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The Role of Collaborative Chat Invention in First-Year Writing: Re-investigating the Transferability of Preliminary Ideas from Chat to Print

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Introduction

The use of computer-mediated communication (CMC) has unique characteristics that enhance the dynamics of teaching and learning. For one, "it is quick and can provide group interaction without requiring all persons to be in one location in order to meet" (Ellsworth 35). Because of this perception, technology-based composition classrooms now employ content-management course tools, blogs, wikis, and/or other applications that put students in contact with themselves and others beyond the classroom. One of the most common practices of collaborative online interaction when composing texts is to revert to synchronous chat during the process of prewriting or invention.

Similar to the employment of collaborative face-to-face communication, student writers who exchange preliminary ideas online are freed from the grips of seclusion and apathy. But the act of writing down initial thoughts and negotiating meaning online with actual peers opens up advanced possibilities. Approximating face-to-face discussions through chat, for instance, requires more cognitive effort because students need to spell out their thoughts comprehensively without the luxury of verbal cues when speaking/listening. Writing in this manner serves as a powerful tool for learning (e.g., finding connections, making meaning), reflection, and analysis (Tynjala 39). Toby Fulwiler underscores the importance of providing additional classroom opportunities for students to know and understand all subjects through writing, making writing more personal to promote self-awareness within the context of a specific discipline (22). The promise of online communication platforms, of course, meets this need.

Because the impact of CMC to student learning and writing practices is considered remarkable (Blythe 122-25; Eldred and Toner 37; Yancey 108), more studies that address the usage of these online communication tools specifically for invention and the transfer of

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preliminary ideas from CMC to student writing are needed. Examining the initial reproduction of ideas in collaborative computer-mediated settings along with teacher-student attitudes and perceptions towards the use of these tools will shed light on how effective they really are in helping college students acquire meaningful ideas for their written texts. Such valuable information will not only help composition teachers assess the best online practice suitable to their own classrooms, but also contribute towards strengthening the pedagogical implications of technology, most especially during invention.

To reach this goal, this study re-examines the effect of synchronous chat as collaborative invention forum on a composition class in an average-sized mid-western state university. One computer-mediated first-year writing class from this university used the chat feature of Blackboard as a tool for prewriting or invention. The transfer of invention ideas to student essays, along with the attitudes and perceptions of the teacher and students toward this online activity, was analyzed and described to strengthen the pedagogical implications of this type of synchronous technology in composition among other CMC platforms. Though short-term investigations on a limited setting such as this may not yield generalizable results, this inquiry can definitely contribute to understanding how technology impacts the writing classroom.

Background

Using computers throughout the writing process has a direct impact on the writer's cognitive processes. Christina Haas maintains that the material tools of writing consistently alter the mental processes of text production (73). By finding out whether word processors do help increase/decrease the length and/or quality of planning the text in a specific writing situation, the role of materiality in writing practices is magnified (Haas 77). With the ubiquity of computers in composition classrooms, pedagogical changes in composing texts now maximize the value of

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non-linearity. It is no longer uncommon to see the use of technology to create computer-based environments that enhance the writing process. Web 2.0 applications, such as blogs, wikis, 3-D virtual environments, and other social networking sites that currently dominate our commercial and academic landscapes have also prompted composition teachers to explore their use in various stages of writing.

Thus, how educators view technology's impact on the teaching of writing should perhaps be an immediate priority for reassessment. In retrospect, the presence of technology in composition classrooms has not changed the basic social tenet of the composing process and academic writing as "computers can make writing processes *seem* new by making visible the ways writers and readers have always dealt with the text" (Takayoshi 247). Donna Reiss, Dickie Selfe, and Art Young confirm that newsgroups and chat rooms, for instance, are tools for collaborative conversation and composition, that writing e-mails is a "writing to learn" activity, and so forth (xviii). Furthermore, electronic discussions in the form of listservs, bulletin boards, and chats are patterned after the question-and-answer adaptations of the Socratic dialogue (Eldred and Toner 37). In light of these claims, composition teachers must adapt a more balanced attitude when integrating technology in order to make each activity relevant to the composing process and curricular goals: "Be enthusiastic but skeptical, excited but critical, explore new technologies but safeguard valued pedagogical approaches" (DeVoss and Selfe 435).

Composition teachers often rely on face-to-face communication for collaborative prewriting to exchange preliminary ideas. Others freely use asynchronous communication tools, such as the Discussion Board, for the same purposes. But knowing the advantages of fully embracing CMC at different writing stages (e.g., invention, peer reviews, revision, etc.) would lead to rhetorically-sound choices of online forums that support student learning (cf. Janet Eldred

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in 2008; Beth Hewett in 2006; Alice Trupe in 2004; Yi Yuan in 2003). Such advantages are more apparent if teachers are aware of the effects of using different CMC platforms on student writing. With a dearth of descriptive research on the effect of CMC on at least *one* specific writing process, purposeful online activities are often rare. Thus, it is necessary to re-examine if there is indeed a correlation between specific collaborative online invention strategies and the quality of student writing to detect the best tool that fits the needs of the students.

The Study

Because the use of synchronous chat when sharing preliminary ideas has been one of the most common collaborative online invention forums in this mid-western state university, it is necessary to investigate the impact of this synchronous tool to first-year writing based on (1) the transfer of ideas from online to print, and (2) the attitudes and perceptions of the teacher and students toward the process. The term "collaborative online invention" is viewed in this study as a prewriting activity students engage in where they are linked with each other through chat to generate and discuss topic ideas before drafting their essays. The research questions investigated in the spring of 2007 are as follows:

RQ1: How effective is the use of chat in generating ideas for writing academic essays?

RQ1a: How much of what was discussed online was reflected in the essay?

RQ1b: How much of the essay was not part of the online discussion?

RQ1c: In terms of language use, what lexical and/or syntactic similarities or differences were evident in the online forum and the written essay?

RQ2: What attitudes/perceptions do the teacher and students have toward the collaborative online invention process?

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RQ2a: (for teacher and students) What did the teacher and students think of the process? Would they prefer using the same invention strategy in future essays? Why or why not?

RQ2b: (for teacher) How did the teacher assess the nature of this strategy in terms of student participation? Did she think the activity triggered fruitful class discussions (or otherwise)? Why or why not?

RQ2c: (for teacher) If the teacher were to modify this collaborative online invention activity, how would she do it? What reasons would she have for her choice of modification?

RQ2d: (for students) How many of the ideas discussed online did students think were tapped into their writing and/or how many of the ideas they have in writing were actually sparked by the online dialogue?

RQ2e: (for students) How did students come up with ideas that were not discussed online?

RQ2f: (for students) Were there any technical terms/words, phrases, or clauses that were picked up online and used in the essay?

Method

This study aims to provide a description of the synchronous mode of invention based on the textual findings of the first research question and teacher-student interviews of the second. The first-year writing class was selected according to scheduling availability, computer lab access, and consent of the course instructor. Students were already exposed to in-class chat activities prior to the investigation, so assigning them to engage in two chat invention sessions before drafting a required research-based essay was not difficult. The data (online transcripts,

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rough drafts, and teacher-student interviews) were collected over a five-week period, taking place between the time when students started generating topics online for their research-based essay until the last student-interview was done. Students primarily explored general ideas for their essays (possible essay topics, theses, main points and supporting details, counterarguments, and so on) in four groups with around two to four students per group on the first chat invention session. After a week, they continued discussing their essay plans as well as possible textual support within the same groups on the second session. Figure 1 shows the assigned group task for a typical collaborative online invention session.

Direction: Explore with your peers and provide feedback/suggestions on the following points:

1) potential essay topics and thesis statements

2) possible main ideas/arguments and supporting details

3) possible opposing views and refutations

4) possible sources

Figure 1: Assigned group task for a typical collaborative online invention session

In their research-based essay, the students were expected to synthesize multiple sources from an assigned chapter in Laurence Behrens and Leonard Rosen's edited collection, *Writing and Reading Across the Curriculum* (9th ed.). The assignment develops each student's critical and analytical skills in both writing and reading. After each collaborative online invention session, the instructor was interviewed face-to-face for approximately 30 to 45 minutes. Prior experiences with using technology in the writing classroom were asked to establish a sense of context, along with comments and observation about the online activity.

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On the due date of the research-based essay rough draft, students who previously signed the consent form were asked to send their rough drafts electronically to the researcher's email account. Electronic copies of the rough drafts were stored and interview appointments were arranged for those who agreed to be interviewed. There was a need to conduct student interviews immediately after the submission of student rough drafts and not prolong them so as to ensure that the collaborative online invention and drafting processes were still fresh in each participant's memory. Students were also asked about their prior experience with technology, along with their comments on the online activity and composing processes.

The instructor who agreed to participate was very comfortable with technology, having infused chat forums in her writing classes for several years before this study began. Without any vested interest in the approach, the possibility of a teacher effect was thus minimized. Twenty-two students from the class were expected, which is the maximum number of students typically enrolled in first-year writing, to agree to participate. After inviting student participants during the researcher's classroom visit at the beginning of the semester, only 10 student online transcripts and research-based essay rough drafts were randomly selected and analyzed; from these subjects, only three were interviewed (see Table 1). The random selection process did not consider the participants' gender, technological experience, or socio-economic status. In compliance with the Human Subjects Review Board regulation, identities of the participants were never revealed. Identification letters for students were used instead in order to eliminate sexual and racial biases. The instructor was referred to simply as "teacher."

Table 1: Participants by group

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Group	Participants
1	Students A, B
2	Students C*, D
3	Students E, F
4	Students G*, H, I, J*

* *Students interviewed*

This study followed a descriptive research design to examine the relationship between the collaborative online invention strategy and student academic writing. Unlike experimental studies, no control groups were created and no treatments were given (Lauer and Asher 82). Patterns from online discussion transcripts, student rough drafts, and teacher-student interviews were identified and retained through classification and coding according to the principles of Strauss and Corbin, with a "microanalysis" approach that resemble "very careful, often minute examination and interpretation of data" (58).

To answer the first research question, four essay categories were grouped to trace and quantify the transfer (and non-transfer) of ideas as well as the transformation (and non-transformation) of linguistic structures from online transcripts to student rough drafts (see Table 2):

Table 2: Four essay categories used for textual analysis

Analysis of Online Transcript **(Chat)**	**Analysis of Written Essay** **(Rough Draft)**

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• Potential essay topic, purpose, and thesis statement	• Clarity of thesis statement
• Main ideas and supporting details	• Formation of logical argument
• Textual Support	• Citation and synthesis***** of academic sources
• Opposing views and refutations	• Integration of counterargument

***** *Synthesis – source connections, usually with a verb between sources (e.g., agrees, disagrees, concurs, expounds upon, contradicts)*

To answer the second research question, the teacher and student interview data were subjected to "analytical coding" by Richards, where meanings in context were considered, "creating categories that express new ideas about the data [and] coding to gather and reflect on all the data related to them" (94). Interview data were then compared with the data from online transcripts and rough drafts until a significant pattern emerged.

Finally, the analytical procedure mentioned above was transformed into the following steps to approximate grounded theory method:

1) Read and mark the subject-participants' dialogues found in online transcripts.
2) Read and mark the essay parts in their drafts based on four categories – (a) topic, purpose, thesis statement; (b) main ideas and supporting details; (c) source citation and synthesis; (d) counterarguments. Note any rhetorically significant language use as well.
3) Reread and analyze online transcripts and mark relevant dialogues pertaining to four essay categories. Also note subject-participants' contribution to group discussions.
4) Code and analyze both texts (online and rough drafts). Reread and immediately repeat coding and/or analysis if a significant pattern emerged.

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5) Reread essay drafts to note any (or lack of) transfer of four essay categories: What was found in both texts (online and essay drafts) and what was found only in one text? Also, compare both texts to identify rhetorically significant language use.
6) Code and analyze teacher and student interviews. Repeat coding and/or analysis if any significant pattern emerged. Finally, compare and contrast both teacher and student interview data.
7) Compare and contrast analyses of online transcript and essay draft data with interview data. Use interview data to supplement or enrich textual data.
8) Arrange textual data and interview data analyses coherently. Point out significant observations and patterns, including the quantity of transfer of each category and language use as well as supplementary patterns based on the interview.

Findings

Examining the initial reproduction of ideas in the chat room and their transferability to the first written draft (RQ1), as supplemented by teacher-student attitudes and perceptions toward the process (RQ2), helps determine the effectiveness of the invention forum in facilitating the acquisition of meaningful ideas and language proficiency. The findings are presented in order of the research question.

RQ1. How effective is the use of chat in generating ideas for writing academic essays?

The intent of this question was to look at the transfer of invention ideas from the chat room to student rough drafts. To address the question, the following items were examined: (1) how much of what was discussed online was reflected and/or not reflected in the essay; and

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(2) distinct language transformations that were evident in the online forum and the written essay. These modes of inquiry comprise three research sub-questions which are expressed in three major themes: (1) transference of ideas from online to print; (2) non-transference of ideas from online to print; and (3) (non-) transformation of linguistic structures from online to print. The quality and quantity of the findings are expressed in distinct thematic sections.

Transference of Ideas from Online to Print

The real-time and immediate setting of synchronous chat causes limited dialogues that negatively affect the transfer rate of opposing views and refutations or counterarguments. However, both chat activities certainly allow students to retain ideas at a higher level, reflect on these outside of the chat room, and add more ideas upon drafting (cf. topic, purpose, and thesis statement; main ideas and supporting details; and textual support or source synthesis categories). Table 3 provides a summary of the data patterns regarding the first research sub-question, "How much of what was discussed online was reflected in the essay?" of the first major research question, "How effective is the use of chat in generating ideas for writing academic essays?"

Table 3: Transference of Ideas from Online to Print

Essay Categories	**Chat**
1) Essay Topic, Purpose, and Thesis Statement ***(successful transfer)***	9 essays with transfer
2) Main Ideas and Supporting	4 essays with complete transfer, 5 essays with

Details ***(average transfer)***	transfer (but more ideas are added to the rough draft)
3) Textual Support or Source Synthesis ***(minimal transfer)***	4 essays with source transfer (but more sources are added to the rough draft)
4) Opposing Views and Refutations or Counterarguments ***(null transfer)***	0 essay with transfer

Indicating ***successful*** transfer, nine essays with transfer are noted in the first essay category (topic, purpose, and thesis statement). An ***average*** transfer of the second category (main ideas and supporting details) reflects four essays with complete transfer and five essays with transfer (but more ideas are added to the rough draft). The third category (sources) indicates ***minimal*** transfer with four essays with transfer (but more sources are added to the rough draft), and the fourth category (counterarguments) shows zero essay with transfer indicating ***null*** effect.

Non-Transference of Ideas from Online to Print

Based on the invention ideas that did not transfer along with those that did, discussions held in chat rooms seem to have satisfactory results in terms of essay topic, purpose, and thesis statement. The immediacy of a real-time setting seems to have caused students to retain most ideas suggested to them at a crucial time, greatly improving their facility for decision-making. The chat room also has positive effects on discussions about textual support and source

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synthesis. Table 4 provides a summary of the data patterns regarding the second research sub-question, "How much of the essay was not part of the online discussion?" of the first major research question, "How effective is the use of chat in generating ideas for writing academic essays?"

Table 4: Non-Transference of Ideas from Online to Print

Essay Categories	**Chat**
1) Essay Topic, Purpose, and Thesis Statement ***(successful transfer)***	1 essay without transfer
2) Main Ideas and Supporting Details ***(average transfer)***	5 essays with added ideas, 1 essay without transfer
3) Textual Support or Source Synthesis ***(minimal transfer)***	4 essays with added sources, 6 essays without transfer
4) Opposing Views and Refutations or Counterarguments ***(null transfer)***	10 essays without transfer (2 essays have counterarguments but are not transfers)

In terms of essay topic, purpose, and thesis statement category, synchronous chat invention displays one essay without transfer. This pattern, when juxtaposed with chat's nine essays with transfer, seems to imply that the immediacy of synchronous chat positively affects

the cognitive facilities of students for brainstorming and decision-making. When it comes to main ideas and supporting details category, chat invention produces one essay without transfer and five essays with added ideas. Six essays without transfer and four essays with added sources to the rough draft are identified in the sources category. Finally, students have lesser online activity in the chat room for counterarguments with only three student-participants (none of the dialogues are reflected in their rough drafts); ten essays without transfer clearly signify the null effect of chat for this category.

(Non-) Transformation of Linguistic Structures from Online to Print

The synchronous chat forums apparently lead to increased rates of critical reflection and modification of language patterns in the first two essay categories after the session. Table 5 provides a summary of the data patterns regarding the third research sub-question, "In terms of language use, what lexical and/or syntactic similarities or differences were evident in the online forum and the written essay?" of the first major research question, "How effective is the use of chat in generating ideas for writing academic essays?"

Table 5: (Non-) Transformation of Linguistic Structures from Online to Print

Essay Categories	**Chat** ***(positive language transformation on FIRST TWO essay categories only)***
1) Essay Topic, Purpose, and Thesis Statement	3 cases of more formal thesis structure and word choice in the rough draft; 2 cases of more specific details found in the rough draft's thesis statement
2) Main Ideas and Supporting Details	1 case of exact word choice and sequencing of main ideas both online and in print; 4 cases of replaced,

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	reworded, or recast main ideas in the essay for specificity or formality; logical reorganization of main ideas and supporting details in 3 rough drafts
3) Textual Support or Source Synthesis	Contrasting results in the use of synthesis verbs indicate minimal effect of source transfer: 4 rough drafts with no source transfer do not have synthesis verbs between sources, but 2 rough drafts with no source transfer do; and 3 rough drafts with source transfer have synthesis verbs, but 1 rough draft with source transfer does not
4) Opposing Views and Refutations or Counterarguments	Irrelevant

After both chat activities, three cases of formal thesis structure and word choice and two cases of detailed thesis statement characterize student rough drafts, implying an increased rate of critical reflection for topic, purpose, and thesis statement outside the chat room. For the category of main ideas and supporting details, the chat activities lead to only one case of exact word choice and main idea sequence both online and in print that suggests meaningful interaction during the session. Most of the linguistic patterns, though, lean more towards critical reflection and modification outside the chat room, with four cases of replaced, reworded, or recast main ideas for specificity or formality and three cases of logical essay reorganization. The third category, source integration, reveals that both chat activities have contrasting results in terms of connecting sources with synthesis verbs. The use of words such as “agrees,” “disagrees,”

"concurs," "expounds upon," "goes even further," "contradicts," and so forth clearly shows the connections or relationships between sources. Specifically, four rough drafts with no source transfer do not have synthesis verbs between sources, but two rough drafts with no source transfer do; on the contrary, three rough drafts with source transfer have synthesis verbs, but one rough draft with source transfer does not. Such contradictions strongly support the minimal effect of both chat activities in this category. Finally, because of the null effect of both chat activities on counterargumentation, the language pattern detected online and in student drafts in this category is likewise irrelevant.

RQ2. What attitudes/perceptions do the teacher and students have toward the collaborative online invention process?

