

## Fostering Collaboration and Developing Higher-Order Thinking with Digital Video

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### Abstract

This study examined the role of digital video in supporting higher order thinking processes through various types of adolescent student collaboration in a digital documentary project. Understanding how new technologies such as digital video expands our concepts of literacy is critical to our appreciation of how it shapes the instructional and learning process, especially in promoting the development of 21st century skills. Constructivist theory provided a theoretical framework for this study. I used interpretive methods in an open-ended middle school environment to study and explain collaborative group processes in a digital documentary project. My goal was to understand the role that collaborative and active learning plays in shaping problem solving and other higher order thinking while examining how the creation of digital documentaries can be used to foster higher order thinking.

### Introduction

The focus of this study was to explore a three-month digital documentary project involving teachers and students at a middle school. My purpose was to understand how group interaction in the development of digital documentaries can foster social interdependence and higher order thinking. While digital video production supports varied roles and identities, and social learning skills (Reid et al, 2002). and collaboration that may facilitate greater task engagement and comprehension (Palincsar and Herrenkohl, 2002), I was interested in finding out how constructivist practices facilitated the development of problem solving and decision making strategies. Computer software can support the development of higher order thinking when learners interact to create a solution to a task or problem (Johnson & Johnson, 1996). In supporting learner co-construction of ideas, digital documentaries may also promote and enhance higher order thinking.

### Theoretical framework

Collaborative learning is an active learning approach in which students work together in small groups to solve a problem, complete a project, or achieve a common goal (NCREL, 2004). As students manipulate information and ideas to solve problems and discover new meanings and understandings, they engage in higher-order thinking. Since sustained social interaction and shared social contexts are important in developing higher order thinking (Vygotsky, 1978), the formation and composition of collaborative groups are critical factors that affect the quality of interaction and inquiry., Tuckman and Jensen's (1977) group dynamics theory identifies four stages of group development - forming, storming, norming and performing- that all groups undergo. When a group is forming, participants can feel anxious not knowing how the group will work or what exactly will be required of them. During the storming stage, conflict can emerge, individual differences are expressed and the leader's role may be challenged. The value and the feasibility of the task may also be challenged. Norming takes place when the group starts to function harmoniously and where participants co-operate and mutual support develops. This enables the performing stage to occur where the work really takes off and the group accepts a structure and method for achieving the common task. Group formation also involves self- selection, random assignment, or criterion- based selection. Group composition determines the effectiveness of collaborative learning, and is often affected by several variables such as participant levels, group size and differences between group members. Group size is an important consideration as smaller groups seem to function better than larger groups (Mulryan, 1992). Smaller groups (of three) may also have less diverse thinking styles and experience that may enrich collective decision-making, while it is harder to ensure general participation in larger groups.

Group heterogeneity, an important factor in collaborative learning, is often related to how group members perceive each other or the task. Some difference of viewpoints is necessary to trigger group interactions but heterogeneity can also lead to conflicts and require social grounding (Salomon & Globerson, 1989). Another condition directly affecting group interaction and collaborative learning is the nature of the task. Significant inquiry requires that students have a modicum of facts, concepts and ideas to gain deeper knowledge of a problem (Newmann, Bryk, & Nagaoka, 2001). While some tasks lead to spontaneous distribution of roles, cognitive tasks should be distributed so individuals jointly find a solution to some problem in a synchronous and interactive manner (Brown and Palincsar, 1984). Some tasks may also lead to shifting roles, but the division of tasks allows each group member to devote more resources to their task (Blaye et al, 1991) Collaborative processes support higher order thinking when learners are taught to reason about alternatives and articulate thoughts and strategies as they work together (Perkins, 1991).

### Project Description

This middle school digital documentary project was constructivist in orientation as teachers and students

used technology which included three laptops, a scanner and three camcorders to develop a set of group videos which were then combined into a major documentary. During the research phase, the groups collected information from books and online resources. They worked with their teachers identifying, paraphrasing and summarizing the information, which they developed into a timeline. Afterward, the groups revised and edited their timelines with their teachers as they created a narrative script. They used this script as a basis for selecting images in developing their storyboards, which served to guide the production of their group video. Once their videos were edited, they were combined to form a single documentary.

#### Methodology

This paper examined a three-month long digital documentary project involving 3 teachers and 20 seventh grade students at a public middle school. As a participant observer, I provided professional development school-based support over a 10 day period to the teachers and students involved in the project, working with students and teacher throughout the school day. The study was modified to focus primarily on middle school students at one school.

Data sources consisted of self and group assessments that evaluated student interactions and group collaboration. Open-ended student and teacher surveys and student work were used at various stages of the documentary development process to assess group participation and learning outcomes. Professional development field reports and observational data as well as teacher surveys and interviews were used to identify the impact of documentary development processes and student collaboration on higher order thinking and project development.

