SCIENCE

By

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ABSTRACT

The nature of literacy is changing. Increased student use of computer-mediated, digital, and visual communication spans our understanding of adolescent multi-modal capabilities that reach beyond the traditional conventions of linear speech and written text in the science curriculum. Advancing technology opens doors to learning that involve literacies far beyond the single textbook classroom. This research project looked at the effects of utilizing multi-modal strategies and techniques in the middle grades science curriculum and incorporated a qualitative collaborative interactive group action research methodology. The authors completed one "cycle' of research and concluded that using the multi-modal tools and techniques students engage in outside of the classroom was a beneficial addition to the traditional curriculum inside the classroom. They recommend more research at other grade levels and content areas to develop specific strategies and techniques to incorporate multi-modal strategies and techniques in more aspects of teaching science.

Keywords: Multi-modal, Multiliteracies, Middle Grades Science Curriculum, Science Pedagogy, Action Research, Collaborative Action Research, Collaborative Interactive Group Action Research, CIGAR.

INTRODUCTION

The nature of literacy is changing. While lawmakers debate over preferred reading instruction methods that include the widespread use of skill-and-drill scripted instruction under the umbrella of the current standards-and-testing regime, adolescent activities outside of the classroom demonstrate high levels of literacy engagement and understanding that challenge educators to critically evaluate traditional modes of literacy instruction (Gee, 1996). Increased student use of computer-mediated, digital, and visual communication spans our understanding of adolescent literacy capabilities that reaches beyond the traditional conventions of linear speech and written text. Advancing technology opens doors to learning that involve literacies far beyond the single textbook classroom. An emerging research tool used in recent years to better understand and improve teacher thinking in education has been the use of collaboration and collaborative action research (Pate, 1997; Elliott, 1990; Noffke & Zeichner, 1987; Carr & Kemmis, 1983). In this study, the researcher were interested in examining how the use of these collaborative techniques might help teachers and researchers not only to improve the understanding of multi-modal literacies, but also consider how multi-modal literacies might be added to the middle school curriculum.

Background

The authors interest in multi-modal literacies developed over a period of time as they have recognized within their school environments, and in the literature, how the use of digital media literacy in print and non-print forms has become increasingly a part of their every day lives. "Everyone profits from settings characterized by passion, purpose, partnership, and plan" (Moore & Hinchman, 2008). As university and classroom teachers, it was commonplace for their students to create products that utilized the Internet, multiple sources of texts, video production including video editing, and research projects that resulted in diverse outcomes. They utilized a variety of assessment strategies with their students, including multiple forms of reading and writing, and included portfolio assessment practices with an authentic audience (Alvermann, 2001). Their student teachers performed well in university coursework, and their students did well on public school state assessments without having to "teach to the

test." One of their successful strategies was a research process where learning took place with multiple texts and multiple modes of production. The products were expected to be of the highest quality, and reflective of learning that took place throughout the process. Multiple text and multiple modes of production created a real world, thoughtful learning environment for their students. What the researchers came to realize, however, was that they were working outside the structured curriculum of their state's middle schools, and that other teachers were still using strategies and techniques tied directly to the state-approved textbooks exclusively. Therefore, they decided to conduct an action research project to better define multi-modal literacies and consider an action plan to implement the use of multi-modal literacies in their middle school curriculum.

Collaborative Interactive Group Action Research (CIGAR)

In this study, the authors made use of Collaborative Interactive Group Action Research (CIGAR) to answer their research question. They define collaborative interactive group action research for the purpose of this study as a group of teachers and university researchers actively working together to ask questions of interest in an attempt to find answers that might help improve their practice. The ultimate beneficiaries of the process are the students, yet the teachers and university researchers also benefit from the new and relevant knowledge gained by experiencing the process. In addition, they see collaborative interactive group action research as a methodology, a process of conducting research using a particular sequence of research strategies and theoretical perspectives (Saurino & Saurino, 2008; 1996; Saurino, 1998).