In order to supplement the textual findings of the first principal research question, the intent of the second research question was to find out what the teacher and students think and feel about using the chat forum as collaborative invention platform. To address the question, three research sub-questions expressed in three major themes comprise the teacher interview: (1) general feedback about the process and teacher preference; (2) assessment of the process in terms of student participation; and (3) suggestions for modification. In addition, four thematic patterns comprise the research sub-questions for student interviews: (1) general feedback about the process and student participation; (2) assessment of transfer of ideas from online to essay draft; (3) description of other invention strategies; and (4) other comments on language use. The findings are presented in separate teacher- and student-interview sections.

Teacher Interview

For the teacher, the use of the chat forum positively characterizes the social act of invention

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and knowledge construction. However, she believed that the fluid and immediate nature of synchronous chat seems to have negatively affected its ability to realize more meaningful interactions. Table 6 provides a summary of the teacher interview in answer to three research sub-questions (RQ2a-c), respectively: (a) "What did the teacher think of the process? Would she prefer using the same invention strategy in future essays? Why or why not?" (b) "How did the teacher assess the nature of this strategy in terms of student participation? Did she think the activity triggered fruitful class discussions (or otherwise)? Why or why not?" and (c) "If the teacher were to modify this collaborative online invention activity, how would she do it? What reasons would she have for her choice of modification?" These sub-questions partially respond to the second major research question, "What attitudes/perceptions do the teacher and students have toward the collaborative online invention process?"

Table 6: Teacher Interview

Themes	**Chat** ***(willing to use Chat as invention strategy though provisions must be followed because of the activity's negative features)***
1) General Feedback about the Process and Teacher Preference	*Advantages* Much less chaotic because students were divided into small groups; Very fluid, dynamic, and immediate capable of producing interesting ideas that students can go back to when archived; and Approximates "messiness" of the invention

	process *Disadvantages* greater tendency for students to go off on little tangents because of informal environment; More random and less-focused conversation at certain times; Hard to keep track of responses; Hard to control at times, especially with bigger groups; and Absence of visual cues in real-time can cause difficulty *Preference* will use Chat as invention in the future provided students have a common set of information to work on
2) Assessment of the Process in terms of Student Participation	Everyone participated, some more than others; Teacher needed to "pull students back" sometimes to keep conversation focused; and Fluid and immediate, students were on a "come and go" mode and said anything online
3) Suggestions for Modification	Teacher suggested that same goals and assignment preparation must be required to students so they

	have a common foundation to discuss; and Teacher must strengthen online presence

The teacher positively considered the use of synchronous chat an approximation of the "messiness" of invention with its fluid and immediate environment. This feedback highlights the capability of chat for producing "spontaneous ideas" (Hand and Prain 740) as valuable references in essay composition. It seems that real-time conversations associated with chat brings about a heightened sense of socialization that leads to knowledge construction as was the case in this study when students collaborated on possible topics, main ideas, and so on, online. But the teacher admitted that the tendency for random and less-focused conversations, the difficulty to control and keep track of responses, and the absence of visual cues most of the time impede meaningful interaction among participants. Synchronous chat may be successful provided students using it for collaborative invention have a common knowledge base to hold conversations together in small groups and avoid spending too much time educating others about their individual topics. Such provisions will result to more meaningful interactions among student participants.

In terms of student participation, the teacher related that everyone was generally engaged in the chat room – reacting to each other's ideas, to the teacher's prompts, etc. – though some contributed less than others due to their motivation/affect/cognition or computing skills. Clearly, constructing knowledge becomes a social act in this case because the individual is no longer solitary (Henri 158). However, the teacher admitted that maintaining the focus of chat dialogues pose numerous challenges because of the platform's fluidity and immediacy that tend to ignite meaningless interactions; nevertheless, she believed that every student participated in this recent

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collaborative invention activity. Some of them might have contributed less than others in the chat room, but they were all generally engaged – reacting to each other's ideas, to the teacher's prompts, and so on.

Finally, two modifications suggested by the teacher for using chat hope to sustain more meaningful interactions. First, she said the same reading assignments should be required prior to the activity to keep students consistently engaged throughout the entire dialogue. As well, the teacher should be more involved in guiding online discussions to help maintain focus and avoid off-tangent remarks.

Student Interviews

Majority of those who used chat invention forums shared positive online experiences, although a minority remarkably expressed the same negative comments as the teacher. Additionally, a few contradictions are evident with regard to the preference for group sizes and assessment of source transfer. Nevertheless, these interview data clearly affirm the social capacity of synchronous chat to promote collaboration and knowledge construction (Bonk and King 7). Table 7 provides a summary of student interviews in answer to four research sub-questions (RQ2a, d-f), respectively: (a) "What did students think of the process? Would they prefer using the same invention strategy in future essays? Why or why not?" (d) "How many of the ideas discussed online did students think were tapped into their writing and/or how many of the ideas they have in writing were actually sparked by the online dialogue?" (e) "How did students come up with ideas that were not discussed online?" and (f) "Were there any technical terms/words, phrases, or clauses that were picked up online and used in the essay?" These sub-

questions partially respond to the second major research question, "What attitudes/perceptions do the teacher and students have toward the collaborative online invention process?"

Table 7: Student Interviews

Themes	**Chat** ***(majority had positive experience with the activity, while a minority shared the same negative comments as the teacher; evidence of a few contradictions with teacher preference and textual analysis)***
1) General Feedback about the Process and Student Preference	*Advantages* 2 students with positive experience shared that interesting ideas were posted that lead to a more focused thesis statement; and These students also commented that the teacher kept everybody right on track when they ran out of ideas by initiating online conversations through questions and suggestions *Disadvantages* 1 student with negative experience shared peers go off on tangents, random ideas often prop up, and discussion seems less focused

	Preference 2 students preferred the use of the same invention strategy; and 1 student was willing to use Chat invention provided there will be bigger groups to maintain conversation if others "straggle off" ***[this suggestion contradicts teacher's positive evaluation of the Chat activity in small groups for ease of control]***
2) Assessment of Transfer of Ideas from Online to Essay Draft	2 students reported getting source ideas from online Chat ***[this experience is contrary to the textual analysis on source synthesis having minimal effect]***; and 1 student did not get much from the activity except that, as another student said, the Chat activity "helped them evaluate their ideas" after posting online or helped them go back and personally restate their thesis, and so on
3) Description of Other Invention Strategies	Other invention strategies – 2 students said individual brainstorming; and 1 student said collaborative brainstorming (with a tutor)

4) Other Comments on Language Use	Only 2 students adopted some language features expressed online (i.e., thesis structure and a peer-suggested quotation); and 1 student expressed ideas originally

According to student interviews, synchronous chat is a valuable invention strategy because it allows instant access of different ideas from others for the improvement of individual essay plans. This description highlights its capacity for knowledge construction through collaborative endeavors (Hand and Prain 753). To help characterize the social act of invention, students claimed that the teacher helped initiate online conversations and kept everybody on track. However, one student thought that conversations were not quite focused throughout the dialogue, and because only a few were fully engaged, online collaboration was negatively affected. While most students preferred the social aspect of chat along with its ability for knowledge construction, the same student expressed the need for sustained meaningful interactions within bigger groups (in contrast to the teacher's preference for small groups).

In terms of their assessment on the transfer of ideas, the students thought the online dialogue allowed them to draw possible ideas and, though a contradiction of its minimal transfer rate, possible sources for their essays. In addition, they reported that the chat invention exercise helped them evaluate posted ideas on their own or through peer feedback. Altogether, synchronous chat manifests its potential for collaboration, knowledge construction, and critical reflection.

Admittedly, the students also used other invention strategies aside from collaborative chat – webbing, listing, and reading assigned articles. One student combined both individual and social invention with an outside tutor, while another explained that most ideas came from chat.

Finally, they revealed that a few language features from online were used in their written drafts. Majority related the transfer of thesis statement structures and quotations. At any rate, this transfer directly supports the collaborative potentials of the forum (Light and Littleton 8).

Conclusion

The findings of this descriptive study indicate that the transfer of invention ideas and language patterns from chat to student rough drafts (RQ1) is directly supported by both teacher-student interview patterns (RQ2). Table 8 represents a descriptive summary with (+) and (-) markers referring to the "positive" and "negative" effects of the online tool, respectively.

Table 8: Descriptive Summary

Research Questions	**Essay Categories**	**Chat** ***(Need longer invention sessions for the LAST TWO essay categories; Positive language transformations on FIRST TWO essay categories only)***
Research Question 1: How effective is the use of chat in generating ideas for writing academic	#1: Essay Topic, Purpose, and Thesis Statement ***(successful transfer)***	**(+)** rough drafts indicate higher retention of topic, purpose, and thesis statement with 9 essays with transfer, 1 essay without transfer

essays?	#2: Main Ideas and Supporting Details ***(average transfer)***	**(+)** 4 essays with complete transfer, 5 essays with added ideas, 1 essay without transfer
	#3: Textual Support or Source Synthesis ***(minimal transfer)***	**(-)** 4 essays with source transfer but more sources are added, 6 essays without transfer
	#4: Opposing Views and Refutations or Counter-arguments ***(null transfer)***	**(-)** 0 essay with transfer, 10 essays without transfer (2 essays have counter-arguments but are not transfers) ***(online transcripts indicate traces of unproductive dialogue on counter-arguments, despite 3 student posts on this category as none of these are reflected in their rough drafts)***

Research Question 2: What attitudes / perceptions do the teacher and students have toward the collaborative online invention process?		**(-)** the teacher and students agree that meaningful and reflective interactions in Chat are seemingly deficient due to its fluid and immediate setting **(+)** the teacher and students agree that interesting ideas are produced in Chat for future reference

The use of synchronous chat for collaborative invention in this context highlights distinct advantages on specific essay categories. For instance, positive retention of essay topic, purpose, and thesis statement (1st category), and main ideas and supporting details (2nd category) from chat forums to student drafts is evident, proving that immediate/real-time collaboration tends to work better for purposes of decision-making, clarification, and thought development (Henri 149).

In terms of source synthesis (3rd category), the use of chat indicates minimal effect, necessitating prolonged invention sessions or separate class periods for this category to attain productive interactions (Olaniran 58). The same requirement for exclusivity or time-length is applicable to online discussions on counterarguments (4th category) to guarantee the success of the online activity.

Finally, data show positive language transformations in two essay categories – topic, purpose, and thesis statement and main ideas and supporting details. Since students did not have enough time for "online reflection" (Paulus 1323), they seem to have compensated the

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development of limited online dialogues through linguistic modifications after class. As previously noted, more should be done to increase the productivity of chat invention with regard to the last two essay categories – source synthesis and counterarguments.

Strongly supporting the textual patterns of online transcripts and rough drafts are teacher-student interviews. According to the teacher and students who used the forum, meaningful and reflective interactions in the chat room were deficient due to its fluid and disorganized conversation (Garcia and Jacobs 362). The attribution of this negative comment is proven by its null effect on counterargumentation along with its minimal effect on source synthesis. However, the use of chat when generating possible essay topics, purpose, and thesis statements demonstrates its capacity for idea retention and immediate clarification. Both the teacher and students agreed that chat forums tend to produce interesting ideas that are necessary for future reference, and the positive retention and transfer rates of essay topic, purpose, and thesis statement ideas are testament to this perception.

In closing, the teacher and students agreed that the use of the chat forum demonstrates the social act of invention and promote collaboration and knowledge construction (Paulus 1339). These perceptions are characterized by the following textual findings – the remarkable retention and transfer rate of invention ideas on essay topic, purpose, and thesis statement; the positive effect of chat on main ideas and supporting details; and the necessity for longer invention sessions to improve its effect on source synthesis and counterarguments.

Suggestions for Computer-Mediated Classroom Applications

Having enumerated the benefits of using collaborative synchronous CMC invention in relation to specific research-based essay components, the following suggestions should also be considered for future applications in the composition classroom. It is important to note that the

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context and purpose of each online practice, the comfort level of its users, and the access to technology must all be considered requisite for the success of any collaborative endeavors in cyberspace:

1. Instead of using exclusively one online tool for each writing phase, teachers might want to combine both synchronous and asynchronous CMC forums to overcome the limitations of a single tool (Paulus 1339) and ensure more meaningful virtual communities comparable to their face-to-face counterparts (Blythe 122-25). After all, creating more options for electronic discussion provides more opportunities for each individual to participate without reservations. The promotion of interdependence is a crucial element in an online learning community (Palloff and Pratt, *Building Learning* 126), so everything must be planned and purposefully facilitated for the benefit of student-participants (Palloff and Pratt, *Building Learning* 127).

2. Other open source software or web 2.0 applications may also be explored to supplement the needs not fully met by the online practice used in this study. Some of these tools are blogs, wikis, and podcasts; web conferencing softwares; Facebook, MySpace, and YouTube; and SecondLife that further enhance the act of sharing ideas and knowledge construction (Blair 42). In her article "Course Management Tools and Other 'Gated Communities': Expanding the Potential of Distance Learning Spaces through Multimodal Tools," Kristine Blair argues that relevant questions must be considered when designing principles for online teaching, such as: "How do you present material?," "How do students communicate with one another?," "How do you assess students?," "How do students learn?," "What tools best facilitate students' learning styles?" (49-50). In terms of professional development, several issues must also be raised for planning: "types of tools to be learned and integrated, pedagogical reasons for doing so, assessment of the impact of technology on student success," and so forth (Blair 51). Choosing an

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interface that caters to these concerns and one that values freedom, peer review, and knowledge sharing will surely make the learning task central (Cole and Foster 4-5).

3. Teachers can also implement strategies to create a virtual environment where "honesty, responsiveness, relevance, respect, openness, and empowerment" (Palloff and Pratt, *Building Online* 22) thrive so group members can feel safe in expressing themselves and facilitate productive interaction. Setting directives or parameters for the fair use of exchanges or outlining expectations for students to follow (Blythe 127; Yancey 112) are some techniques that can maintain order and sustain healthy conversations apart from the mere presence of the teacher. Hopefully, these will guide online members to achieve virtual utopia and get something out of an enriching experience.

4. More opportunities for student reflection after each online activity may be provided in order to support the learner (Barab and Duffy 32-33; Palloff and Pratt, *Building Learning* 129). "Transformative learning" or learning based on the interpretation of experiences, ideas, and assumptions is a direct result of self-reflection as learners take part in the meaning-making process and re-enact the online classroom (Palloff and Pratt, *Building Learning* 129). One way to facilitate self-reflection is to have the class review archived conversations and develop a summary at the end of each online conference. Another is to engage students in face-to-face dialogues or whole-class discussion after a virtual activity to address comments, questions, or concerns they may have about the exercise.

5. Most of all, teachers might want to combine face-to-face and online activities to accommodate a variety of learning styles (Olaniran 158). Not everyone is comfortable with digital or face-to-face communicative situations, so a combination of both will allow more opportunities for student engagement. Also, exercises designed specifically for natural settings

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will arm teachers with alternative options in the event of unforeseen technical glitches and avoid classroom paralysis. The key here is to be sensitive and flexible with the task, student performance, and logistics to ensure productivity and success.

Since these pedagogical implications are derived from a context-based descriptive study, it is necessary to extend these suggestions to practices that teachers know will work best in their own classroom contexts. Nevertheless, these principles primarily require composition teachers to embrace the role of a facilitator in a computer-mediated classroom (Olaniran 157; Palloff and Pratt, *Building Online* 22) and structure challenging conversations among a community of learners (Hiltz; Littleton 255). Teachers should work on becoming partners with students in an online learning community because it is the students themselves "who are experts when it comes to their own learning" (Palloff and Pratt, *Building Online* 23). The moment knowledge is freely constructed by both the teacher and the student/s, the capacity of online practices in the writing classroom is truly maximized.

On the whole, computer technology offers new and unique possibilities for collaboration not available in other contexts and illuminates our human capabilities as collaborative learners (Light and Littleton 8). However, this notion is accompanied with challenges for teaching and learning (Littleton 255), so it is incumbent upon the teachers to make informed decisions (Rickly 41). After all, it is not technologies themselves that create these unique learning environments but how these online tools are implemented (Cooney 285; Simonson 29).

Recommendations for Further Research

In his discussion of research methods in composition, Beach notes the importance for researchers to adopt a self-reflexive mode and question the underlying assumptions guiding the research that easily govern their understanding of writing (239). Because several areas

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concerning the powers, skills, conditions, and pedagogies that need attention in composition classrooms have not been met by the present study, more qualitative research such as longitudinal ethnographic or case studies should be explored to attain in-depth understanding of a writing phenomenon. There is also great demand for formal descriptive studies that move observations into coding and quantifying (Lauer and Asher 19) to gain a more holistic view of the various effects of computer-mediated and digital technologies on the writing processes and products of our students. On the other hand, Patricia Rose Webb insists that more studies with mixed-mode approaches, in which quantitative data are used to triangulate qualitative data (471), will open up new areas for research and expand the kinds of answers and results we can achieve (473). This influx of both parametric and non-parametric studies in varying contexts will also attempt to remediate the limited scope of this study and its application towards larger populations for further generalization.

To articulate the possibilities of computer networks in the composition classroom, more investigations on collaborative electronic environments must be considered (Trupe 134). Heide McKee and Danielle Nicole DeVoss argue that the contexts for writing research has evolved with the expansion of digital writing spaces (5), yet “many questions [still need] to be asked about researching in and with digital technologies” (24). It is therefore imperative that our research approaches, methodologies, and ethical understandings should address these changes in communication technologies (McKee and DeVoss 11). In line with this, the following research projects are recommended for further investigation to develop this pilot study to a larger scale:

1. One limitation of this study is the use of Blackboard despite the availability of various Web 2.0 tools and other software applications that are more prevalent in the lives of our students. Exploring the functionality of Web 2.0 tools such as Wikis or other collaborative writing tools

(Paulus 1341) in the composition classroom would provide new perspectives on the way digital technologies have changed the processes, products, and contexts of writing and the teaching of writing. The use of newer electronic technologies in the classroom justifies the need for more research and training in teaching writing with computers.

2. Another possibility is to look closer at what learners actually do when collaborating in CMC environments by examining *only* their interactions in cyberspace. In other words, the focus of such investigation should be on the "how" of composing (the process) than the "what" of composing (the product) (Barritt and Kroll 50-51). This kind of inquiry may adapt the method of discourse or conversation analysis of comment types and/or conflict to determine how students negotiate and make connections among their ideas and those of their peers online. Because these factors were deliberately excluded in the present study, the influence of age, gender, and personality types and/or learning styles with respect to preference for different types of online communication modes – synchronous or asynchronous – may also be considered to enrich the analysis of student communicative practices.

3. On the other hand, the examination of both online dialogic artifacts and written products as evidence of knowledge construction (Paulus 3124) remains valuable in the field of computers and writing, composition studies, and cognitive-developmental psychology. The purpose of the present study is admittedly aligned within the parameters of this inquiry, but a few limitations may have affected its results. Since the student-participants were made aware of the research objectives prior to their online activities, some online posts might have been influenced by this information. Thus, subject recruitment for the next project involving a larger population across semesters should be done preferably *after* the collaborative online activities to control the variables and avoid contamination in the process. As regards methodology, there should be a

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more holistic approach towards the detection of ideas from online transcripts to the written product in order to illuminate the phenomenon under study. Hence, an idea traceable online should be attributed to the participant who used it in print regardless of whether it came from the dialogue of the participant him/herself or somebody else.