Students completed surveys (See Appendices A and B) at the start and the end of the project. Observations, field notes and digital photographs were recorded throughout the project. Student products were collected at the completion of the project.

This study focused on the following research questions:

1. What kinds of collective problem-solving and decision-making and practices do students undertake in creating documentaries?
2. How does production and other digital documentary development processes foster student collaboration??
3. How do these collaborative processes shape their understanding of historical issues and events?
4. What are the implications and outcomes of such student partnerships?

#### Data Analysis

After student data was organized by groups in a matrix under various categories, the data was analyzed using an interpretive method. Interpretive data analysis is based on the idea of a socially constructed reality. It does not predefine dependent and independent variables, but focuses on how humans construct or make sense of their experiences.

I was interested in understanding the role that collaborative processes play in the development and use of problem-solving and decision-making strategies and approaches by adolescents in digital documentary development. Interpretive data analysis was therefore used to identify how the development of these collaborative groups affected their ability to respond to key events and how these events in turn shaped the development of problem-solving and decision-making strategies by these groups.

1. Utilized teacher survey responses and interviews to build a picture of the project development and the creation of the collaborative groups.
2. Cross referenced teachers' interview responses and professional development observations with students' responses and related them to group dynamics theory to develop a picture of the formation of each of the six groups.
3. Key events were identified under each category in the matrix to determine the problems each group faced, the strategies they used to deal with them and what they had learned from their collaborative experience.

#### Findings

The dynamics involved in the selection of the digital documentary topic had a direct impact on the nature of student collaboration. The topic – New York and Its Influence on the Birth of the Nation – was selected during initial professional development workshops, and was intended to establish some curriculum alignment with the NYC Scope and Sequence. The teachers felt the topic also provided interdisciplinary connections between their three subject areas- social studies, English and mathematics that facilitated exploration of history, the arts, science and technology. This topic, however, was less connected to the actual social studies curriculum the students were studying during the project, and they were unfamiliar with the economic and political history of New York City.

From the onset the teachers sought to clarify the task –the creation of a digital documentary- by providing model videos, engaging in project discussions and outlining the subtopics for the students. They felt that these activities helped the students to sufficiently understand the project requirements. They also felt that the students' desire to learn more about the topic and their city, the individual choices they were given and their interest in creating a video created a positive attitude among students toward the project.

Student participation in the project was based first on teacher assumptions that academically competent students would automatically be able to assume certain project responsibilities. Seventh grade students were selected for the project based on their academic record and good behavior, and the fact that they had kept up with work in missed classes. The students were also asked to write a letter if they wanted to join the project.

The curriculum subtopics rather than group makeup provided the impetus for group organization. Research prompts ("He started with a boat and \$100 and became one of the richest men in America," "Do you love money? Money, money, money!") were used by the teachers to spark student interest in specific subtopics. Students' subtopic selections determined their group choices; in cases where students did not make a

selection they were assigned to one of the seven groups.

Various factors such as class origin and group size affected the group compositions. About 66% of the 29 original students came from one class, 705, while the rest were chosen from five other seventh grade classes. Two students each came from three classes, 3 students were selected from one class, and one student came from another class. Consequently, some of the 705 students worked more with their classmates than with students from other classes, and some of the groups tended to be more homogeneous than others. Most of the groups were of an optimal size, as three of the seven groups consisted of 4 students, three groups had three students, and 1 group consisted of two students. Eventually, 20 students worked on the project.

The level of teacher interaction with students inadvertently affected the students' ability to foment and cement relationships with other group members. The project was centered in the project liaison's 705 centrally located classroom where the groups met twice weekly during lunch and frequently after school to work on the project. Since the project liaison was also the 705 homeroom teacher, students from this class benefited from the higher level of participation and interaction by their teacher with their groups and the entire body of students, especially at the beginning of the project. As the project progressed, more of the group work shifted to the two other teachers' classrooms, and closer interactions between the non-705 groups and the other teachers helped to guide those students through the documentary development process.

The diverse nature of the groups also created logistical challenges that affected students' ability to stay focused on and to complete the project tasks. The groups also worked on the project during specific class periods, and at times it was difficult to get everyone together from different classrooms. Teachers were sometimes reluctant to release the students, and while the digital documentary process required extra time, effort and work, all students were not able to stay after school as needed. Some students found it difficult to meet the additional project requirements: to maintain good grades and make up any work they had missed when they were pulled out of classes or participated in trips as a result of the project.