Methodology

The Cycle of Collaborative Interactive Group Action Research

The author's form of collaborative interactive group action research is a methodology, a process of conducting research using a particular sequence of research techniques, strategies, and theoretical perspectives. The research group in this study consisted of two in-service middle-school teachers (cooperating mentor teachers), two pre-service science teachers, and three university collaborators. Meetings with various members of the group were scheduled regularly throughout the study, and video teleconferencing sessions, email, chat room sessions, and phone conversations were utilized for distance communication. The group meetings provided a place where plans were made, questions were asked and answered, problems were discussed, and reflections were expressed. The group setting also provided an avenue to brainstorm new ideas, strategies, and techniques used to initiate actions, solve problems, and ultimately answer their research question.

The research process completed in this study involved four chronological phases and a planning phase for future cycles. The four chronological phases were developed from the recursive collaborative group research cycle that is outlined in Table 1 as a timeline, and illustrated in Table 2 as a cycle.

Phase 1 through 4 comprise the first research sequence of "Cycle 1" and Phase 5, and any following phases, might repeat the cycle to gain more information. After the first cycle, research questions could be modified or replaced, based on what was learned to date. A complete cycle, including the steps in the research process as was

Phase 1: August 2008	Planning Phase of the project and of Cycle 1
Phase 2: September 2008	Baseline data collection for Cycle 1
Phase 3: October-Nov. 2008	Minicycles: Actions/ Reflection/Adjustments
Phase 4: December 2008	Repeat baseline data/Reflection for Cycle 1
Phase 5: January 2008	Return to Planning phase for future cycles

Table 1. The Chronological Phases of Collaborative Interactive Group Action Research

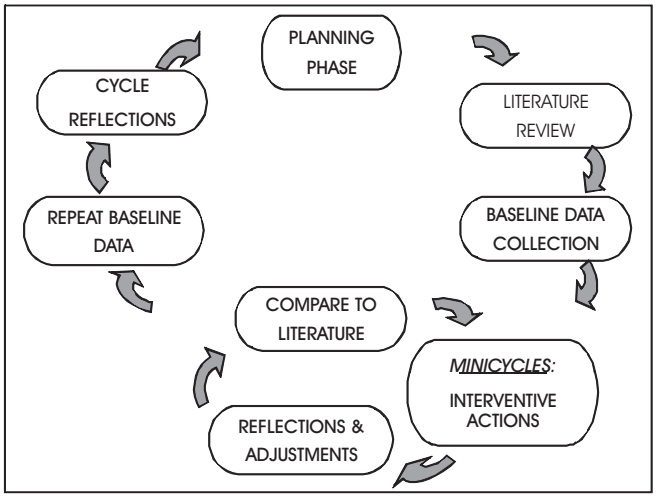

Table 2. One "Cycle" of Collaborative Interactive Group Action Research

conducted during our study, consists of the sequence of steps outlined in Table 2.

Phase 1- Planning Phase

As illustrated in Table 1, Phase 1 (Planning Phase in Table 2) began in August 2008 with an initial meeting of the teachers and the university researchers. The teachers had volunteered to do the research after being contacted by the university researchers, but did not know any particulars about the process of conducting this type of research. The general plan of creating research questions, taking actions, collecting data, and reflecting was discussed and a basic time line for the cycle of research was established. The students had a variety of questions and concerns that were expressed and discussed. Their most arduous concern dealt with the amount of time required to complete the project. The university researchers emphasized the fact that the process was flexible and the time line could be adjusted. Teachers were exposed to the current and seminal literature at the beginning of the project and throughout the project the data and reflections were compared to the research literature in all major areas of their research. The finalized research question is as follows: What effects might utilizing multi-modal literacies in the middle grades science curriculum have on motivation and test scores? The authors chose the two classrooms where their pre-service middle grades teachers were working with their in-service teachers as their observation sites for their examination of multi-modal literacies. All of the group members observed or participated in the actions to better triangulate the data.

Phase 2- Baseline Data

Phase 2 (in Table 1) began after the new school year started in September of 2008. This marked the start of the "Baseline Data Collection" phase of the first cycle of research (see Table 2). After the research question had been finalized, the next step was to start collecting data that would be summarized and used to establish what the current situation was with respect to the research question. The objective of the phase was to answer the question, "What is the current situation with respect to their research question?" The data established a "Baseline" against which they could measure change when they repeated baseline data collection later in the research cycle.