And finally, the use of computer-mediated tools in the teaching of writing is here to stay, so our research and pedagogy should continue to accommodate these online practices. Some of these tools may have limited capacities in certain contexts that temporarily affect student involvement and cognition, but the rapid advancement of computer technology permits more experimentation in the composition classroom that would suppress these limitations. As we aim to find the best online practice that suits the performance and comfort levels of our students, the traditional sense of maintaining a learner-centered environment through critical and reflective interactions for the creation of new knowledge must still be valued.

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Developing Multimodal Literacy: The Role of Collaboration and Constraints in the Design of New Media Assignments

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Introduction

As composing text becomes increasingly intertwined with an array of new modes, media, and technologies, communicators are presented with ever-expanding opportunities for informing audiences. Writers must negotiate complex decisions not only about the content and structure of their intended messages but also about the rhetorical and communicative affordances provided by different media and technologies. This article examines how students in a seminar on multimedia theory and production navigated these composing challenges as they created audio documentaries utilizing multiple media. Specifically, I discuss this assignment and resulting student projects in terms of the critical framing and scaffolding needed to prepare students for this work, as well as the ways in which assignment constraints can encourage critical deliberation over authorial intention, audience, media, and other rhetorical considerations essential to the composition of substantive new media texts. In addition to demonstrating the communicative and educational possibilities of multimodal literacies, discussion of this course project illustrates the role of collaboration in the production of multimedia and the potential value this holds for students both academically and professionally. Although this article uses the experience of graduate students as the focus of the assignment sequence, this discussion is applicable to the ways in which the multiple literacies of students at all levels can be developed.

Background and Key Concepts

Literacy is Changing: Multiliteracies and Multimodality

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It has become almost commonplace to hear calls for the inclusion of multiple media into coursework in composition, rhetoric, and professional communication (Kress & Van Leeuwen, 2001; New London Group, 2001; Selber, 2004; Wysocki, Johnson-Eilola, Selfe & Sirc, 2004; Yancey, 2004). Much recent scholarship in writing and professional communication studies has focused on the ways changing technologies are influencing the kinds of texts available for consumption and the kinds of practices needed to analyze and produce them. In her Chair's presentation to the 2004 Conference on College Composition and Communication, Kathleen Yancey contended that "Literacy today is in the midst of a tectonic change" and writing is no longer just about "words on paper" (2004, p. 298). In addressing her audience of 1,500 college writing educators and scholars, Yancey challenged listeners to broaden their views of what constitutes writing and to explore how they might better attend to its increasingly multimodal dimensions. She argued that while traditional word-based writing is not likely to disappear anytime soon, students already "compose words and images and create audio files on Web logs (blogs), in word processors, with video editors and Web editors and in e-mail and on presentation software and in instant messaging and on listservs" (p. 298).

Not only can we take advantage of students' interest and everyday practice in utilizing these various means, but we also must recognize that this wider range of communication media is increasingly the norm and expectation for students, faculty, and employers. As Selfe (2004) argues, "if we continue to define literacy in ways that ignore or exclude new media texts, we not only abdicate a professional responsibility… but we also run the risk of our curriculum holding declining relevance for students" (p. 55). It is no longer sufficient to think exclusively of written language as a means for composing rhetorically effective communications. The rise of new media has brought with it new means for expression, persuasion, and interaction with others. It

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has also brought new expectations for learners and those responsible for educating them. Despite the fact that many of our students are now coming to our classes with considerable technical expertise, their work is often missing the major component we, as instructors, *can* bring to the table: instructional support of purposeful composing practices that utilize conscious selection among available meaning-making resources in ways appropriate to the intended audience and desired reception.

Beyond simply accounting for shifts in popular communication methods, embracing a broader vision of what it means to write or be literate holds great educational promise for students. Digital texts that incorporate words, images, sound, movement, and other modalities offer expanded possibilities for achieving an intended communicative outcome. Writers have an opportunity to choose the mode or medium that will best express a particular message for a given audience, purpose, and context (Dorr, 1994; Lemke, 1998; Cope & Kalantzis, 2000; Kress, 2003). Further, different modes and media afford different advantages both for writers in conveying their messages and for readers in choosing which means best support their ability to understand a text. There are many instances in which an image or sound may better convey an idea or support an argument than can written words. The prevalence of new communication media adds to the negotiations and range of possibilities students face as they consider not only what to say, but how and through which means to say it. Students can and should learn to negotiate critically which mode or medium might best inform or persuade targeted readers in a given situation. Being able to do so not only gives students more intentional control over the messages they produce but also better equips them for an increasingly digital and multimodal world where such literacy practices are expected and valued.

Technological Collaboration and Its Value for Learning

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As new media technologies continue to evolve in both sophistication and range of capabilities offered, the necessity for students to collaborate on the development and composition of projects continues to grow as well. Collaboration has long been a central component in the teaching and scholarship of writing (Ede and Lunsford, 1984, 1990; Porter, 1992; Johnson, 1997), so cooperative composing of new media texts builds on an established history of theory and classroom practice. However, at the same time as collaboration in new media is similar to collaboration in print-based texts, it also entails additional activities and possibilities. As the examples that follow demonstrate, even small-scale projects require extensive, prolonged cooperation among team members. Not only is experience using communicative technologies with others an increasing expectation in both academia and the workplace (Anderson, 2007), such collaboration also offers important pedagogical and educational value. Significantly, this includes sustained interaction with others and the negotiation of multiple, sometime conflicting ideas in the composition of texts. Composing multimedia texts with others necessitates utilizing team members' differing technological expertise, exploring the multisensory ways different media function for an intended audience and purpose, and analyzing critically how ideas are presented and supported through multiple, often non-textual means.

On a concrete level, emphasis on collaboration in writing studies often focuses on helping students to work productively with others of differing backgrounds to create texts. Through classroom activities such as group discussion and peer critiques, students are encouraged to consider the views of others, as well as how they might best construct their texts to account for these varying positions while still achieving their desired rhetorical goals. Through sustained interaction with their own texts and the reactions of others, students come to see that

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conceptualizations of audience change for each rhetorical situation and must be negotiated anew for each text. These practices and benefits are further enacted in the collaborative composition of new media texts where students not only have to address the concerns of readers and the differing views and approaches of others within their teams but also the communicative function of various modalities.

Putting Multimedia Composition into Practice

The Importance of Critical Framing in New Media Assignments

While scholarly calls for incorporating new media into our curricula offer great promise for teaching media-rich, rhetorically-oriented writing and communication, the integration of such composition and production work is significantly challenging, even when we have students who come to our classes with considerable writing and/or technological experience. Providing a critical frame is essential in helping students to develop a context for their composing work. Such a background not only introduces the rhetorical, communicative, and theoretical potentials of new media but also helps students to be aware explicitly of why they are being asked to engage in this work.

As part of a graduate seminar in multimedia theory and production, I wanted students to experiment with the communicative possibilities of various media and to work collaboratively with classmates to negotiate their rhetorical approach and intentions. To start building a framework for supporting these goals, I designed the beginning of the course to include theoretical readings on new media and multiliteracies and critical analysis of a variety of new media texts. Our discussions focused on how educational, scholarly, and entertainment texts employed multiple modes and narrative structures to convey their complex messages and in what

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ways these were successful (or not) in engaging their audiences. Academic texts, such as Daniel Anderson's 2003 multimodal *Kairos* article, and educational texts, such as the Smithsonian's media-rich *African Voices* web site, helped to demonstrate how multiple media can be used strategically to assist users in understanding and interacting with different kinds of information. Anderson's use, for example, of both textual and video-based explanations of students' multimedia composing practices, along with samples of their finished products, worked to demonstrate his contention that even low-tech technologies can offer instructors a variety of approaches to teaching a broader range of literacies. It also allowed the voices of his students to be heard and seen firsthand in support of his argument about the educational value of these classroom activities. The *African Voices* web site illustrated how the interplay of words, images, sound, and movement can immerse users in complex subject matter and offer choices in the way they interact with that content. With these readings, analysis, and discussion as background, students developed a context for understanding some of the theoretical implications and practical applications for new media texts and could begin considering how they might realize these possibilities in the composition of their own work.

The Importance of Scaffolding the New Media Composing Assignment

Before beginning project planning and production of their own texts it is essential for students to engage in preparatory activities to help scaffold their learning of new technologies and literacies. For the first composing assignment in this course I began with construction of audio texts so that students could focus on the various media affordances (voice, music, sound effects, ambient noise) and rhetorical effects (content sequencing, transitions, sound levels, etc.) of a single modality. Although many multimedia applications have an initially steep learning

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curve, multi-track audio editing applications such as Soundtrack, Audacity, and Goldwave are relatively easy to manipulate after a brief introduction and a little practice. Such applications, some available for free as shareware, provide authors with tools for editing the content of recordings, for choosing how to integrate and layer voice, music, and sound effects, and for manipulating sound levels and other audio components to convey specific meanings to their target audience.

The first step in scaffolding this assignment was designed to help students be more conscious of how complex and richly layered even the most quiet environments are. I began by having students conduct acoustic soundscape studies in which they recorded and analyzed the auditory dimensions of a particular environment such as a coffee shop, computer lab, or other local venue. They were asked to identify in a written analysis as many sound sources as possible, noting their contribution to the overall soundscape. In listening to these recordings and discussing their analyses, students noted that this exercise made them more attentive to the diversity of sounds in everyday life and the multitude of ways in which they signal information or understanding about what happens around them.

The second scaffolding activity involved acquainting students with audio editing technology and helping them to get comfortable with some of its basic functions. Students were introduced to the audio editing application Soundtrack, and were asked to create a short, non-linguistic story using only sound effects. They could select from any of the hundreds of sounds that come with the program, but they had to choose and arrange them so that they conveyed a narrative of some sort. This activity not only helped students to learn the basics of the software but also encouraged them to consider what kinds of information audiences need in order to make sense out of lots of little pieces of a larger story.

The final scaffolding activity asked students to listen to and analyze several audio narratives from programs such as *This American Life* and web sites such as *Story Corps* and *Radio Diaries.* Such activities are useful because they provide models of differing approaches to the integration of audio media and the role they play in achieving different audience reactions (anticipation, empathy, happiness, trepidation, etc.) to the material. In class we discussed the stories that were told and the ways in which different audio components, such as transitional music, background sound, and volume levels were used to support elements of the narrative, to build suspense or to offer additional meaning not conveyed in the dialogue of the story itself.

The Importance of Assignment Constraints in New Media Composing

Although the scaffolding activities provided a foundation for selecting and crafting various audio media for rhetorical purposes, setting constraints for student projects was also critical. Constraints require students to negotiate audience, approach, tone, and other rhetorical considerations and to make conscious, critical choices about what works best in a given situation. For the audio documentary assignment I designed four major constraints to which successful projects had to adhere. First, students had to work in teams of two or more to create collaborative audio texts. This required individuals to contribute their own ideas, to build on the expertise of others, and to work productively as a team to compose a text which suited the needs and interests of the group as a whole. Second, student teams had to capture a narrative recounting of an event or to investigate a question, activity, or community of people. This constraint provided a rhetorical purpose and narrowed the approach while still leaving flexibility in subject matter selection. Third, students had to consider carefully all the available auditory options that had potential for expressing meaning and intention. This included options such as contextual

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voiceover material, conversation between multiple participants, relevant natural sounds, background or transitional music and sound effects. This constraint was intended to push students to explore alternative ways of conveying meaning and utilizing the ability of rhetoric to function through different sensory capacities. Fourth, I purposely limited the time of the finished documentaries to four minutes to encourage students to negotiate content, structure, and media choices within their teams. This process was vital in compelling students to be selective about their material and to be creative in how they conveyed their narratives in the time allotted. It also discouraged the inclusion of gratuitous sounds that increased media use but did not serve a rhetorical purpose.

A final requirement of the assignment was that individual students had to write a detailed reflection and justification of their project's production and authorship choices, as well as discuss their role within the collaborative team. Such reflections are critical in helping students to assess their own work, as well as being able to articulate explicitly what they learned through experience. Students were asked to use this piece of writing as an opportunity to consider what they set out to do and how they addressed the most significant challenges they faced along the way. Even in final projects that were less successful in accomplishing what authors had envisioned, the written reflections made it evident that students learned far more about the potentials of multimedia communication and collaboration from attempting to put theory into practice than they could have through reading, discussion, and analysis of others' digital texts alone.

Student Reactions and How Constraints Shaped Their New Media Composing

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With critical framing, scaffolding, and assignment constraints in place, I moved to the next phase of the assignment in which students formed teams and began work on their audio documentary projects. The examples and discussion below are illustrations of the ways in which student learning about new media communication occurred through hands-on production activities. Despite their differing subject matter (everything from a reconceptualization of a Belizian folktale to living a hedonistic lifestyle to one young girl's love of football) what all of the student composing experiences had in common was intensive collaborative development and negotiation among group members about point of view and sequencing of events, the ways in which audio elements, such as volume levels, could best be manipulated to convey an intended meaning, and why particular audio choices, such as use of sound effects instead of ambient noise, were more rhetorically suited than others at a given point in the story. Even with extensive previous experience composing rhetorically effective print-based texts, students completing this multimedia project were intellectually challenged because the assignment required them to engage in a far less familiar communicative context. Such an assignment requires students to attend critically and purposefully to selection of rhetorical elements and to assessment of the different ways in which they function as meaning making resources for an intended purpose and a targeted audience. In the following sections I use examples from student projects to illustrate the role that assignment constraints played in shaping development of multimedia composing practices.

Collaboration

For each of the student teams collaboration was a challenging but beneficial component. It allowed members to draw on the differing cultural, experiential, and technological backgrounds of individuals and it provided an avenue for deciding upon and critiquing the

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rhetorical impact of particular media and narrative choices from differing perspectives. An example of the value of collaboration can be seen in one student group's reinterpretation of a folktale from Belize. One group member had grown up hearing multiple versions of the legend of Xtabai, a cautionary, moralistic tale about the dangers of insincere love. One of the most difficult aspects of this group's project was deciding how to integrate the many versions of the Xtabai legend into a single, cohesive narrative. Adding to this obstacle was the need to stay within the four minute time constraint outlined in the assignment. Collaboration was key as group members proposed, tried out, evaluated, and reworked various possibilities. As one group member reported in his reflection,

> Lisa, Rachel, and I … worked well together, [but] this didn't mean we were always of one mind about what to do or how to approach the project… It also became evident that we are three different people with some significant differences, but this made for a stronger project than what each could have produced working alone… I think the collaborative nature of this assignment underscored the process for using sound effectively. (Chris)

Collaboration was also a valuable pedagogical approach with regard to learning new literacies and technologies. Many of the students in this course reported serious apprehensions both about learning new software and about making use of the technological capabilities in a purposeful way for the assignments. Working in teams allowed students to rely on the varying technical strengths and learning styles of each other and to provide support as they experienced frustrations and potentials through their experimentation. As one student reported, "Polina and I worked well together and having someone else to share anxiety with always lessens it"

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(Jennifer). Others reported that the differing backgrounds of group members allowed them to learn from each other as they developed skills in new areas: "Some of us had more technical expertise and others more writing expertise, so it proved to be a good combination of skills… We all made sure we didn't get too comfortable just doing one thing over another, but rather doing a mix of things so we each got adequate experience" (Rachel). Although many teams reported some of the usual challenges to group work (time constraints, interpersonal disagreements, etc.), they also saw value in having multiple perspectives, experiences, and technical proficiencies from which to draw when working with new media.

Media and Rhetorical Choices

Selection and compromise over media choice to achieve a desired rhetorical outcome was perhaps the most difficult but useful aspect of this assignment. Each of these development decisions about the use of available meaning-making resources demonstrates the critical thought about rhetorical intentions that groups had to negotiate in order to create a purposeful and media-rich project that balanced both their authorial intentions and the expectations of their audiences. Critical discussion about the selection and integration of various media not only improves the quality of texts produced but also provides students with valuable opportunities to learn how to work productively with others of differing perspectives.

In exploring possibilities for utilizing multiple audio options, students had to analyze the appropriateness of individual sounds for given purposes and whether or not these worked to convey both literal meaning and the tone of the story they were trying to achieve. They had to experiment with the communicative function of various audio components including meaning conveyed through both linguistic and non-linguistic content and the manipulation of auditory dimensions such as intonation, volume level, and transitions. Lastly, students had to balance their

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communicative objectives with the reactions and expectations of their listeners. One example of how these composing choices played out comes from a member of a project focused on living a sadomasochistic lifestyle:

> Of particular note is our choice to leave the laughter on the track instead of editing it out. While some of the other students [during peer feedback] commented on it being too lighthearted for the subject matter, they were unaware that frivolity was, in part, our aim and intentional, an expressed desire of the interviewee. The aim was not to present the subject's alternative lifestyle as dark and disturbed, but rather as another choice available to people. (Kaleb)

Here, student composers were clearly aware of how most audiences were likely to respond to content about sadomasochism, but chose consciously to work against these responses to provoke a particular reaction through the use of audio choices that seemed out of place.

Although differing in subject matter, the members of the Xtabai group were particularly interested in experimenting with of issues of media choice and rhetorical intention. Their decisions about background music were especially important in how the group framed and conveyed their story. In the beginning, they chose to set it up as a recounting of a fairy tale, calling children to story time delivered by "Mister Roger's evil twin". The music is upbeat and sing-songy. As the true nature of the story begins to unfold, however, the background music transitions to a foreboding bass maintained as a sound bed for the rest of the narrative. With these auditory decisions the authors were deliberately choosing to impact the way listeners understood the story, balancing this carefully with their authorial intentions.

Time Constraints

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In addition to collaboration and media selection, working within the time constraints for this assignment proved to be a constructive consideration in shaping students' composing and production activities. Having to fit their multimedia documentaries into four minutes not only encouraged students to create a meaningful text that kept audiences engaged from start to finish but also compelled groups to make hard choices about what content to keep and what to cut. Most teams recorded far more content than they could use, so debate over which ideas and information were needed to convey a coherent narrative was essential. As one member of the Xtabai group contended,

> The first and probably most difficult to contend with was, by far, the time constraints. After recording the original narrative, we found that we had almost eight minutes of narrative alone… In our desire to remain within the time allotted, we had no choice but to dispense with some elements in the narrative we particularly liked—understanding all too well the importance of creative decision making. We had to select those sections that transitioned well, and that preserved the enchanting aura of the story. Having listened time and again to the original cut, we decided upon the 'gist' of the legend and inserted those aspects that heightened curiosity and interest. Even though we were disappointed in not being able to use all we had recorded, it was evident how important the 'ideal' selections had to be, considering the audience's involvement in a story such as this one. (Lisa)

Similar to the reflections of many other students, this student's comments illustrate the value of time constraints in new media assignments in encouraging careful and deliberate choices about the rhetorical value of particular communicative elements.

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Changes for the Future

Of course, like any first time assignment, not every outcome of this project was ideal. Two aspects will be especially important in revising future iterations of this project. First, students could have benefited from additional direct instruction in and practice with the technical capabilities of the audio software. All groups reported their initial frustration in activities such as aligning and transitioning between various audio clips used to build their documentaries. While experimentation through trial and error is an important part of learning to use any new software application (and is a skill students must utilize to keep up with the constant evolution of applications), further demonstrations and supporting documentation would have reduced the technical impediments and increased time spent on the activities of composing and meaning making.