Students' prior experience and understanding of teamwork and collaborative work incorporating technology was a salient factor in their group's ability to respond to the open-ended challenges involved in creating their digital documentary. The physical configuration of the 705 classroom supported group learning, student-centered instruction and a cooperative climate. Through an advanced class, students had been taught how to work in groups, select leaders and work with a common purpose. Technology was integrated into the English teacher's daily instructional routine. In the two other classrooms where instruction was more teacher-directed, the seating was arranged in a seminar U-shaped configuration or students sat at their individual desks, and there was little or no technology based instruction.

These factors played a significant role in the ability of various groups to engage in collective problem-solving and decision making constructivist tasks and to overcome the challenges they faced during various phases of the documentary development process.

As the groups embarked on the process of translating their subtopics into videos, their lack of prior knowledge made their research even more critical, especially if they were to engage in deeper exploration of their subtopic. Students' inadequate research skills, limited access to appropriate online information, and lack of task completion by some group members heightened the difficulties they experienced in collecting information on their topics and made this task time-consuming. The groups diverged in their approaches to the research task.

Group A and Group B shared similar characteristics and were able to complete their videos ahead of the other groups. As Group A embarked on the project, they began as a group of individuals, but they quickly moved beyond the forming stage by utilizing the collaborative group know-how and skills that some group members possessed. They established a sense of purpose as members responded to the research task by "talking" and exchanging information, selecting a leader, recognizing each member's strengths, and establishing roles, responsibilities and task ownership as they identified "who was in charge of what." During this stage, Group A members developed greater unity and consensus about their work. While they came from two classes, they were well acquainted with one another and forged closer bonds. Their ability to organize and share work equally also brought greater harmony so they were less affected by conflicts and were able to focus on the task at hand. By working collaboratively to clarify their tasks and what they needed to do to accomplish them, they were able to achieve their goals.

As Group A worked on the script, they used a range of strategies to organize the research information. After identifying a rationale for their research, they synthesized and identified key ideas in their information. They used these ideas to systematically organize their script "piece by piece." They were careful to ensure that all pertinent information was covered. "We discussed how we will jump from time to time without missing nothing." They were also concerned about ways of expressing their ideas, "how we were going to put it."

The group understanding of how their script related to the storyboard helped them to grapple better with this task. They worked collaboratively in critically appraising the meaning embodied in their storyboard images. "We got pictures to match our script. We all sat together to see which ones look best." Once Group A's members gauged the scope and length of their video, this information was used to make content and scheduling decisions. Group A members generally felt that collaboration made the work easier while it empowered individuals within the group. Sustained communication and a commitment to work together as a team continually strengthened the group structure and identity, enabling them to complete tasks effectively throughout the project: "We worked better as time went on as we got to know each other and we all got into the project. We hardly had problems."

The two Group B members shared many similarities with Group A. They were associates rather than close friends, and like some Group A members they had learned to work in small groups. Group process rules governed the way they worked throughout the project. As they encountered difficulties with the research, through their discussions they recognized that they lacked the necessary research skills ("We had a problem figuring out what's important") and sought advice from their teachers and other sources. In their exploration of various strategies, they learned how to apply their own personal experiences and views to decide what was critically important about a topic. Group B's ability to apply these strategies in completing their research task led them to work independently and collaborate closely on other tasks.

As they attempted to transform their information into a script and "explain what our research was about," they worked by consensus to determine the information they needed and how it would be ordered using time as

an organizing principle. "Introducing then going into the past and then back to the future," "We went by the dates and put things we agreed on." Group B used a similar collaborative approach as they worked on their storyboard and created their video. While Group B understood that the script was the basis for the creation of the storyboard, they were concerned about finding appropriate pictures that could represent their mutually agreed upon ideas. They used strategies that had worked previously, as they recognized that "We didn't have much of the pictures." After they identified resources and "looked at books and the Internet," they selectively organized their images in their storyboard. "We took things that we agreed on." Group B continued to make collective decisions by identifying video editing challenges and utilizing visual discrimination strategies in selecting and combining appropriate other digital media in creating their video. Group B felt that this was a positive experience. They had worked well together from the start and they had "learned that putting your all in your work is the best." This approach seemed to motivate one of the students who, while not considered an overachiever, began to assume more responsibility not only for his group's work but in other project areas as well.

Initially, Group C faced more hurdles during their group formation than Groups A and B. Leadership, role and task ownership issues predominated, but these were compounded by the difficulties they encountered doing their research. "The problem was the information assigned to someone never got done." With a lack of strong leadership, conflicts arose over roles and responsibilities as two members tried to assert their independence. These problems led to appeals for support and teacher intervention, which gave students a more equal forum to discuss and iron out their differences. The group agreed that one member would do script writing while the other two members would put their project together. Eventually, the fourth member dropped out due to time constraints." Group C also explored research strategies similar to those of Groups A and B. During this storming phase, attempts to resolve these conflicts led members to formulate more realistic procedures to govern the group behavior. As roles were reassigned among group members, they noted that there were fewer distractions. "We solved problems by appointing other students to do what was needed."