The baseline data indicated that at the beginning of the school year their middle school curriculum included use of the single textbook provided by the school in over 90% of the suggested lessons. The curriculum was structured with a majority of teacher-centered activities, and content to be taught was prescribed. Student performance assessments included multiple-choice tests and writings graded using rubrics. The researcher's in-service teachers began the year teaching in the way described in the current curriculum, and data concerning on-task time, interest kevel, and grade point averages of ten varied students (five in each class) was collected and summarized.

Phase 3- Minicycles

Phase 3 (Minicycles of Actions, Reflection, Adjustment of Interventions, and Comparison to the Literature in Table 2) included the interactive actions the authors took to answer their research question, reflections about their actions, adjustments of their interventions if needed, and compare their results to the Literature. It began in October as the student teachers started teaching lessons as part of their pre-service assignments, and were observed by their in-service teachers and university researchers.

The pre-service teachers were challenged to incorporate multi-modal literacies in their lessons, which resulted from a review of the current literature to define the term multi-modal literacies (or multiliteracies). Today's middle level students exist in a world of multiple signs, with more engaging symbol systems available than ever before (Young, Dillon, & Moje, 2001). Conventional print text is just one of many available sign systems. The challenge is to teach students how to engage with these new literacy worlds (Eisner, 1994; Luke & Elkins, 1998; New London Group, 1996; Willinsky, 1990).

The group brainstormed a variety of different multi-modal teaching actions that might be incorporated into the science curriculum. Once several strategies and techniques were agreed upon, the "actions" to be taken in the classrooms were prioritized into sequential order and all teachers implemented the actions one at a time (at the same time during a Minicycle) in their respective classrooms. During each Minicycle the teachers would

implement an action, reflect on the action at the next research group meeting, adjust actions or try variations of the actions, summarize what they learned about implementing the action, and compare their results with the research literature. The authors had time to complete four Minicycles during their project.

Science Digital Stories

Digital stories include images (digital photographs, pictures, or Internet images) that represent the text, text that tells the story or conveys information about the digital images, and sound, music, or voice that supports the images and text being conveyed. Any linear text can become a multi-modal digital story. Teachers facilitate students creating simple digital stories, individually or in groups, either with in-class computers or in the computer lab.

Science Class Wiki and Voice Threads

A Wiki is an online tool for composing and editing text as well as an easy-to-use platform for developing a web presence. Wikis have a number of features that are useful in the teaching of science writing including the fact that they are often free of charge, allow for various levels of editorial control (both students and teachers can edit) giving teachers the ability to manage and safeguard student privacy and authorship, and Wiki pages are stored online so they can be accessed by teachers and students from any computer. Wikis are useful in discussions and student reports about various science topics. With VoiceThread, group conversations are collected and shared in one place from anywhere with no software to install. A VoiceThread is a collaborative, multimedia slide show that holds images, documents, and videos to allow teachers and students to navigate pages and leave comments using voice (with a mic or telephone), text, audio file, or video (via a webcam). Users can "doodle" (draw on top of the media as they record comments using mic, webcam, or keyboard), use multiple identities, and pick which comments are shown to others. VoiceThreads are useful when specific science content is being presented by the teacher and learned by the students.

Science Class Blog

Web log or Blog is an online publishing platform that supports individuals in posting text and multimedia on the Web to share journal ideas, news, research, and post group reflections or other class activities. The science class Blog is useful as a place to just talk about science as it relates to the lives of the students and is not necessarily related to the current content or topics. The Blog becomes a chronological accounting of how science interacts with the lives of the students and their families and friends. .

Science Graphic Novel Templates

A graphic novel is a book made up of words and pictures. Typically, in a graphic novel, the pictures are arranged on the page in sequential panels, while the words are presented in speech bubbles (for dialogue) or text boxes (for narration). 'Graphic novel' is a word that describes a medium, not a genre. Graphic novels can be histories, reports, projects, fictional applications of science, or anything in between. It is useful as a term project or science fair report format. Teachers provide a template of panels with strategy instructions such as starting in the middle panel with a picture of the "climactic" moment of their project, adding text, and then moving forward and backward in the report with previous and successive panels to complete the description in graphic novel format.