Second, it would have been constructive for students to have been required to be more specific in the issues analyzed in their final written reflections. While many students considered critically their negotiation over the meaning making resources they selected or the way the final project exhibited (or didn't) their authorial intentions, it would have been valuable to push students' thinking about these issues further and for them to have more explicitly connected this to the theoretical readings we had done on multimodality and multiliteracies. Additionally, in future assignments I would ask students to articulate in more depth how collaborative negotiations actually took place and what value and challenges this had for their composing process. I would ask students to compare their experience with collaboration on print texts with their experience with collaboration on this new media assignment and to discuss how and why each differed.

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Lastly, while many students came into the course with anxieties about using technology and reported getting more comfortable with them through various activities and assignments, it would be useful to have them articulate the specific concerns they had and the specific educational scaffolding that supported these learning experiences in productive ways. I would use these insights to learn more about where gaps in scaffolding occurred and how these might best be supplemented in the future.

Conclusion

The critical framing, scaffolding, and assignment constraints I designed for this project provided students with a structured framework for supporting the development of new media composing practices. As instructors, it is important not only to provide a theoretical context for understanding the communicative potentials of new media, but also ample opportunities for students to experiment, collaborate, and revise their approaches to implementing multimedia in rhetorically purposeful ways.

Using multiple media to compose not only offers an occasion to convey the same idea through several means, it also allows writers to experiment with the ways in which their ideas are received by their intended audiences. Further, because multimedia composition requires an integration of content, technology, and media as meaning-making resources, collaboration is a necessary and valuable part of the process. Working together not only helps writers to negotiate their rhetorical intentions for the intended audience but also helps them to develop strategies and practices for working productively with others of diverse backgrounds and viewpoints. In each of the audio projects created in this course it was evident that working to integrate multiple media into their texts helped students to develop new literacies and provided them with rhetorical tools

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for building compelling and creative communications. The ability to utilize all available communicative resources and to collaborate with others on the production of texts is vital to students as they make their way through academia and transition into professional settings.

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An Analysis of Online Discourse and Its Application to Literacy Learning

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Introduction

Teaching entry-level composition and literature courses at the college level in a variety of settings (university, private college, and community college) over the past nine years has placed me in the intersection of k-12 and higher education literacy learning. During this time frame, online communities such as MySpace and Facebook have grown in popularity among middle school, high school and college students. This same age group also spends a good portion of time communicating with each other through text messaging. As a recent Stanford Study suggests, these students are spending a lot of time writing outside of the classroom. And they are engaged in their outside of class writing (Keller, 2009).

Yancey (2009) in studying this phenomenon suggested that educators might better reach the needs of 21st Century learners by introducing online writing and discussion boards into the classroom. Thinking along these same lines and wanting to engage the multiple learning styles and needs of students (Gardner, 2007), I have incorporated WebCT discussion into my college composition and literature courses. However, few studies have been done to investigate how students communicate and interact with each other in online discourse and how this discourse can be used by instructors as a means to understand students' literacy learning. Because constructivist literacy theorists show literacy learning to be transactional and relational (Weaver, 1994; Moffet, 1983; Cambourne, 1995; Rosenblatt, 1976) and online discourse is also transactional and relational, I want to study my students' interactions with each other on an online discussion board throughout the course of one semester to analyze how they processed literacy learning.

Writing theorists and instructors who study and implement this holistic language-centered approach of instruction are often described as sociopsycholinguists because their approach "emphasizes the *construction* of meaning, drawing upon the inidvidual's unique constellation of prior knowledge, experience, background and social contexts" (Weaver, 1994, p. 57). Viewing writing from this perspective changes the way we view students and writing. Rather than being empty vessels into which we pour our knowledge of writing, students became active participants engaged in the construction of meaning. In writing, students draw on their own knowledge of self, their interactions with others in the communities, and their prior experiences with language as they construct and compose. In this learning context, the instructor becomes a facilitator and guide offering support and guidance (Calkins, 1983; Graves, 1985; Goodman, 1986; Smith, 1986; Weaver, 1994). While Whole Language has often been credited with this philosophical instruction often referred to as constructivism, in the early twentieth century Dewey (1902) also noted that the social experiences of an individual student should be our starting point in considering how we plan and implement curriculum and that our first priority should be to provide a meaningful environment for authentic learning to occur.

The writing classroom lends itself to this type of meaningful and authentic environment because the acts of reading and writing are both transactional and relational (Weaver, 1994; Moffet, 1983; Cambourne, 1995; Rosenblatt, 1976). When we create and interact with a text, we draw on our prior experiences and understanding of language, self, and others. And in these interactions, a schema of discourse occurs. In simple terms, schemas are organized constructs made of prior knowledge, experiences, and feelings (Anderson, Spriro, & Anderson, 1977; Adams & Collins, 1979; Rumelhart, 1980; Iran-nejad, 1980; and Iran-Nejad & Ortony, 1984; Weaver, 1994). Thus, in communicating with others or in interacting with a text, we activate our

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schemas to make meaning and sense of the interactions. In turn, new meaning results from the interactions, and our schema is transformed by our social interactions.

In a first-year writing classroom, this might occur in the following manner. Students arrive in the writing classroom with various schemas about writing. When I ask them about their previous writing experiences, a common schema that students often present during the first week of classes is that writing is a linear process initiated by a writing assignment. Most typically, the looming writing assignment they visualize is the research paper. They fear the length, the grammar, the punctuation, and the grade. They bring scars of previous high school writing assignments and remember pages of their writing covered in red. Most students describe these experiences as leaving them with the impression that they cannot write.

Since I believe that writing is much more than what this schema represents, as a constructivist writing instructor, I would facilitate transactions and interactions within the classroom between the students, their writing, other texts, and myself to transform their schemas so that they might grow to see writing as recursive rather than linear. I would encourage them to see writing as a tool of inquiry and communication rather than as a final product or a grade. Additionally, I would facilitate learning that pushed them to find relevance and purpose in their writing.

But to create the types of interactions and transactions that might transform their schemas about writing, I would need to also realize that schemas are formed by and governed by self. Thus, instructors need to understand how students are processing self and engaging the self in interactions with others in the course and with the course learning. This requires an acknowledgment that “meaning arises during transaction . . . in a given situational context, an

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event during which meaning evolves." And, "the activation of schemas is influenced by our interpretation of the social context" (Weaver, 1994, p. 27).

As I began implementing and utilizing an online discussion board in my writing classroom, it occurred to me that it was recording students' processing of the self and the self's interactions with others. Thus, the discussion board became a rich recording of my students' interactions, transactions, and transformations of schema. To better understand how my students' self-systems and schemas were formed, I analyzed the transcribed recordings of their discourse on the online discussion board.

Thus, my discourse analysis was guided by the following questions:

- What themes and metaphors could be found in my students' online interactions?
- What did the themes and metaphors reveal about their perceptions of literacy and their processing of the course content?

Answers to these questions may help educators find ways to use the online discussion board as a tool for monitoring how their students are responding to and processing course material, especially in regards to literacy learning.

Methods

The online discourse that I analyzed is existing data from a College Writing and Research course that took place during spring 2009. I chose a student discussion question that was posted midway through the semester (Week 6). It was of particular interest to me because it received more responses than other posted questions during that week (26 responses from the 27 students enrolled in the course).

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This online component of the course invited students to further discussion of topics from the classroom on a WebCT discussion board. As part of this discussion, each student was asked to volunteer to be class discussion leader for at least one course period. Students chose the day they wanted to lead and facilitate class discussion. In leading the discussion, they were asked to summarize the discussion from class, react to the discussion, and then further discussion by asking a question of their classmates. Classmates were then asked to respond to one question a week and to also respond to one classmate. Thus, they were responsible for two discussion postings each week and could freely choose which of the discussions they wanted to participate in online. The discussion leader was not required to respond to his or her own question, but was asked to respond to a classmate. Students were not required to meet length or content requirements in their responses.

The course met for 50 minutes three days a week. When students were absent or on days that students did not volunteer to be online discussion leader, I served as online discussion leader. Students were also aware that I was reading postings and intermittently participating in online discussions. To avoid dominating or intruding in discussion, I kept my own postings to a minimum but would reference the discussions during classroom sharing. I would also use their interactions to inform my course curriculum decisions. Sometimes I made alterations and adjustments in our schedule and in my lesson plans based on their discussions. The existing WebCT data of the course offers a recorded text of our online transactions in discourse. Thus, through the course of the semester, we authored our own text as we transacted with the course readings and each other. As Rosenblatt (1976, 2004) might say, our transactions resulted in its own text.

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Since Rosenblatt (1976, 2004) developed the Transactional Theory of Reading and Writing in her book *Literature as Transaction*, it was appropriate that I used her literature criticism theories in an English course while I explored how students transact with each other, course readings, and online discourse to find meaning. In my analysis, the word "text," was defined as Rosenblatt defined it: "a set of signs capable of being interpreted as verbal symbols. Far from already possessing a meaning that can be imposed on all readers, the text actually remains simply marks on paper, an object in the environment, until some reader transacts with it" (p. 136). Additionally, when I used the term "reader," like Rosenblatt I was implying that a transaction with a text had occurred. And in that transaction a meaning resulted.

To investigate how social transactions influenced learning and perceptions of learning in the online discourse, I used and applied the discourse analysis theories and principles of James Gee (1999) who in finding themes in discourse also called attentions to "I-Statements" and categorized them as "cognitive," "affective," "state and action," "ability and constraint," and "achievement" (p. 124). Looking at "I-Statements" proved especially helpful as I used Marzano's (2001) revised model of Bloom's Taxonomy to observe and categorize the systems students were using to process course content. Marzano's model proposed that students begin processing information with a "self-system," then move to a "metacognitive" system, and "cognitive" system before internalizing information as knowledge (p. 11).

As the "self-system" is the first step in this processing system, it seems imperative for instructors to understand how students define and reflect on self as they engage in learning processes. Looking at the I-Statements in the online texts, allowed me to identify when and how students were engaging "self" in the learning process.

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An English classroom is especially conducive to this type of reflection as self-reflection is inherent to the reading and writing process (Weaver, 1994; Moffet, 1983; Cambourne, 1995; Rosenblatt, 1976; Ballenger, 2000). But, as Crossley (2000) in her explorations of narrative analysis reminded us, reflection of self is also social. How we see ourselves also "relies on the feedback and evaluations we receive from others" (p. 12). Crossley (2000) used George Herbert Mead's metaphor of the " 'the looking glass self' " (p. 12) to illustrate our tendency to see ourselves through the eyes of others. To further this metaphor, we might see the online discussion board as "a looking glass self" that provides instructors with a useful tool for not only examining how students' perceive their selves and their learning, but also for how they interact with others and influence each other as they engage in the reflexive behavior of learning.

Like Gee (1999), Crossley also looked for themes, metaphors, and I-statements to analyze how individuals define themselves in relation to others. Operating from the premise that individuals tell narratives to understand themselves and their place in the world, narrative psychology also offered me an avenue for finding themes and metaphors as I sought to understand how my students defined self and "used language as a tool for the construction of reality." Adapting the theories of Crossley, I read my students' postings as narratives "where the experience of self takes on meaning only through linguistic, historical, and social structures" (p. 49). Thus, in analyzing the discourse for themes and metaphors, I also looked for linguistic patterns, historical significance, and social structures. These I found in online classroom behaviors by quantitatively looking at the length of postings and sentence structures and qualitatively exploring meanings of the behaviors.

Results

Themes and Metaphors: Perceptions of Success

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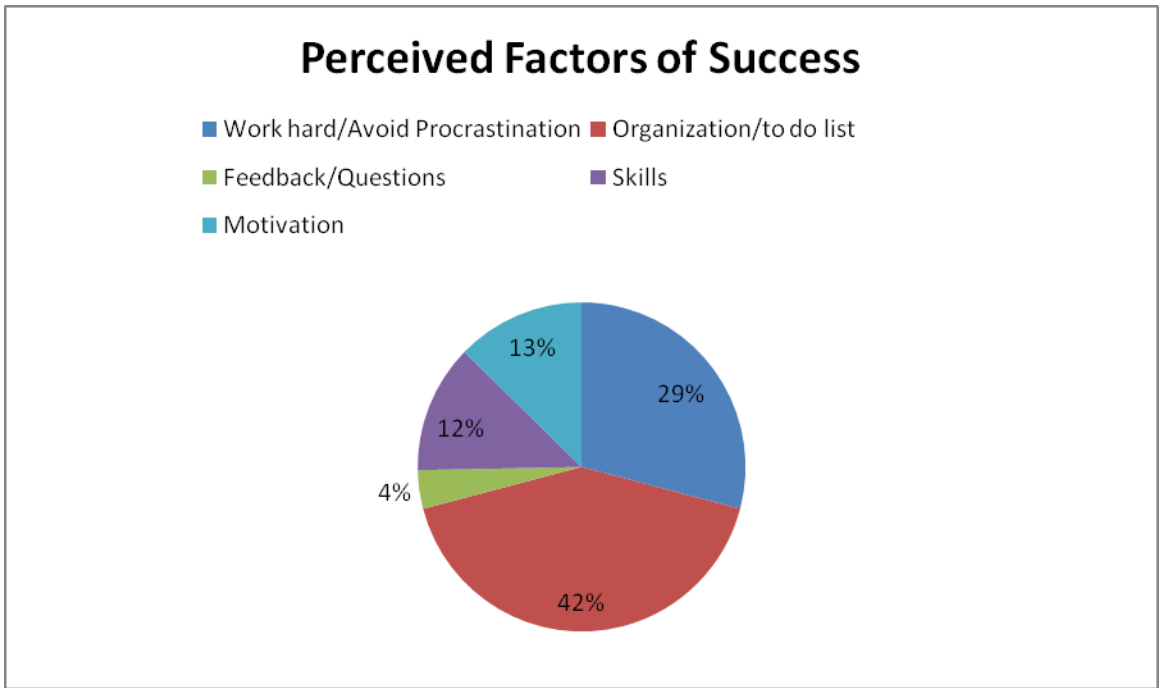
Self-Systems

While reading through the postings to the student posted question "What could you do for the remainder of the semester to improve upon your mission statement and complete your goals you set early in the semester?", I found the following themes repeated throughout the postings (listed in greatest frequency to least frequency): work, try harder, forget, remember, procrastination, literacy skills/resources, review goals, motivation, focus, bring materials to class, ask questions, organization, feedback, stress, attendance. For each theme, I created a category and then placed a tally within the category each time a posting applied to the theme. Some responses fit within multiple themes. And some postings mentioned a theme multiple times. For example, in the following posting "work" is mentioned three times. Thus, three tallies were placed in the work category for this theme. This posting also mentioned the literacy resources of formal and informal workshops. So, two tallies were placed in that category as well.

> I believe that if I concentrate extremely hard and put a lot of **work** into it I can achieve every aspect of my mission statement. I [think] that if I **work** with my classmates, participate in formal and informal workshops as well as **work** on it in my free time I will accomplish all of my goals.

I then examined the categories to see where they overlapped with each other. For example, since hard work often involves avoiding procrastination I merged the two into one category. With this type of thinking, I formed the five following categories: Work hard/procrastination, Feedback/Questions, Motivation, Organization/to do list, and Skills/Resources. The following pie chart shows the categories and frequency of the themes. As shown below, students believed that hard work (29%) and organized work (42%) were the largest factors in successful literacy learning.



I-Statements

As Crossley (2000) and Gee (1999) both found I-statements indicative of how students perceived themselves in relation to others, I listed all of the I-statements within the postings and the frequency of which they were used. I also categorized them using Gee's (1999) categories for I-statements (p. 125).

Cognitive

I think 12

I believe 2

Affective

I need 5

I wanted 1

State and Action

I agree 10

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I tend 3

I haven't 1

I don't 1

Ability and Constraint

I can 5

I could 2

I should 2

I would 3

Achievement

I will accomplish 1

I apply myself 1

Below is graph showing the results. As seen below, most of the I-statements were talking about students' states or actions. Students less frequently stated how they felt and seldom made statements about their achievement or accomplishments.

Behaviors

Length of Responses

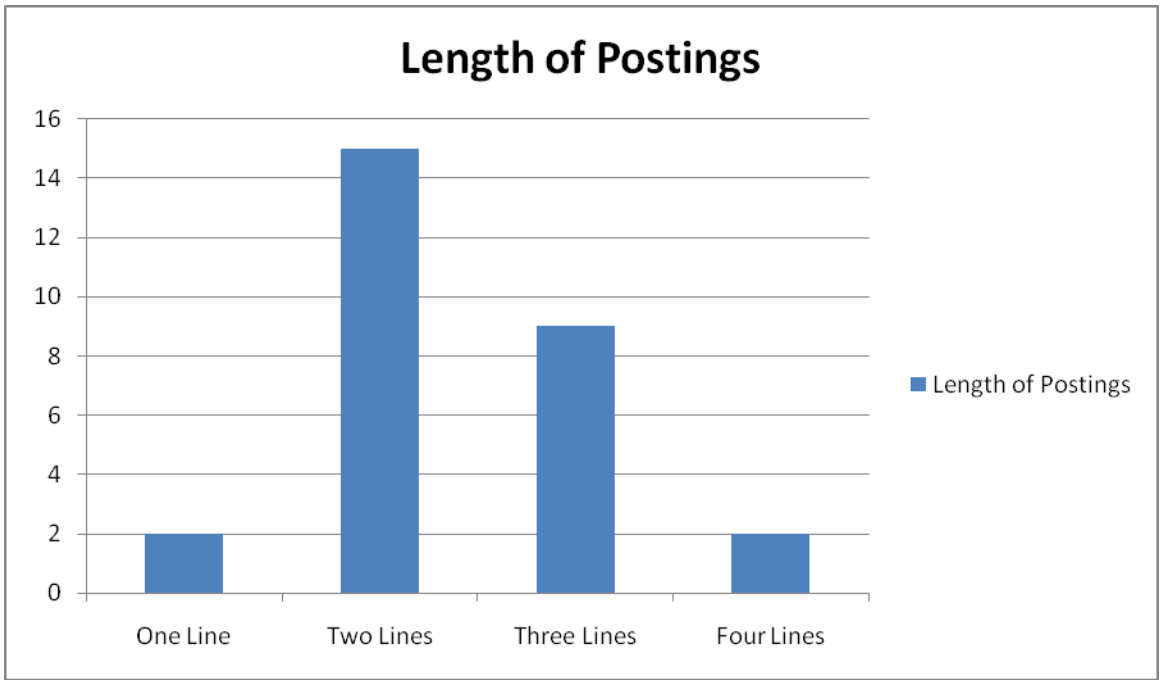
Students posted responses that ranged in length from 1-4 lines of text. In reviewing the posts, I observed the following frequency in length of postings.

One Line 2

Two Lines 15

Three Lines 9

Four Lines 2



Students most frequently responded with two and three lines of text. They less frequently responded with one and four lines of text.