As the group communication and focus increased during the next stages of video development, the level of trust grew within the group. The group became more self-directed, and there was greater discussion, reflection and consensus as members defined the nature of the tasks and how they would be achieved. A schedule was used to manage group responsibilities. In creating their script, the group used interesting biographical details as an organizing principle in building a picture of their historical personality and in selecting pertinent research information. "We started with an interesting fact about him, then his early life, and so on."

As group responsibilities and work patterns became more solidified, group members entered a norming phase as they became more focused in working on their storyboard and video. Collaborative discussion and joint decision making helped them to identify and resolve visual content issues in their storyboard and to determine the timing and creativity of digital images in their video. In the end, Group C members felt that while teamwork required commitment, it had helped them to know and support each other in achieving their goals.

Group D faced similar problems during the project though they attempted to collaborate and managed to complete their video. During the forming stage the four members who were from three classes exchanged information and tried to find some common ground by aligning themselves with similar partners. The group splintered as two students from the same class bonded while the other two began to establish a relationship. Group D, however, lacked a leader who could unify these two factions. Since Group D members had no common classes, they usually met with a teacher and the consultant during lunch and after school to do their project. However, the after-school schedule was difficult for some students and did not strengthen the group identity.

With teacher guidance the students were taught the same research skills as the other groups, while a calendar helped the group members to establish roles and responsibilities for the duration of the project. However, Group D collaboration occurred primarily through teacher intervention as the two factions maintained a separatist attitude. Although Group D members lacked guidance and leadership, through discussion they developed their own strategy to overcome this problem. They decided to "look at other groups' work and see what they were doing," to use the strategies and rules other groups were utilizing as a model to guide their own work.

Group D used these models to guide their discussion, to understand the nature of their tasks and determine how to resolve the problems they faced. In organizing their script from their research information, they separated the work equally ("We took little parts of the information") and discussed organizational strategies to ensure the information was synthesized in a logical order. As they established roles, rules and responsibilities, their behavior began to mirror those of the other groups. During meetings they built consensus to deal with storyboard issues. "We arrived at a decision by working together." Nevertheless, while Group D members felt their strategies were validated as they dealt successfully with each task, Group D's sense of identity wavered at times as members worked in pairs narrating or editing their video. By the end of the project, members' views also diverged, with some testifying that the group had worked together while others felt that that everyone had not contributed to the group's success.

Group E members attempted to establish a working relationship but there was little sense of group identity due to unresolved individual differences and a lack of definitive leadership. Generally the members, who came from different classes, saw themselves as individuals. Communication problems grew as they failed to assume roles and responsibilities. While one member had the strongest leadership capability, he lacked focus and maturity and distracted other students. This led to conflicts between the group members until eventually he was removed from the group. Another member was more self-motivated and responsible but did not want to assume the group leadership.

As the project challenges grew, Group E's lack of focus and collaborative skills was evident in their failure to accomplish tasks on time. There was little group discussion, and teacher guidance was critical in helping the group to deal with its research challenges. While the group tried splitting up the work, the script was organized in a scattered fashion since "the group had problems not working together." As the sense of group identity waned, one member worked intermittently on the project while the two most motivated group members took the lead in doing the storyboard and video with teacher guidance. Generally, Group E members felt that cooperation was important, but they had learned little from their collaborative experience.

Project reorganization and the reconfiguring of particular groups led to the formation of Group F, which began the project later than the other groups. This group was affected by factors similar to Group E such as a lack of strong leadership, different homerooms, a problematic schedule, and weaker academic skills. They had also been working on different topics before they were co-opted into Group F. Despite such challenges, the two group members established a working relationship, and strove to fulfill their roles and responsibilities.

However, Group F proceeded more slowly and needed more support than other groups in developing strategies to deal with all aspects of the projects. Since the group members did not see each other often, they did not collaborate sufficiently in developing strategies and did not benefit enough from discussions about project concepts. Consequently, they lacked the skills needed to organize their research information and a conceptual understanding of the role of the script and storyboard in video production. As a result, Group F's members found the documentary process particularly difficult. However, they felt that they had shared and accomplished more through their teamwork, and they had learned how to collaborate by making the documentary.

#### Implications

Digital documentary projects provide an opportunity for constructivist-based collaborative learning, which facilitates higher order thinking. This study suggests that the development of a collaborative group culture can facilitate the utilization of learning strategies. It was evident that those groups that had been grounded in collaborative processes had an advantage in strategizing and managing the learning process. It fostered interdependence and group independence. Teachers need to develop constructivist activities or environments that allow students to engage in higher-order thinking and become producers of knowledge.

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