Phase 4 - Repeat Baseline Data

The first part of Phase 4 (Repeat Baseline Data in Table 2) began in early December, and basically consisted of a repetition of the data collection process conducted at the beginning of the cycle. The second baseline data allowed us to compare the current situation with the data collected at the beginning of the study. By the end of the full-time period of teaching by the student teachers, the in-service teachers were teaching a multi-modal curriculum, and baseline data concerning on-task time, interest level, and grade point averages of ten varied students (five in each class) was again collected utilizing similar methodology as was used at the beginning of the project. The information was summarized for use in the Cycle Reflections, and the summarized conclusions were again compared to the current research literature.

Phase 4 - Cycle Reflections

The other part of Phase 4 (Cycle Reflections in Table 2) began after all the data were collected and analyzed. The

researchers examined the data and made direct comparisons between the initial and final baseline data. Then they reflected on the other data collected, what they had learned as a result of experiencing the process of conducting the research, and the research as an ongoing cycle. Their reflections indicated that they had highlighted effective strategies and techniques that might improve school curriculum through the addition of multi-modal literacies if implemented consistently over an extended period of time. The authors also believe that other techniques and strategies might be found to be effective if they continued the research question through more cycles. They agreed that experiencing the research process made them more aware of the interests of their students in terms of their motivation resulting from multi-modal interactions, and that by becoming proficient with the research process itself, they could continue to grow professionally through other projects. Although the researchers did not attempt quantitative analysis of their baseline data, they did notice and subjectively agreed that on-task time, interest, motivation, and grade point average all improved after they implemented multi-modal literacy teaching techniques. Therefore recommended that the topic warrants more in-depth research.

Conclusions and Recommendations

In summary, they found the Collaborative Interactive Group Action Research approach as a challenging and worthwhile learning experience for the teachers. As researchers they observed how these teaching strategies might be used effectively in the classroom and compared them to the current research literature, with some being new to the field. It is with the support of research projects such as those cited above and others that we should promote the idea of science educators becoming involved in all forms of inside and outside school multi-modal strategies and techniques to help develop and extend the science practices of our young people. The author's future research will continue to explore more deeply into science teaching issues, teacher preparation, and pedagogy of multi-modal application, especially in an effort to develop a middle grades multi-modal model for science curriculum. Many school systems are still focusing on comprehension strategy books such as Tovani's (2000) I Read it But I don't Get It, Keene and Zimmerman's (1997) Mosaic of Thought, or Allen's (2000) Yellow Brick Roads. Research on multi-modal science teaching does not seem to be as widely read as strategy books, and we wonder why. When will the school systems get on board with the multiliteracies that are currently invading their classrooms, households, and work places?

All students should have the opportunity to experience learning authentically. Through the implementation of multi-modal models as policy, teacher preparation, and pedagogy programs, learning may take place through multiple text formats, and the authors encourage more research on science teaching through field trips, camp outs, online searches, and expert speakers from various fields. Instruction may take place through Socratic seminars, use of smart boards, computers, interviews, and videotapes. The possibilities seem endless, but one thing you will not find in a multi-modal classroom is only a single textbook. Rossi and Montgomery (1994) indicated that changes in traditional forms of instruction are needed to engage students at-risk, and that such instructional strategies include student-centered multi-modal activities similar to those used in this study.

Finally, they feel that a way to grow continually as a teaching professional and engage in activities that might answer questions such as ours about adding multi-modal literacy instructional techniques to our middle school science curriculum is to promote participation in collaborative interactive group action research, or similar forms of classroom-based action research. Now that distance technology is sophisticated enough to make research available to teachers and others in distance locations, there is little reason why CIGAR or other methodologies should not be used as one important means of professional development, with resulting research articles available to all. In addition, they feel that collaborative efforts between teachers, administrators, students, parents, researchers, and other concerned members of their community are very important and necessary to fully address the issues and concerns of all their students.

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