Sentence Structure of Responses

Sentence structures of the postings show a tendency of students to respond in simple subject/verb responses. In examining the sentences, I found twenty-five subject/verb sentence constructions. Of these, all but six were active and began with “I.” The subject/verb sentences

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that were passive always followed an active subject/verb sentence that began with "I." Only one student used sentences that began with introductory, dependent clauses. And within that clause, I found the active subject/verb construction that began with an "I" statement. The independent clause following the dependent clause was a passive subject/verb construction.

In analyzing these findings, it appeared that students most frequently responded with active, subject/verb sentence constructions and then followed those sentences with passive, subject/verb sentence constructions. Thus, they framed any statements about ideas or content with their own actions and beliefs first. This can be seen in the following postings, which might serve as the typical pattern of postings.

> I usually don't go back and read my goals, but just think about things that I would still like to improve on, so it really isn't something that is set in stone, its more a improve as you go type of thing. [Grammar not corrected]

> I think that Brandon is right, it's important to review your goals frequently and also look to see if you should modify them.[grammar not corrected]

In both examples, you see the students beginning with active subject/verb independent clauses that are I-statements—"I usually don't" and "I think." These statements frame the passive subject/verb independent clauses—"It really isn't something" and "it's important." As these postings show what I stated above, students begin with how they see themselves in relation to each other and then state what they believe about the content.

Discussion

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Before discussing the implications of these findings, I first want to provide a context for the online discussion in which this student's question was posted. During the six weeks prior to this discussion, I had engaged the students in reading Stephen Covey's (1994) book *First Things First* as a way to discuss, form and achieve literacy goals and to see how they related to an individual's life mission. Literacy was presented as an intrinsic avenue for them to take an active role in their own learning. Thus, students had spent six weeks introspectively reflecting on their life mission and literacy skills and goals prior to this discussion. Almost midway through the semester, they were beginning to get serious about attaining the goals they had set for themselves. Posts previous to this question revealed a discomfort with the lack of set deadlines but acknowledgement that it was producing more quality writing. They were finding freedom frightening and unsettling but empowering.

In planning the curriculum, I had used a constructivist paradigm that engaged them in peer evaluation and feedback, writing workshops, and small group discussions. Workshops consisted of informal groups where they shared their writing with each other and provided feedback and formal workshop where papers were read in advance by myself and five other student participants and then discussed verbally within the group by myself and those who shared papers. Students could use the workshops at any stage of their writing process. Students were also encouraged to use the campus writing center and library research consultations as they worked on their papers. My intent was for students to find a writing process that worked for their own unique needs and improve in their own established literacy goals by using the resources provided to them in our class and on campus. They were not graded on individual papers but rather on class participation and a self-compiled portfolio that displayed how they improved in their established literacy goals and a reflection that discussed where they were in their literacy

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growth and how they would continue to grow after the course ended. Thus, growth was graded above skill.

Themes and Metaphors: A Looking Glass of Self

In response to the student posted question "What could you do for the remainder of the semester to improve upon your mission statement and complete your goals you set early in the semester?," the students' responses revealed that they shared the belief that organized, hard work would bring them success in achieving their goals. They were using what Gee (1999) called a cultural model to make sense of their learning. A cultural model might most easily be understood as a"storyline or image" that we apply to situations to make meaning and "to set up what count as central, typical cases" (p. 59). To set goals the students relied on their cultural model of success, which closely matched what Straus (1992) and D'Andrade (1984) found to be a common American cultural model of success. Both Struas and D'Andrade found Americans to believe that hard work allows people to meet their goals and that in turn results in success. Gee (1999) explained that "[i]t is not uncommon that cultural models are signaled by metaphors" (p. 69). As an example, Gee (1999) used Straus and Quinn's (1997) findings that people often compared marriage to work at a job or an investment of money. In other words, they were using metaphors of work and money to understand marriage and find success in it. My students were using the American cultural model and metaphor of work to find ways to achieve success in their literacy learning. They had accepted and were utilizing the model work = success.

To further understand this "storyline" they were writing, I applied Crossley's (2000) theory that we share narratives as we search for meaning in our lives. Thus, in reading the online narrative, we see the conflict as "complet[ing] your goals you set early in the semester." As they work to resolve the conflict, the theme and metaphor of organized, hard work embedded in

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American society and the education system becomes a framework. They rely on this process that they have used and found successful in the past.

In fact, we might see them relying on the historical behavioral model of education. At this point in the semester, they are still relying on past learning behaviors that emphasized work and deadlines rather than process oriented, intrinsic learning that values feedback, literacy skills, and intrinsic motivation. They have not yet internalized the constructivist curriculum that is seeking to intrinsically motivate them in a process that values feedback from each other as they use literacy skills. Like most of American society, they still value the end product. This is shown in the rhetoric of the student's question which asks how they will "complete" their goals. Completing a goal implies that once attained it is finished. Unlike the literacy curriculum Covey and I had introduced that presented literacy goals as part of a life-long journey and process, they still saw goals as end products of hard work.

However, the emergence of the themes motivation (13%), skills (12 %), and feedback (4%), shows that their cultural model and metaphor of hard work is beginning to be questioned by my constructivist curriculum. Gee explained that cultural models, while often "emblematic of an idealized, 'normal,' typical' reality," may be "challenged by someone or by a new experience where our cultural models clearly don't fit" (p. 60). Looking closer at the postings where these themes emerged supports this. For example, one student posted a response that first applied the work metaphor but then valued feedback. The student then one minute later posted a response that valued reflection, writing, and process.

First Posting

I believe that if I concentrate extremely hard and put a lot of work into it I can achieve every aspect of my mission statement. I think that if I work with my classmates,

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participate in formal and informal workshops as well as work on it in my free time I will accomplish all of my goals.

Second Posting

I agree with [name removed], I think that if I wrote down my thoughts when I'm deep in them it would help my writing process and eventually improve my writing dramatically. [Grammar not corrected]

In analyzing this students posting, we can see that the student begins by valuing "hard work" and then applies the American work leads to success metaphor. But, the student then integrates "work" with receiving feedback from classmates in the phrase "if I work with my classmates." This shows that the work metaphor is being challenged by the course curriculum's value of receiving feedback from others in the writing process. The student then mentions resources provided from the course that allows for feedback from classmates when he mentions participating in "formal and informal workshops." And while his final statement indicates that he still sees "goals" as an end product "accomplish[ment], his second posting one minute later shows that this notion is also beginning to be challenged, as he mentioned "if I wrote down my thoughts when I'm deep in them it would help my writing process." This statement showed a value for writing down thoughts and reflection as part of a writing process—not as an end product to accomplish. Additionally, his wording "eventually improve my writing" revealed that he wass beginning to see literacy as slow process that improves. This was a shift away from the work=product=success=end theme and metaphor.

A Revised Model of Bloom's Taxonomy

Using Marzano's (2001) revised model of Bloom's Taxonomy as lens for analyzing these postings provided another way to look at how students' were applying self in the constructivist

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literacy curriculum that I framed the class with. Remember, as I mentioned in the purpose section, Marzano's (2001) model of behavior proposed that new information and tasks presented students' self-systems with a decision "to engage" in learning. If their Self-System decides not to engage then they continue in their current behavior. If they decide to engage, their Metacognitive System "sets goals and strategies" (p. 11). These goals and strategies then become processed as either relevant or non-relevant information with any prior knowledge they have about the new information or concept.

In applying this model, it would appear that students decided to engage in the constructivist literacy curriculum as they began to use their Metacognitive System to set goals and strategies. While I had required this as part of the curriculum, their discussion of goals and means of applying strategies for learning shows in an engagement with the curriculum. And if they are only engaging because it is required, this would really only re-echo the behavioral educational metaphor of work they are applying to process the new information. Doing what you are told and doing it well brings success. As they worked (about midway through the semester) to process the curriculum with their "Cognitive System" they utilized their prior knowledge of literacy by employing the behavioral organized, work metaphor that they had used in English courses prior to my course.

Examining their use of "I-Statements" gave another lens to see how they were engaging their Metacognitive and Cognitive systems. In looking back at the "I-Statements" graph in the Methods section, you will recall that most of the "I-Statements" were categorized as State and Action (15), Ability and Constraint (12), and Cognitive (14). This validates my findings in the previous process. The State and Action and Ability and Constraint categories would show an employment of the Metacognitive system that "sets goals and strategies." Statements such as "I

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can" (5) and "I agree" (10) show goal setting and strategizing behaviors of the Metacognitive system. Additionally, the postings validated Gee (1999) and Crossley's (2000) claims that self is linked to perceptions of others. In engaging the Self-System and moving through the Metacognitive System, the most frequent I-statement was "I agree," and this statement most frequently began postings. Thus, in setting goals and strategies for "self," students began by reflecting on their actions in relation with others' action. It appeared that they read their classmate's postings, reflected on their own behaviors, and then agreed that they behaved in a similar manner. Students defined their own actions in relation to others' actions. The total of these combined categories (27) would also indicate that most students at week six were still engaged in the Metacognitive System of the behavior model.

Yet, some students were beginning to engage in the Cognitive System processes as they posted cognitive statements of "I think" (12) and "I believe." Interestingly, those students who were engaging in the Cognitive System also were the students who mentioned constructivist strategies. For example, consider the following postings:

> I think that Brandon is right, it's important to review your goals frequently to see if you should modify them.

> I think that if I would try to motivate myself to do some of my homework when I have a chance to do it, it would keep me from being stressed out and it would help me reach my goals better.

> [. . . .] I think that if I wrote down my thoughts when I'm deep in them that it would help my writing process and eventually improve my writing dramatically.

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The first post began with the cognitive statement “I think” and then proceeded to agree with another student that reviewing of goals is important. But what is most significant is the student’s acknowledgement that goals are not always permanent. They sometimes need to be modified, which showed an acceptance of the revision process of the recursive writing process of a constructivist curriculum. This student in entering the Cognitive System was beginning to internalize the curriculum and also saw his classmate as internalizing the curriculum. I also saw this as moving beyond a behavioral engagement where the student was doing what he saw I wanted him to do. He wasn’t agreeing with me; he was agreeing with a classmate. He was seeing his classmate’s opinion as valuable—which is also part of the constructivist literacy curriculum. Seeking feedback from others helps us in our own growth and learning. This posting showed that this student was beginning to accept and value his classmate’s feedback.

The second posting also began with the cognitive “I think” statement and then showed a value for motivation as the student believed it would alleviate stress and allow her to reach her goals. A value for “motivation” and desire to use it as a means for reaching goals showed a shift away from the behavioral “work” metaphor of learning and a step toward embracing a more intrinsic learning model that sees self motivation as key to success. It also showed a realization that stress (linked with the previous behavioral work model) as a hindrance to reaching goals.

While the third posting has previously been discussed in this paper, it also showed a movement from the cognitive “I think” statement toward an acceptance of the constructivist curriculum being introduced. Shortly after stating “I think” he concluded that working with others and receiving feedback from them is an effective strategy in reaching his set goals.

In conclusion, the discussion board not only offers students a chance to engage their Self-System as they engage in processing new curriculum, it also allows for instructors to monitor

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how students are processing the new curriculum. Analyzing the use of "I-Statements" and examining how they are being used in conjunction with existing learning themes and metaphors provides instructors with a lens for understanding their students' engagement in the learning process. In reading and examining online classroom texts, instructors can find another means for listening to the voices of their students and adjusting curriculum according to their students' needs.

Additionally, the social interactions of the online discussion board revealed a natural tendency for students to seek feedback from others as they learn and process new information. Thus, it would appear that the constructivist literacy theories that engage students in social learning processes more closely match the way students learn outside the classroom than the behaviorist work models that have been employed in k-12 curriculum during the NCLB era.

Online Behavior

Linguistics

The structure of the postings showed a tendency for students to most frequently use the active, independent subject/verb clause. This would reiterate the earlier findings that students were employing the Metacognitive and Cognitive Systems of the model as they processed the new information. Seeing themselves as actors engaged in setting goals and strategies they began sentences with "I." And as they progressed from the Metacognitive System to the Cognitive System, the statements still began with "I" as they thought about the new material and discussed their beliefs about it.

Historical significance

As the students engaged in processing the new constructivist literacy curriculum, they engaged the behavioral "work" model that they had used in past educational setting. This "work"

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model takes on historical significance as it showed my students employing the belief system of the NCLB era which rewards organized, work (test testing) with successful scores that equate intelligence and success. The above analysis of the "Self-System" as it processed the constructivist curriculum and moved through the Metacognitive and Cognitive Systems showed how this metaphor was utilized as prior knowledge to begin to employ the new constructivist model of learning that placed value on feedback, motivation, and process rather than end product results. So while quick and surface readings of the postings caused me to believe students were rejecting the constructivist curriculum I was introducing, further and closer analysis that looked at their postings in relation to Marzano's model of behavior revealed that students were not rejecting the curriculum but rather utilizing their prior knowledge to process and move toward accepting and applying the curriculum.

These findings might prove useful for other educators for identifying the prior paradigms and structures students are employing to process new curriculum. In particular, instructors may find it helpful to understand their students' habits and behaviors within its historical significance as they introduce new and potentially conflicting paradigms of learning in the classroom. The online discussion board may offer instructors a helpful lens for viewing and making sense of learning tensions within the classroom. Additionally, instructors may come to find that the tensions are not counterproductive but rather part of the learning process as students engage and process the new information.

Social Structure

The length of postings and structures of postings all revealed that students respond very similarly on a discussion board. Most of the postings were two or three lines in length. Two line postings were most frequently followed by two line postings and three line postings were

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followed by three line postings. The structures of the postings showed a tendency to first state whether or not you agreed with others on the discussion board before stating any ideas or thoughts about the course concepts. Most agreement statements were stated “I agree” and were the first two words of the postings. This would indicate that the students had a social desire to agree with others and echoes sociolinguistics’ observations that individuals tend to see themselves in relation to others (Gee, 1999; Crossley, 2000).

Literacy Theory Applied

My observations of my students interactions with each other and the text of the online discussion board reiterated the theories of constructivist literacy theorists that literacy learning is transactional (Weaver, 1994; Moffet, 1983; Cambourne, 1995; Rosenblatt, 1976; Ballenger, 2000) . As my students engaged in the curriculum, they transacted with each other and the online discussion text as they processed the curriculum and engaged the Self-System through the Metacaognitive and Cognitive Systems of learning. In analyzing how they engaged with the curriculum, it became apparent that the Self-System relied heavily on transactions with the online text as students sought to identify themselves in their own learning. Learning was social as students looked to others’ postings to form the length, structure, and content of their own postings. In conclusion, the online discussion board and the literacy learning became inextricably bound as they employed the same means of engaging students in literacy learning. Likewise, the discussion board not only provided a “looking mirror of self” (as cited in Crossley, 2000, p. 12) for students, it also provided one for me as an instructor as I was able to analyze and examine my students’ literacy learning.

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Pre-service teacher education enriched by technology-supported learning environments: a learning technology by design approach

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Abstract

Many teacher educators are now concerned about how to scaffold student teachers in the development of the literacy demands of the digital age. The present paper presents a descriptive account of a learning technology by design approach to teacher education, which basically addresses this problem. It draws on a technological pedagogical content knowledge framework to conceptualize what it means learning to teach in the digital age and presents an educational experience, the subject New Technologies Applied to Education, taught in a pre-service teacher education program. The results of this subject approach show that the students' semiotic production is an evidence that when learners are motivated, their capacity to learn is not limited by teachers' capacity to teach. It is suggested pre-service teacher education should prepare future teachers not only to consume, but also to produce and distribute semiotic resources, taking a more active and critical role in their learning process.

Introduction

The widespread use of Information Communication Technologies (ICT) in all areas has a direct effect upon the way in which the world is perceived. The way knowledge is represented, the modes and media chosen, is a crucial aspect of knowledge construction, which makes the form of representation integral to meaning and learning more generally (Jewitt, 2008). As Kress (2003: 9) puts it, "the former constellation of *medium of book* and *mode of writing* is giving way, and in many domains has already given way, to the new constellation of *medium of screen* and *mode of image*". That bears profound consequences to communication and education, forcing

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researchers and educators to rethink social relations and knowledge construction processes under the new conditions of the digital age (Jewitt & Kress, 2003; Jewitt, 2006; Balagué & Zayas, 2007; Cases & Torrescana, 2007; Pérez & Redondo, 2006). Actually, a great problem of children at schools nowadays is that those who teach them live in a world differently experienced to the world which the young take as their normal world (Kress, 2007).

The discussion is of particular relevance for those who prepare people who will soon act as teachers. As Katic points out, "preparing these pre-service teachers to use technology in ways that could transform learning practices is no easy task and one that falls on the shoulders of current teacher educators everywhere, regardless of content area discipline and technological proficiency (Kati, 2008, p.158). Living in a society in which telematic networks rapidly become the most outstanding means of communication, one of the greatest challenges to be overcome by educational systems is enabling teachers and students to achieve competency and mastery on the use of technology instead of letting them be enslaved by it (Moya & Cervera, 2003, p.252).

In this context, what can teacher educators do to scaffold student teachers in the development of the literacy demands of the digital age? The present paper presents a descriptive account of a learning technology by design approach (Mishra & Koehler, 2006) to teacher education, which basically addresses this problem. The paper draws on a technological pedagogical content knowledge framework to conceptualize what it means learning to teach in the digital age. The present paper thus presents an educational experience, the subject New Technologies Applied to Education, taught in a pre-service teacher education program. While the subject is taught in a traditional fully on-campus program, the teacher explores different spaces of (inter)action, apart from the classroom. This teaching experience explored four domains of student's (inter)action: Moodle activities (forum and wikepedia), traditional theoretical seminars,

workshops (laboratory activities to produce an educational web, a blog and a webquest) and the class' blog (http://tintafrescavlog.blogspot.com/), the latter a non evaluative activity. The effects of the use of Moodle in the construction of a student-centered environment of learning is discussed. Deep learning, as opposed to surface learning, helps integrate new data with existing knowledge structures in a meaningful way. It can only occur if the learner is able to identify the personal relevance in a learning object (Biggs, 1979).

With the advent of social software tools, numerous advantages for computer-mediated communication have been made available both for students and teachers. These tools enhance social networking and knowledge sharing on a global scale, providing opportunities to access, use and produce authentic content in real-world contexts. In fact, as Coiro et al (2008) highlight, before internet, no previous technology of literacy had been adopted by so many, in so many different places, in such a short period and with such profound consequences. Ensslin (2007), who reported high levels of student motivation and deep learning in a project involving literature and hypertext, calls our attention to the fact that hypertext, as a pedagogical tool, as well as any technology of communication, has to be organically incorporated in a carefully planned syllabus, which integrates conventional teaching approaches with a constructive use of technology.

Teacher Knowledge and Education

Mishra and Koehler (2006) and Koehler and Mishra (2008) build on Shulman's (1996) work to elaborate the conceptual framework called Technological Pedagogical Content Knowledge. Shulman advanced thinking about teacher knowledge by claiming pedagogy and content had been treated in the literature as two separate bodies of knowledge and advocated for their

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integration. Pedagogical Content Knowledge, Shulman thought, was at the intersection of pedagogy and content and was crucial for good teaching.

Although Shulman did not mention the role of technology in his framework, his defense of a type of teachers' education which took into account both pedagogy and content remains valid nowadays, as long as it is extended to reflect the new conditions of learning and teaching in the digital age. As Mishra and Koehler (2006, p.1023) point out, "what has changed since the 1980s is that technologies have come to the fore front of educational discourse primarily because of the availability of a range of new, primarily digital, technologies and requirements for learning how to apply them to teaching".

For Mishra y Koehler, though not all teachers use technology in their teaching practices, it is now undeniable that technology is an essential part of the educational landscape. According to the authors, it is now not possible to conceptualize teacher education based exclusively on the relatively stable technologies used until a few years ago, like books, chalk and chalkboard. In the past, technology did not change as fast as it does nowadays and teachers and their educators could concentrate on the search of most appropriate pedagogical strategies for specific aspects of the content. In the context of the educational landscape of the XXI century, nevertheless, a new element must be added to that search: technology.

The Technological Pedagogical Content Knowledge framework (Mishra & Koehler, 2006; Koehler & Mishra 2008) offers a theoretical model for the use of technology in education. The authors add technology to Shulman's model and emphasize the connections, interrelations, affordances and constraints between knowledge of content, technology and pedagogy. It is in the interrelations established among those different types of knowledge necessary for good teaching that the Technological Pedagogical Content Knowledge framework makes its most relevant

contribution. Though other authors had pointed out the importance of articulating content, pedagogy and technology, Mishra and Koehler are sensitive to the different types of knowledge established in the interrelation of these three fundamental areas. Figure 1, elaborated by the authors, presents the three areas of teacher knowledge, Content (C), Pedagogy (P), and Technology (T), and the areas created in the interrelation among them: Technological Content Knowledge, Pedagogical Content Knowledge, Technological Pedagogical Knowledge and, finally, the area that organically integrates all areas of teacher knowledge, Technological Pedagogical Content Knowledge.

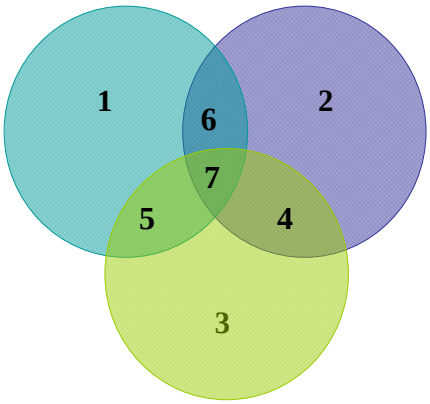

Figure 1: Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge framework. The three circles, Content (1), Pedagogy (2) and Technology (3), overlap to create four other types of teacher knowledge: (4) Technological Pedagogical Knowledge, (5) Technological Content Knowledge, (6) Pedagogical Content Knowledge, (7) Technological Pedagogical Content Knowledge.

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Technological Pedagogical Content Knowledge is thus a nuclear area of knowledge which integrates all types of knowledge considered above. The professional who can organically integrate them is able to see both learning and semiosis in different ways content, pedagogy and technology experts usually do. Similarly, the pedagogical designs he or she is able to elaborate, including pedagogical objectives, content, materials, techniques, etc, will be transformative of reality and will allow their student's learning to be transformative as well. This professional will be able to 1) create and or/use technologies having into account specific pedagogical designs; 2) identify and select most appropriate technologies a specific pedagogical design, taking into account their affordances and constraints as conditioned by the semiotic modes technologies integrate, produce and allow students to produce; 3) use and/or modify in creative ways in the educational context technological tools generally designed for the contexts of business or entertainment; and, last but not least, 4) understand what is it that changes in education when we use new technologies.

Following Rittel and Webber (1973), Koehler and Mishra (2008, p.3) propose to view teaching with technology as a "wicked problem", a view in which teaching is taken as "a highly complicated form of problem-seeking and problem-solving that derives from flexible and integrated bases of knowledge". Preparing teachers is by no means an easy task. The present paper expects that by offering an example in which pre-service students were asked to integrate content, pedagogy and technology and solve problems independently will contribute to the elaboration of pedagogical designs that favour teacher education in agreement with the demands of the digital age.

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Student teachers should develop a holistic understanding of the new contexts for learning and teaching in the digital age. They must then be offered the opportunities to produce multiple and varied types of text which instantiate the type of knowledge they have constructed. Their own learning must be driven by their interests so as to allow them to organically integrate content, pedagogy and technology knowledge. Student teachers must be active, creative and transformative actors in their own process of learning. Teacher educators must constantly assess their own pedagogical designs and exercise problem-solving flexibly integrating different bases of knowledge.

Pedagogical designs for teacher education must offer models in which their students can experience learning and representation. When the students are future teachers all formative actions must be reflexive. That implies, as Russell et al. (2003) point out, that as important as it is teaching student teachers the mechanisms of technology, it is exposing them to examples of uses of technologies with pedagogical objectives in their own educational process. Professional development to incorporate ICTs into teaching and learning is a continuous process and should not be thought of as one 'injection' of training. So as pre-service teachers develop the understanding that using technology meaningfully for their students is an intrinsic part of their future job, they should have the opportunity of experiencing technology in their teacher education program, technology should be introduced to them in context and pre-service teachers should experience innovative technology-supported learning environments in their teacher education program. The UNESCO corroborates that view: "unless teacher educators model effective use of technology in their own classes, it will not be possible to prepare a new generation of teachers who effectively use the new tools for learning." (UNESCO, 2002, p. 34).

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Example of a learning-technology-by-design Approach

This paper aims at presenting a descriptive account of a teaching experience which uses a learning technology by design approach. It focuses on the construction of artifacts and puts emphasis on learning by doing. In this approach, as Misha and Koehler (2006, p.1035) note, "design is learned by becoming a practitioner, albeit for the duration of the course, not merely by learning about practice". This section will offer an account of the context in which the experience was performed (setting and participants) and a general description of the subject organization.

Setting and participants

The present paper presents the experience of a subject, New Technologies Applied to Education, taught in the curriculum of a teacher initial training program developed in the Pedagogy Department at the University X. The program comprises 180 credits (10 classroom hours/credit) distributed in three years. Students who successfully complete the program are allowed to teach students up to 12 years old in the Spanish educational system, but would have to take two more years in an undergraduate course to apply to a PhD program. The *Strategic Teaching Plan* (2006) adopted by the University X aims at, among other things, promoting a student-centered educational model which will help students develop special competencies within a specific academic area, multidisciplinary competencies, practical skills, and ethically and environmentally driven competencies.

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The subject New Technologies Applied to Education focuses on the skills related to the selection, evaluation and production of multimedia pedagogical materials. Such skills should make students able to promote learning as "agentive selection from, engagement with and transformation of the world" (Kress, 2007, p.37). The experience reported here had an enrollment of 210 students, who received theoretical classes in two separate groups and were split into 8 groups for the workshops during 15 weeks. In the following section, we make a general description of the subject and of the domains of (inter)action students had available.

The subject design: New Technologies Applied to Education

The major objective of the subject was raising technology awareness by providing students the opportunity to design, develop and evaluate multimedia materials.

There were four domains of interaction for the subject:

1. Moodle - Moodle is a free open source software (FOSS) which allows the production and development of web-based courses (Rice IV, 2006; 2007). In the case of the subject experience reported here, it had an important role: it was used to maintain links to the bibliography students should read, to make available web links where students could find extra online information, to keep constant communication both between teacher-students and students-students, to manage organizational aspects in general (task delivery, examination calendar, etc), to centralize information (on evaluation performance indicators, for example), to continue discussions initiated in class (forums), to do cooperative work (Wikipedia) and to organize online databases fed by the students (online educational videogames, WebPages and blogs of interest).

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2. Theoretical on-site seminars – Every week, two hours were dedicated to discussion of a text or paper available to students on Moodle. In general, the teacher also made available a power point presentation which guided interactive debate about the challenges of literacy in the digital age, the use of information and communication technology in Spanish schools, pedagogical uses of online environments, games, Voip, etc., pedagogical multimedia evaluation criteria, etc.
3. The workshops in the Faculty's laboratory, where students organized themselves in groups. Each group was supposed to create:
    - An educational webpage with a minimum of 3 html documents all linked to one another– the software used in classroom was Dreamweaver, but students were free to choose any other web page design software they knew of;
    - An education oriented blog – the blog hosting service students received instruction on was www.blogger.com, but, again, they were free to choose any other host service they knew of; and
    - A WebQuest – students could choose between using Dreamweaver to create their WebQuests or using services like PH WebQuest (http://phpwebquest.org/?page_id=14), which was actually found in the Web by one of the students.

Aspects related to the materials' content were dealt with in the theoretical seminars. Students had the freedom to choose which topic they wanted to develop, the only condition being it must be of an educational nature.

4. *Tinta Fresca* – Fresh Paint (http://tintafrescavlog.blogspot.com/) was a non evaluative cooperative space created about a week before classes began. Students were invited to become authors of *Tinta Fresca* and to use it as a space to share and express their feelings and ideas. 23 students volunteered as authors. By the end of the subject, *Tinta Fresca* had had more than 2 thousand visits (http://www.histats.com/es/); 34 posts, 13 of them published by the teacher; and an average of 5.5 comments/post.

All three materials produced by the groups (web page, blog and WebQuest) must have links to one another and also to the subject's web page, EDUCANET (http://pedagogia.fcep.urv.es/educanet/) and to the class' blog, Tinta Fresca. Since the very beginning students knew that their outcomes did not have their teacher as their only audience, but were supposed to be shared in the subject's webpage. They were encouraged to think as teachers and to prepare their materials with one of their possible audiences in mind: students, parents or colleagues. Their workshop outcomes are now available in the Resources section of EDUCANET (http://pedagogia.fcep.urv.es/educanet/recursos/recursos.html/).

In the workshops, students worked in groups. The groups received some instruction from the teacher responsible for the subject on how to perform the activities, but were highly encouraged to research on the Web for information on how to solve specific problems and incorporate multimedia materials into their work. Besides, students were asked to share any new information they found of relevance for their colleagues and to ask each other questions on how to perform specific tasks in the appropriate Moodle spaces: 2 forums were created for that, *How have you done it?* and *Doubts*.

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The workshop of the subject experience reported here generated 75 WebPages, each of them with at least one blog (some groups decided to make blogs individually) and a WebQuest. With varying levels of technical and content quality, it is fair to say that, when compared to the subject demands and to the instruction students formally received in class, students' semiotic production, their Webpages, blogs and WebQuests, in general is an evidence that when learners are motivated, their capacity to learn is not limited by teachers' capacity to teach.

Workshop classes focused on the design mode of Dreamweaver, which does not require programming knowledge. However, once students learned to make simple code manipulations, such as including You Tube videos in their web pages, they soon began to search for all kinds of stretches of code in Internet, and learned how to include music (http://ivoon.com/), power point presentations (http://www.slideshare.net/), counters (http://www.histats.com), calendars (http://www.free-blog-content.com/), vokis (http://www.voki.com) animated titles (http://www.hotlink-bumfiles.com/), etc. Two things are important to highlight: first, manipulations like these were meant to increase their materials' interactivity, to make them more attractive and to help visitors who could not yet read (many of the WebPages aim at very young audiences) to understand content and/or perform activities; second, as the students webpage design was a real exercise and their work was actually uploaded to the subject webpage, a group's advance in the incorporation of a particular multimedia material immediately became public knowledge and was soon incorporated by the other groups too.

Out of the subject 15 weeks, a week theoretical session was dedicated to the discussion of the design and evaluation of multimedia materials and another one to the discussion of what teachers can learn from videogames in general and how to evaluate and choose educational videogames. At this point of the course, most students were busy with their evaluated material

improvements, so they received no instruction at all on how to produce interactive activities with Zona Click (http://clic.xtec.net/es/clic3/index.htm), Hot Potatoes (http://hotpot.uvic.ca/) or Game Maker (http://www.yoyogames.com/make). They did, though, have the links for manuals and further information in the Moodle environment and, during the theoretical sessions, were highly encouraged to research these tools independently. A few of them did indeed investigate autonomously these tools and report that in the Moodle forum (for two examples: http://pedagogia.fcep.urv.es/educanet/recursos/musica/canconsiinstruments/crucigrama.htm,http://pedagogia.fcep.urv.es/educanet/recursos/infantil/menjabemenjasa/webquest/memori.html. One student looked for the teacher so as to present her work with Game Maker. In the game, players drive a train through 12 levels or months. In the Catalan culture there are sayings for each month, like, *en febre, abriga't be* (in January, get a good coat) and part of the difficulty in the student's game is guessing them.

The use of Moodle allowed the teacher and the students to maintain a close relationship. During the 15 weeks the subject lasted, the teacher sent out 116 messages in the different forums open to all students, some of them solving doubts, moderating debates or of real participation in the discussions. These messages do not include individual messages sent out to students who privately asked for information or help, neither the numerous messages students sent to their colleaguesvv in the discussion and doubts forum available in Moodle. Though it is not possible to provide data for comparison – how many emails the teacher would have sent out using a different approach, for example – these numbers can be considered high if the on-campus, face to face nature of the subject is considered. This online interaction is actually expanding the spaces of interaction traditional instruction uses.

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Students were encouraged to think of themselves as teachers and researchers and, in many situations, both in the Moodle forums, in the workshops and in the theoretical classes, students and teachers reversed roles. Students became peer tutors or reciprocal mentors, debating theoretical themes and teaching their colleagues and their teacher how to solve problems or improve the design of their multimedia materials.

A direct result of this type of subject organization is the establishment of new relationships between the teacher, the students and knowledge. At the very moment students and teachers reverse roles, students enter a new type of relationship with knowledge: they understand their teacher's limitations are natural and do not accept them as their own limitations. Students then learn things which were not actually taught in classroom and, most importantly, become teachers themselves, transforming what they have learned in public knowledge. It is possible to move ahead of an instruction of minimums and to empower students to set their learning objectives as high as they will.

Discussion

I would like to highlight here I do not imply the simple presence of technology will allow any change in classroom. I am strongly aware it is the teachers' responsibility to choose a pedagogical design which will either present a world that can be ordered for the student or designed by the student. When technology is good enough, and by that I mean it allows enhanced interactivity, students' agentive design and management of their learning, and access to extensive relevant supporting materials, it is up to teachers to engage with a theory of learning which attends to the meanings of those who have power or a theory of learning which attends to the meanings which result from principled engagement with the world. In other words, technological

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developments alone do not and will not promote student-centered learning, but they will more than ever make evident whether teachers will stick to their central and powerful position in a instructional paradigm or if they will become managers and facilitators who build scaffolding for learning.

When learning takes place in a variety of interactional environments, teachers and students have more opportunities to reverse roles. When that happens, teachers become guides and encourage further investigation, while students become agentive in the selection from and engagement with the transformation of the world. That process opens space for fundamental changes in the social relations established among students, teachers and knowledge. Students can become teachers, what should be considered an essential part of pre-service teachers' instruction. They can teach themselves, their peers and their own teacher. There is no shame for teachers to be taught by their students and that should be clear both for teachers and their students. A teacher is no longer someone who knows more things, but someone who knows different things. He or she must pursue the acquisition of knowledge as a lifelong objective, as well as students.

In a richer variety of learning interactional environments, the pride for autonomous discovery can be fostered, and the passiveness many of us find familiar in students in different learning contexts is challenged by motivation. Motivation arises when the outcomes of students' activities are not only a means of getting a grade, but become public semiotic resources. In the subject experience reported here, having their WebPages open to their peers view and any other Internet visitor was a much stronger driving force than the grades themselves.

Concluding remarks

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It is of extreme importance teacher educators rethink their practice so as to allow future teachers not only to consume, but also to produce and distribute semiotic resources, taking a more active and critical role in their learning process. Redesigning pre-service teachers and their instructors' authority relations in the development of teaching skills is a key factor for the accomplishment of educational systems in which learning becomes individual's agentive selection from, engagement with and transformation of the world. As in the experience reported by Ashton and Newman (2006), we need to "reconceptualize ourselves as academics". The authors rightfully say that "today's teacher educators must develop students' capabilities, not just their skills and knowledge, and in so doing they must relinquish some power. In the 21st century knowledge sharing is needed, not knowledge hoarding" (Ashton and Newman, 2006: 829).

During the 15 weeks the subject lasted and during the elaboration of the present report, many important questions arose, which can only be addressed in future research. How does the teaching received by these future teachers actually impact in their teaching, if it does at all? How do teacher educators assess their teacher students' multimedia outcomes when, as Unsworth (2008) pointed out, despite social semiotic research on the interaction of writing, speech, gesture, sound, still and moving images, theoretical descriptions of digital rhetorical systems and a working pedagogical metalanguage remain still in their infancy. How do teacher educators address specific literacy needs of student teachers who specialize in different areas of knowledge, such as science, language and history. The present experience report, nevertheless, demonstrates a learning technology by design approach allows student teachers not only to consume, but also to produce semiotic resources which may help them improve their classes. Future work should explore the development of a more critical attitude towards technology, semiotic resources and literacy itself.

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As a final remark to be made about the experience of the subject reported in the present paper, I would like to say the reading of the bibliography and attendance to the theoretical sessions were far from ideal. That, however, reinforces what has been said before in that theoretical seminars were, among the four domains of interaction of the subject, the only one which kept traditional roles among students and the teacher. It is only when students are motivated and produce actual semiotic resources when their capacity to learn goes beyond ours to teach. It still remains a challenge making theoretical content a learning adventure for students.

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Strengths and Weaknesses of Plagiarism Detection Software

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Abstract

With increased accessibility to electronic text, plagiarism by university students is increasing. Turnitin is a software detection service that can assist faculty in the identification of incidences of plagiarism; however, not all faculty members have adopted the service. This study identifies the strengths and weakness of the service which impact the adoption of the software on a university campus. Suggestions are provided to support faculty in better utilization of the TurnItIn from an educational perspective and as a method of preventing plagiarism.

Introduction

Because of the recent budget cuts at universities, concerns have been raised as to whether money spent on plagiarism software was well spent. Less than 10% of faculty members were found to be using the service. Low adoption rates could be attributed to the lack of knowledge about the availability of the software or how to use the technology. The use of plagiarism detection software also raised concerns by faculty members which may contribute to the level of adoption. The purpose of this study was to determine the factors contributing to lack of willingness by faculty members to use a plagiarism detection service and to identify how those who had adopted the software were using it.

What is Plagarism?

Plagiarism is considered by many to be copying or borrowing another person's work or original ideas. According to Standler (2000), terms like "copying" and "borrowing" disguise the seriousness of the offense. Plagiarism is defined as:

> "In minor cases, it can be the quotation of a sentence or two, without quotation marks and without a citation (e.g., footnote) to the true author. In the most serious cases, a significant fraction of the entire work was written by someone else: the plagiarist removed the true author(s) names(s) and substituted the plagiarist's name, perhaps did some re-formatting of the text, then submitted the work for credit in a class (e.g., term paper or essay) or as part of the requirements for a degree (e.g., thesis or dissertation)" Standler, R. B. (2000, p. 2).

Based on the definition above, one can assert that when plagiarism is committed, it can be considered as an act of fraud which involves stealing someone else's work and lying about it. According to the United States law, the expression of original ideas is considered intellectual property, and is protected by copyright laws, just like original inventions. Almost all forms of expression fall under copyright protection as long as they are recorded in some way (such as a book or a computer file) (Turnitin, 2008). Students can plagiarize a range of sources including paragraphs from magazines, scholarly journals, books, or newspaper articles. They can also purchase papers from commercial or academic research services.

Why do Students Plagiarize?

Cheating by students has occurred as long as institutions of learning have been in existence. Widespread student plagiarism predates the internet but electronic sources have made the practice easier (Baird, 1980). Several studies revealed that competitive achievement striving

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and self-esteem can significantly influence the prevalence of cheating (e.g., Baird, 1980; Eisenberger & Shank, 1985; Perry, Kane, Bernesser, & Spicker, 1990; Ward, 1986; Ward & Beck, 1990). Other contextual factors that influence college cheating behavior include faculty responses to cheating, sanctioned threats, social learning, and honor codes (Canning, 1956; Jendrek, 1989; Michaels & Miethe, 1989; Tittle & Rowe, 1973). Students often blame cheating on college faculty for using irrelevant course material and not connecting assignments to course material (McCabe, Treviño & Butterfield, 1999). The academic climate of the institution a student attends may also be an important situational factor. Some researchers believe that the climate at many educational institutions has eroded to the point that cheaters face trivial penalties, if any, and faculty members pay so little attention to academic dishonesty that students conclude it is foolish not to cheat (McCabe & Drinan, 1999).

A meta-analysis on academic dishonesty research by McCabe and Drinan (1999) found widespread cheating on academic campuses across the United States. In one study, as many as 72% of students admitted to one or more instances of serious cheating on a test or examination (Kraus, 2002), up from 39% on the same campuses in 1963 (Bowers, 1964).

Approaches for Addressing Plagiarism

Plagiarism has increasingly become a problem educational institutions and many have decided that the best approach to preventing cheating is the to use plagiarism detection tools such as Turnitin. The use of this tool has come under scrutiny from both the students and the professors. Due to concerns about plagiarism, many universities have developed rationales for using plagiarism detection tools/software: deterring and detecting cheating; fostering learning of

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proper acknowledgement practice; building institutional reputation; and treating students fairly (Martin, 2004).

Universities have embraced the use of services such as TurnItIn to deal with rising numbers of plagiarism incidents on campuses. Advocates of argue that increasing incidents of plagiarism should be addressed by pedagogical change focusing on how assessment is conducted. One method suggested is to use authentic assessment, which involves the students in the learning process and includes personal reflection (Bassendowski & Salgado, 2005). Another method is to create a unique assignment that would not be available from "paper mills", and by including unique requirements and changing those requirements each semester (Bassendowski & Salgado). In addition, faculty can enhance the course with tools such as: wikis, blogs, discussion threads, emails, and chats which provide a variety of writing samples and a sense of each student's writing style can also reduce plagiarism (Baron & Cook, 2005). Faculty can also provide cognitive scaffolding for online research (Howard & Davies, 2009). Additonally, students should be taught values, how to handle pressure, and the customs of authors as part of their course of studies so they understand why it is important to use their own words (Howard & Davies; Williams, 2008)

Barriers to Using Plagiarism Detection Services

Turnitin is a plagiarism detection service that has created a database of more than 10 million student papers. Even though courts have ruled that Turnitin's plagiarism detection process is not a violation of students' property rights, some faculty believe this type of service is a way of using the use of another's intellectual property rights for profit (Walsh & McNally, 2007). Having student papers warehoused outside of the control of the university has created

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concerns because of the potential to abuse of this central repository of student writing (Cochrane, 2006). Some faculty members have expressed concern over the use of the service because they maintain that it breaches the student-teacher relationship.

Other barriers to adoption of plagiarism detection services include lack of knowledge about the availability of the technology, how to use the technology, and how to incorporate the technology (Hall & Hord, 2001). Other barriers included limited availability of time, not understanding the relevance of why the technology, poor usability design, access to technology, and time to redesign curriculum were barriers to learning the technology (Butler & Sellbom, 2002; Amburgey, 2007).

Methodology

The purpose of the study was to identify why faculty members use Turnitin, how the faculty members use the results from the program, and to determine barriers to adoption by faculty members.

Participants

The participants for this study were faculty members from a midsize university consisting of nine colleges. The university has a variety of program offerings at the undergraduate and graduate levels including masters and doctoral degrees. Of the 807 faculty, 44% are female and 56% are males. The faculty has 71% of the its members in the tenure track with 26% full professors, 25% associate professors, 20% assistant professors and 29% of the faculty are core instructors, instructors, adjunct faculty, or assistants.

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Procedure

A survey instrument was developed by a cross-disciplinary team of faculty members and technology support personnel to explore the use of Turnitin by the faculty members at the University. The survey was developed to collect two types of data: (1) demographic information about age, gender, and college and (2) issues surrounding plagiarism to determine professor's level of concern about plagiarism and what actions were taken when plagiarism was identified. The survey collected information both from participants, who had used or not use Turnitin. For those participates who used Turnitin, the questions focused upon frequency usage, course types, assignment types, and plagiarism identification frequency. For those participants, who did not use the software, the Likert-scale questions identified their reasons for not using the service. Finally, a series of open-ended questions provided the faculty an opportunity to expand upon their feelings about why they use or did not use the service.

The University has multiple campuses so an online survey tool was used. This method also allowed the faculty to express their opinions freely since the research team was unable to trace who had participated in the survey. Because all faculty members were required to use university email for all university related correspondence, the message inviting faculty to participate was sent by email. The invitation to participate in the study contained the informed consent letter and the link to the survey. Follow-up reminders were sent twice a week through the university announcements for six weeks. After the sixth week, the survey was closed.

Analysis of Data

The survey collected of two types of data. To obtain quantitative data, participants responded to a three point Likert-scale questions: very important, important, and not important.

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The original survey designed for the study was modified by the university to reduce the number of questions and decreased the five-point scale option to the three-point Likert-Scale. The modifications reduced the amount of time faculty spent in answering the questions; however, it also decreased the depth of information obtained by the researchers. The Likert data was converted into mean and percentage scores to observe broad patterns within the responses.

The open-ended questions allowed the research team to understand why the faculty selected their rating on the Likert-scale. Content analysis was used to identify patterns within the data collected from the open-ended question. One of the researchers did the content analysis and placed the data into broad groupings as to the reasons why people used Turnitin, when the tool was used, how it was being used as a teaching tool, and challenges in using it as a teaching tool. The research team then met to analyze the results developed within the broad categories. During the data-analysis process, the data was compared across the groups for similarities and differences.

Results

Demographic Data

Of the 807 member faculty, 165 participated in the survey for a response rate of 20%. The participants were closely divided between users (86 faculty) and non-users (80 faculty members). The College of Education and College of Nursing had the highest percentage of responses at 29% with College of Arts and Letters following at 26% and the College of Business at 24%. These four colleges would most likely use Turnitin because the course content involves writing. The three colleges with the highest rates of non-use were College of Engineering and Computer Science with a response rate of 10%, College of Science at 23%, and College of

Architecture at 14%. In the opened ended question responses, members of these three Colleges indicated they were not using the service because the curriculum is mathematically based, hands-on programming, or design work. Of the different age groups, faculty members between the ages of 31 to 40 were more likely to use the software (63%). Of the other age groups 46% to 48% indicated they used the software. By a narrow margin, females were more likely to use Turnitin at 56% than males at 51% (see Table 1).

Table 1: *Participation in Survey by Colleges*

College	# Faculty	# Participants	% Participating
Arts and Letters	189	50	25%
Business	122	29	24%
Biomedial Science	46	5	11%
Education	112	32	29%
Engineering and Computer Science	70	7	10%
Honors College	35	6	17%
Nursing	34	10	29%
Science	148	18	12%
Architecture, Urban and Public Affairs	56	8	14%

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Using Turnitin to Detect Plagiarism

Turnitin can be used in three ways to identify incidents of plagiarism. A majority of faculty members (64%) automatically submit papers for an originality score. The percentage of originality scored used to identify potential plagiarized material ranged from 20% to 40%. The factor that seemed to affect this variability was the amount of expected material that was to be cited or quoted within the assignment. Ten percent of faculty members used Turnitin if they suspected the student had plagiarized the paper and used the originality report to confirm their suspicions. Finally, four percent of the faculty members had the students submit their own papers.

For most faculty members, the originality report alone was not enough to support allegations of plagiarism. In the qualitative data, faculty indicated that once the paper was identified as having plagiarized content, they conducted their own investigations to confirm the report before they conferred with the student. The need for these confirmations seemed to be prompted by the high number of false positives that can be reported by the program. The number of high false positives appeared to occur because the program frequently used content-related phrases as non-original and website content changing from the time of submission to the verification of plagiarism by the faculty member.

Knowledge about the faculty willingness to submit papers to the service to identify plagiarism can deter copying by students. Only 5% of the user participants reported they use the program as a deterrent in the Likert-scale question. However, 13 faculty members mentioned deterrent as a reason for using the software in their classes in the open-ended question response. The effectiveness of the program in deterring plagiarism was questioned by one faculty member

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who noted that even with a "big song and dance" about using the software; he still catches someone every semester. Others found the program to be effective as a deterrent. One professor noted that before using Turnitin, she would have several plagiarism cases every semester, now plagiarism had been reduced to zero. Finally, another professor noted, "It is the best counter-plagiarism tool since students discovered online papers."

Using Turnitin to Support Teaching

One purpose for using Turnitin is to teach students how to be responsible digital citizens by using proper citations and quotations within the paper. Approximately a third of the professors (32%) reported using the program as a tool to teach students the difference between original thought and plagiarism. Thirty percent of the professors use Turnitin to teach how to properly cite. As one instructor observed, "As for Turnitin, I think it is VERY valuable as a tool for educating students on the role of putting attention into the thoughts and work of others. It helps them re-think their citation methods and also encourages them to learn a citation format (i.e., APA style). Additionally, when students have a high level of not-really-paraphrased thoughts, I am able to use it as a coaching tool." However, another professor reported the opposite experience and questioned what the students are actually learning, "I have found that rather than learning what plagiarism entails, students learn how to change enough words to beat the software detection tools." Finally, others had not considered using the service as a teaching tool. "I hadn't ever thought of using it as a teaching device and am not sure how I'd go about using it as such." This indicates a common problem in training how to use the technology tool without focusing on the instructional value of the tools.

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Turnitin's Strengths

Turnitin users seem to like using the program as evidenced by their comments. They stated: “I think it is wonderful”, “Turnitin has definitely reduced plagiarism in our courses”, “best counter-plagiarism tool”, “very effective”, and “invaluable tool”. Reasons for the positive impressions of Turnitin vary. The strengths of the program included identifying material published on the internet and papers submitted to another class. The service also saves time for faculty who used Google searches for finding plagiarized content.

Non-Users Reasons for Not Adopting the Program

Among non-users of the software, the most frequent reason cited for not using Turnitin (53%), was the belief that the professor was able to identify plagiarism without using Turnitin. Eleven of the survey participants indicated they prefer to use assignment design to prevent plagiarism. A common approach mentioned was to have the students work on one writing project throughout the class which required the professor's input for improvement. Another approach suggested was to have students write papers on unique topics so they are unable to find already published material on that subject or the topic. Some courses have content that supports a uniquely individualized project within the class such as changing the behavior of a subject in a psychology class. Finally, some faculty felt they had adequate knowledge of the writings in their fields of study to identify plagiarism in their class without the service.

Technology Challenges Led to Non-use

Of the non-users of Turnitin, 36% had explored the program. These individuals reported several challenges in using it. One of the most frequently reported concerns was the inaccurate

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reporting of the originality reports. Several factors contributed to inaccurate reporting including commonly used phrases being reported as unoriginal which raised the originality score leading to a false positive identification of plagiarism. Another concern raised was the method in identifying plagiarism incidents. At the heart of the software application is a database of paper submitted by students each semester papers but not scientifically-based journal resources. This design flaw results in the program catching plagiarism from secondary sources, but not from primary sources; thus making Turnitin ineffective for science classes or higher level courses that require journal citations in the writing.

The inaccuracy of the originality reports the service produces resulted in high levels of frustration. As one professor expressed, “I have seen many discrepancies on the Turnitin’s reports. The website referenced in the originality report did not exist.” Turnitin’s defense was that the website changed after the report was created, but faculty members found this reason to be unsatisfactory. They maintain the discrepancy happens too often. As one professor stated, "Much as I support the idea of the software, I have serious reservations about how reliable Turnitin is. Since I will fail a student for plagiarizing, I need to know that the software used to determine plagiarism is robust and acute. Right now, Turnintin does not meet those criteria.”

The final concern voiced by the faculty was difficultly in using the program. Thirty-eight percent of those not using Turnitin reported the lack of knowledge about how to use the program as "very important" and another 20% rated their lack of knowledge as "important" in their non-use of the program. Lack of time was also another factor with 16% rating this reason as "very important" and another 23% as "important". In the open-ended question, some professors noted they did not have time to learn how to use the program or knowledge of where to go to learn how to use the program. Another factor contributing to non-use was the need to request a Blackboard

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course shell, which was another technology tool they did not know how to use. Finally, the papers had to be turned in electronically and for different reasons, professors did not want papers in electronic format for grading.

Another concern noted by many professors was how quickly students acquire the ability to trick the program. Students with savvy technology skills are able to circumvent the service way of evaluating for plagiarism changing the originality scores. Websites are now available that teach students how to fool the service. Students also learn techniques on their own after submitting their papers several times.

Results

With impeding budget shortfalls, the university was questioning the expenditure on Turnitin, a plagiarism detection service, citing adoption by less than 10% of the faculty. The survey created for this study explored how faculty members were using Turnitin and questioned why they were not using the program. Patterns emerged as to how faculty members were utilizing the software and flaws within the program, which were contributing to the program not being used. The survey also revealed misunderstandings about the capabilities of the software and suggestions arose for how to utilize the software as a teaching tool. These patterns can be used for planning for faculty training in the use of the software and targeting faculty who are more likely to use the program such as: professors in the fields of education, nursing, business and humanities. Increasing the number of user creates a better justification for continual expense incurred by the service. Because of ethical concerns, faculty may not feel uncomfortable using the service for their classes.

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Faculty members, who used the software, felt strongly that the software was helpful to them in detecting plagiarism. For this group, the Turnitin originality reports produced a result that addressed their needs. First, the service compared papers to content available on the Internet the source material for many identified incidents of plagiarism. Second, Turnitin compared papers to those submitted by other educational institutions allowing faculty to identify papers purchased from other institutions. Third, the service created an institutional database of papers submitted from previous semesters, which prevents selling or sharing of those papers to current students. Fourth, Turnitin reduced the time faculty of large classes spent in checking for plagiarism. Finally, the service provided an originality report that identified the content that had been copied and the original source of that content. This allowed the faculty members to verify if the content had been copied before conferencing with the student.

The process used by Turnitin to detect plagiarism is not an all inclusive process so it does not identify all cases of plagiarism. The service did not compare the student papers to certain primary sources or restricted material. As a result, science classes, upper division courses, and graduate level courses were not using the service as often. Some faculty members felt the originality report itself cannot support allegations of plagiarism due to the rate of high false positives. The high false positives were attributed to the identification of frequently used common phrases from a specific content area and internet content changing between the time of identification and verification of the copied material.

Turnitin may not be necessary for all classes; in particular, classes in which faculty can design unique assignments. In addition, classes that require papers to be submitted multiple times were less likely to use the service. In graduate level courses, the content may be so specific that

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the faculty member was aware of the publications in that area allowing him/her to quickly identified copied material.

Barriers to adoption of the TurnItIn service identified in this study were similar to barriers found in the literature. The most frequent reason cited for not using the program was the lack of awareness of how the software worked. To address that concern, the technology team believed that integrating Turnitin with Blackboard would simplify the steps required by the faculty members to use the software. However, this approach was not a complete success. The survey revealed that faculty members were not using the service because they did not use Blackboard. Thus, some faculty members were unaware that Turnitin could be used without the course management system. Additionally, some confusion existed about training for Turnitin with many faculty members unaware that an online web tutorial was available for their convenience. Finally, faculty noted high false positives based upon common phrases within the content area indentified as plagiarized phrases. With proper training on the program, faculty would learn how to exclude those phrases from the originality report increasing the usability of the program.

Ultimately, using the Turnitin service had mixed reviews. Faculty indicated they use the originality reports to identify the incidents of plagiarism and then use the opportunity to teach proper citation and quoting techniques. Other faculty members indicated a desire to re-submit a paper a second time after it has been edited. However, without excluding the first set of results, the reports showed lower than 10% originality because the paper was compared to the previously submitted paper. Faculty would benefit from on instructional strategies for the using Turnitin in the classroom.

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Even with proper training, some faculty members reported that they continue to feel uncomfortable in using detection services like Turnitin. Those faculty members, who used the program, felt responsible for promoting student's ethical behavior; which could lead to improving the quality of the educational programs the university is offering. Other faculty believed that using Turnitin on every paper inhibited the development of professor-student trust and others felt the service created ethical concerns regarding use of student's intellectual property. Faculty members expressed concern using an originality report that could falsely identify plagiarism as proof to expel students from a class, program, or university.

Limitations

The survey itself posed a limitation. The original survey developed by the team was scientifically based with redundancy built in to validate the questions. The assessment coordinator at the University decided that the survey had to be completed within a 15 minute time frame which limited the data collection possibilities. The survey was revised to be a program evaluation format rather than a research format. As a result, the study yielded less information and did not allow for measuring the validity of the survey. However, the research team was able gather enough information to share.

This study had other limitations including being limited to one university meaning that it is cannot be generalized to other institutions. Second, the participants may have been those that strongly felt positively or negatively about Turnitin. The other faculty members may not have participated in the study because they do not feel using plagiarism software was important in their classrooms or that plagiarism was occurring in the courses. As a result, faculty members that participated in the study had strong feeling for or against the use of Turnitin.

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Future Studies

Demographic variables seem to have little influence in the faculty's decision to use or not use the program except for the 31 to 40 age group who are slightly more likely to use the program than the other age groups. Faculty members in this age range are open to learning and using technology while younger faculty members may be open to using technology but could hold similar views as their students regarding plagiarism. Younger faculty may not view the copy and pasting of text from a website unethical. A study could clarify if younger faculty have this view does this view gradually changes as faculty members gain knowledge and experience in writing professionally.

Implications of the Study

Understanding the strengths and weaknesses of plagiarism detection services, the usage patterns, and the concerns of faculty, post-secondary institutions can provide insight into expenditure of funds for such services. Plagiarism detection services are not a good match for all content areas or academic levels. Regardless of availability and training, some faculty members will continue to have pedagogical and ethical concerns about using the service.

Within a large organization, it is difficult to communicate to everyone the types of technology and computer software available. As the study found, a lack of knowledge about the software prevented faculty from using it. Increased accessibility to training can be achieved by providing just-in-time training online and subsequently increase the number of faculty using the program making the expenditure for the services more cost effective. Training should be linked within the courseware management program near the plagiarism detection software program. For clarity, this training should demonstrate the keystroke movements on the computer screen.

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Additionally, training packages should include several features: (1) how to establish assignments that can be batch loaded into the system, (2) how to eliminate the common phrases used in a discipline, (3) how to submit a draft as opposed to a final copy, (4) how to read the reports generated by the program and (5) how to prevent high false positive within the reports. Finally, at least one training session should be available on how to use plagiarism detection software to support the instructional objectives of a class.

Each plagiarism detection software package has different strengths and weaknesses. Our study revealed that programs that create databases of student work create ethical dilemmas for faculty in deciding whether or not to use the program. Regardless of the service chosen, preventing plagiarism should not be dependent upon the software alone. Assignment design is also useful in preventing plagiarism.

The study conducted and subsequent data-analysis can assist in making policy decisions related to the use of the plagiarism detection services at educational institutions that require the use of such software. It was discovered that not all university majors or programs will benefit from use of the application. Courses with hands-on activities, dominated by mathematical processes, or artistic content cited little need for the program. Classes that require the use of primary sources that come from books or items not in digital format may also not benefit from detection software. Finally, the program does identify text plagiarized from specialized journals. The study concluded that the combination of the program's weaknesses and ethical concerns will continue to impact the level of adoption of plagiarism detection services by some faculty members.

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Technological Literacy in First-Year Composition: Implementing a Module Approach

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Introduction

Many first-year writing programs offer exposure to technological literacy in their curricula. Students are introduced to software programs in the designated computer lab; they are asked to engage in web research; they write and edit papers with various composing and editing tools; they use presentation tools to support their oral presentation; and they might create a website in lieu of or to support their final paper. Selfe's (1999) explorations of literacy in the 21st century, Duffelmeyer's (2000) article on critical literacy in first-year composition, Selber's (2004) discussions on technological multiliteracies, and Gruber's (2007) work on students' approaches to technological literacy have helped us conceptualize our roles as composition teachers who consider technological literacy as integral to a 21st century literate college population. We know that teaching critical technological literacy has become even more important now that students are tech savvy but not necessarily analytical about the impact of technology on their lives. We also understand that they might have better job prospects in difficult economic times if they can combine the functional skills with the critical and rhetorical skills outlined by Stuart Selber (2004).

Many of us try our best to follow the excellent suggestions we read about when we incorporate technology and multimodal teaching into the writing curriculum. But our efforts are often hampered because we don't have sufficient training, means, or support to be innovative and successful in our individualized contexts with long histories, specific student populations, and specific administrative needs. To help us think through the practical aspects of integrating technology into the writing curriculum, I use the concept of reflective practice outlined by Donald Schon (1983) in *The Reflective Practitioner* where he encourages us to look at our experiences, build new understandings, and connect these understandings to the situation that is

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unfolding. As Schon puts it,

> The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation. (p. 68)

To reflect on how we built on and made changes based on our experiences, I show one institution's efforts to integrate technological literacy despite initial resistance from graduate teaching assistants and faculty in the department. I show why and how we decided to incorporate a structured module approach to technological literacy in the first-year writing curriculum at my institution, what components were included into the modules, and how we trained graduate assistants to teach the modules. After providing the institutional context, I show the programmatic background that led to the development of seven technological literacy modules, incorporating functional skills as well as critical and analytical skills, ending with production skills. I focus on the specific challenges that we encountered when we moved from the "idea"—the conceptual and theoretical stage—of technological literacy modules to the "doing"—the practical stage—where we trained graduate assistants in the day-to-day classroom practices of incorporating technological literacy modules into a writing curriculum. Ultimately, I emphasize the need for explicit and continuous training and assessment, with ongoing refinement of existing modules to meet the needs of the students as well as the needs of those who teach technological literacy.

Understanding the Past, Moving Towards the Present

The 4-credit first-year writing course at my institution is taught by graduate teaching

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assistants who are enrolled in a two-year master's program in English with area specializations in literature, rhetoric, creative writing, linguistics, or English education. A small number of GTAs are enrolled in the applied linguistics PhD program. The writing program also hires two one-year instructors who were GTAs the previous year and who just finished their master's program. Much of the training happens during a two-week orientation (previously one week) before the start of the Fall semester. Furthermore, new GTAs take a 3-hour practicum course during the first semester they teach in the program. GTAs, before I became the WPA, followed the same general syllabus that they could adapt to their specific strengths. However, all sections used the same readings, which focused on the environment, and they used the same assignments in all their classes. One of the GTA concerns when I started was the lack of guidance for day-to-day activities in the classroom and the general feeling that the GTAs did not receive enough support to do the best job possible as new teachers.

When I was asked to take on the position and responsibilities of the Writing Program Administrator in 2002, I was not only asked to make sure that the GTAs received the support they needed to teach the introductory writing course successfully, but I was also charged to incorporate technology into the first-year writing curriculum. The chair of the department considered my teaching and research interests in technological literacy as a perfect fit with the university's goal to become a technology-enhanced and technology-focused campus.

In some ways, I considered this to be the perfect charge. I could use my training in computers and writing to explore how best to integrate functional and critical technological literacy skills into an introductory writing course, making sure that the overall goal of the course—to teach critical reading, thinking, and writing—would stay intact. I could train the graduate assistants to look beyond teaching computer skills to teaching analytical skills that were

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already an integral part of the curriculum. Students would become critical users of technology; they would be ready to discuss social, cultural, religious, and gender implication of technology use, and they would be able to incorporate their own, critically evaluated, multi-media productions. I could go to campus-wide meetings and address the need for a definition of technological literacy that went beyond the functional to the critical and analytical.

In many ways, it was a monumental charge. The university-wide technology committee wanted to follow a national trend that would show prospective employers that students had the functional skills to enter the workforce. The 2002 mission statement, for example, stated that "undergraduate programming prepares students for life in the twenty-first century by assuring individual development through small classes, close interaction with senior faculty, and sophisticated learning technologies more commonly found at the nation's leading private universities" (2002 University Mission Statement). The department chair wanted to be able to tell the university that the writing program could contribute to this trend, and that we would teach functional skills and make students more marketable in the workplace. This would provide the English Department with leverage for asking for additional funding for a second computer lab. We could promise that every section of the first-year writing course would be taught in the computer lab once a week, and we could make sure that students knew how to use word-processing software, documentation software, presentation software, and even web-editing software.

Although the university was ready to move into the 21st century with "sophisticated learning technologies" and many online programs and courses, teaching technology—or teaching about technology—in a first-year writing course was seen as incongruent. Many departmental faculty members, although they didn't teach the first-year writing course, weren't sure why the

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English Department needed to teach technology at all. What were the reasons, they wanted to know, for wasting time on technology when students don't even have a grasp of sentence structure and grammar? And the graduate teaching assistants were horrified that they would have to teach technology skills to their students. What, they wanted to know, would happen if they didn't know how to trouble-shoot? What would happen if students knew more than they did?

Such attitudes about technological literacy, and the concerns voiced by many faculty and graduate assistants have been widely documented in current computers and writing research, and much of the research has pointed to the need for looking more closely at how technological literacy is defined. Furthermore, researchers have also pointed to pedagogical benefits—for students and teachers—of incorporating technologies into the writing curriculum to create active learning communities in the classroom (see, for example, Bromley and Apple, 1998; Selfe, 1999, 2007; Day, 2000; Selber, 2004; Oblinger, 2007).

It would, however, be unrealistic to discount the administration's and faculty's perspectives and concerns, and the fears of those who would have to teach technological literacy. I could appreciate the administration's push towards functional literacy. I could even agree that students needed to be proficient in functional technological literacy to make them more competitive in a competitive job market. It is a university's goal in this economy-driven and consumer-oriented system to prepare students for the challenges they will encounter once they receive their university degree. But I could not agree that functional literacy was the ultimate goal in students' technological literacy training.

The most immediately impacted constituents—in addition to the students enrolled in the first-year composition course—were the GTAs. Considering that many of them had not been exposed to extensive technological literacy training in their undergraduate careers, it was no

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surprise that mention of an integrated technological literacy curriculum was received with more resistance than excitement. In addition to learning how to teach students how to write in an academic setting, they were now also asked to teach them how to use technology. This additional responsibility, as they saw it, interfered with their own studies in the various English Department master's programs. How could they teach writing successfully, learn new software and teach it, and get a degree on the side? Sure, they used computers to do research and to write their papers, but why would a writing teacher actively engage in teaching students technological literacy, a concept that they, like the administration, considered to focus around functional skills.

I commend my educational background, the theories I read and applied in my research and my teaching, the practices that resulted from years of experience and years of reading scholarly work, and the many discussions I had with colleagues, for my continued willingness to forge ahead with a vision that didn't gain much support from the constituents with whom I needed to work. Although my approach to the methodologies and pedagogies of teaching writing and incorporating technological literacies did at first not intersect with those of most of my departmental colleagues or graduate teaching assistants, I was still convinced that I didn't want to support a curriculum that would make students into adept technology users, but I wanted them to be able to approach technological innovations critically and analytically. That meant to work closely with the administration and with my colleagues, but it especially meant to work closely with the graduate assistants who would be teaching the course, and to clarify the reasons for incorporating technological literacy, and with it multimodal literacy, into the writing curriculum.

Joddy Murray (2009), in *Non-Discursive Rhetoric: Image and Affect in Multimodal Composition,* provides a well-articulated argument for moving students and teachers from discursive and print-oriented rhetoric to a new model of rhetoric that includes multimodality, or

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non-discursive text, image, and affectivity. The need for this new approach, according to Murray, is evident in everyday texts and is "an important development to rhetors and teachers alike because it provides us a way to talk about rhetoric as it is experienced in many multiple and layered textual modes and media" (p. 2). Discussing and assigning multimodal texts also allows us to bring "our classrooms into the twenty-first century b assigning the kinds of texts students will undoubtedly encounter outside of academia" (8).

Murray's discussion of producing discursive and non-discursive texts confirms the challenge I faced when advocating for integrating technology and multimodality into the composition classroom. As Murray puts it, "the challenge … is not one of substitution, rather one of addition: we must continue to teach students to become adept at writing discursive text with its sequential structures, disciplinary expectations, and, ultimately, nonaffective tone; we must also teach students to become adept at 'writing' non-discursive texts with its layers, images, and, without a doubt, pervasive affectivity" (p. 8). Promoting student skills in both areas is especially pertinent if we take seriously Stuart Selber's (2004) comment in *Multiliteracies for a Digital Age:*

> If students are to become agents of positive change, they will need an education that is comprehensive and truly relevant to a digital age in which much of the instructional agenda seems to be little more than indoctrination into the value systems of the dominant computer culture. … It fails to expose students to the wide array of literacies they will need in order to participate fully and productively in the technological dimensions of their professional and personal lives. (p. 234)

If we ask students in our composition classes to critically engage in analysis and thoughtful production of multimodal texts—succinctly discussed by Gunther Kress (2000) in

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"Multimodality"—we encourage students to understand the complexity of writing in multimodal environments. As Kress would put it, we force "a rethinking of the distinctions usually made between communication and use, and in particular between reading and use" (p. 188).

When I argued for the inclusion of technological literacy into the writing curriculum, I was especially concerned about providing students with an understanding of the complexities involved in communicating, and the need to become multiliterate and multimodal. And, as Selber argues, "it is certainly the responsibility of writing and communication teachers to help students develop … a keen and judicious sense of the technological world around them" (p. 235).

Exploring Intersections

When I started working with the GTAs in the Spring of 2002, we decided, after consulting with the GTAs, to use the curriculum that was already in place and to work on revisions during that first semester. The overall course goals were very discursive and did not encourage multimodality and multiliteracies advocated by Murray (2009), Selber (2004), Kress (2000), and others. In many ways, the course goals were very similar to and modeled after the goals of other first-year writing courses and included:

- To introduce fundamental writing principles used in academic settings.
- To understand the connections between critical reading and writing skills through close attention to the production and interpretation of texts.
- To apply critical reading and writing skills to formal writing tasks, including an extended writing project.

In other words, the course was intended to introduce students to critical reading and writing in the academic community. Throughout the semester, they were asked to practice the

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reading process: generating questions or deriving answers from texts; summarizing texts; identifying examples, drawing inferences, and making logical or comparative connections; organizing information in a variety of ways; seeing and learning rhetorical skills used by effective writers; and evaluating the merits of what we read. At the same time, they were also required to practice the writing process: identifying audience and purpose; gathering or finding ideas; organizing and interrelating those ideas for readers; drafting in order to develop, support, and illustrate ideas; revising from trial-and-error and in light of peer input; and editing for clarity and accuracy.

After several meetings, we formed a GTA curriculum committee that worked on changes to the readings and the assignments used in the course. Many of the GTAs had expressed concern that the current readings, with a strong focus on the environment, did not appeal to the student population they were working with. Furthermore, GTAs wanted to include instructions for GTAs on how to teach the assignments that included summary, analysis, synthesis, rhetorical analysis, and argument. They also wanted to make sure that students would be given detailed guidelines for every assignment. The semester-long collaborations on the curriculum revision were shared during regular GTA meetings, making sure that everybody felt comfortable with the changes to be implemented in the Fall of 2002. The resulting changes to the readings, and the instructions on rhetorical principles were published in a reader and rhetoric, *Composing Identity through Language, Culture, Technology, and the Environment*, which was used by every GTA teaching the course.

In addition to the curricular changes we worked on during the Spring semester, the department chair and I learned about the funding of an additional computer lab, and the scheduling of all classes in the lab, at the end of the Spring semester. GTAs had finished the

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curriculum revisions; many were getting ready to graduate, and the few returning ones were getting ready for summer break. When I introduced the notion of technological literacy to the group who would be returning in the fall, the responses were not hostile, which I attributed partly to the successful collaboration and GTA involvement with curriculum revisions throughout the semester. However, the responses were not enthusiastic either and could best be described as lukewarm. The few GTAs who had taught in the computer lab told the others that "it wasn't a big deal." They liked being able to get students on the computer and have them write in class. It was much easier to read their writing this way. At that point, I didn't engage in extensive discussions about the role of technological literacy in the classroom, but I knew that I had to be specific and explicit about the constructive use of technology in a first-year writing course, moving GTAs away from using computers as high-tech babysitters that would get teachers out of teaching and that would get students to be expert typists. Instead, I needed for the GTAs to understand that technological literacy would be more complex than functional literacy. It would encompass Cynthia Selfe's (1999) definition that "*technological literacy* refers to a complex set of socially and culturally situated values, practices, and skills involved in operating linguistically within the context of electronic environments, including reading, writing, and communicating" (p. 11). It would also address the need for multiliteracies and multimodality so pertinent in twenty-first century lives.

After talking to the GTAs at the end of the spring semester, I also realized that we would need more extensive training than the one-week session that had been the norm in the past. GTAs needed to be introduced to the course goals, the curriculum, lesson planning, pedagogies and methodologies, and they also needed to understand the purpose of technological literacy—the functional as well as the critical, and what Selber (2004) called the rhetorical and what we

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called the creation process—in the writing curriculum. I also wanted to make sure that GTAs would be invested in teaching technological literacy. This implied to me, taking Jeanne Gunner's (1994, 2002), Janet Miller's (1990), Irene Ward's (2002), and Edward White's (2002) comments on shared authority and de-centering the writing program to heart, that the graduate assistants needed to participate in developing the specific aspects of each module even though many had not had any training in teaching, much less in integrating technological literacy into a first-year writing course.

The summer before orientation and before fall classes started was one of the busiest summers of my career. Because I wanted to make sure that GTAs were compensated for an additional week of training, I needed to write a grant proposal to the university's e-learning center, outlining the reasons for funding one week of GTA training. I also needed to research possibilities for integrating technology into a writing course, and putting together outcomes, skills, and practical tasks that students should be able to perform throughout the semester. The course description, for example, had to undergo some changes and needed to include that students were expected to develop technological literacy skills to rhetorically analyze texts, sounds, and images, to use online resources based on the audience addressed, the purpose explored, and the language used, and to produce multimedia projects that addressed the rhetorical concepts that students explored in the classroom.

The integration of this course goal was intended to show that technological literacy was intricately connected to the rhetorical principles taught in the course. By including this goal, we expected that graduate assistants would be trained and would be willing to teach this goal to their students. I knew from previous conversations that many GTAs, and many of my colleagues in the department, considered this an additional goal that was not connected to the primary goals—

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to teach critical thinking, reading, and writing--of the course. Since the GTAs had never received training on how to integrate technology—even though some taught in the departmental computer lab and didn't think it was "a big deal"—technology remained a stand-alone project that nobody had attempted to clarify. Now, with the intended integration of technology, and with one hour/week of every section of the first-year writing course taught in a computer lab, it became necessary to rethink training, to explore how graduate assistants would be introduced to the changes in the curriculum, to make sure that their workload did not increase, and to ponder how those changes would be related to my colleagues and to the administration.

To provide a starting point for discussions about how technological literacy would function within a writing course, one of my colleagues and I established specific outcomes for a technology-rich writing curriculum. We learned much from the work done at Michigan Technological University by Cynthia Selfe, Dickie Selfe, Marilyn Cooper, and Anne Wysocki. We also found Albert Borgmann's (1984) concepts of technological literacy and Barbara Duffelmeyer's (2000) work insightful in our decision-making processes. Based on our research and on our understanding of our institution's needs and student body, we initially focused on working on the following primary tasks:

- Provide all students with increased technological literacy skills.
- Establish the connection of technological literacy learning with learner-centered education.
- Train teachers to use learner-centered pedagogies in e-learning environments.
- Establish ongoing assessment of learning outcomes to adjust to students', teachers,' and employers' needs as the new economy expands and evolves.

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We used the summer break to outline the learning objectives connected to technological literacy in the writing curriculum, making sure to underline the importance of integrating multimodal literacies. This was in line with NCTE's (2005) "Declarations concerning the broadest definitions of multimodal literacies" where they tell us that "it is the interplay of meaning-making systems (alphabetic, oral, visual, etc.) that teachers and students should strive to study and produce." (NCTE). Based on our experiences, our research, and the research of colleagues in computers and writing research, we focused on the following objectives:

- Students will be able to critically analyze the use of text, graphics, links, and sounds in online resources.
- Students will be able to rhetorically analyze online resources based on the audience addressed, the purpose explored, and the language used
- Students will learn to be critical of the diverse and often contradictory information present in online resources
- Students will have the basic skills to build an academic website that pays attention to rhetorical principles and that exhibits their most important work from the introductory writing course
- Students will be able to apply technological literacy skills to work in their major and other disciplines

This, of course, required certain practical tasks that needed to be included in the course syllabus and that students needed to finish. We underscored the importance of using functional skills for critical purposes, which is outlined in the following list:

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- *Module 1: Using Word Processing, Online Editing, and Email Skills*: strengthen students' skills to write successful papers, memos, and letters by considering audience, purpose, and author.
- *Module 2: Collaborative Activities/Online Discussions*: strengthen writing and collaborative skills by providing students with an opportunity to communicate effectively with their peers by paying attention to the rhetorical situation.
- *Module 3: Web Research/Use of Internet Sources*: connect in-class readings, library resources, and web information to increase student awareness of viable and non-viable sources by focusing on audience, purpose, and author and the author's use of rhetorical appeals.
- *Module 4: Multi-Media Presentation*: increase awareness of presenting information for different audiences by using appropriate formats and paying attention to the rhetorical situation.
- *Module 5: Development of an Academic Web Site*: apply critical analysis and writing skills to developing a site for academic learning and growth.
- *Module 6: Analysis of Visual/Cultural Representation in Popular Media*: increase awareness of diversity and be able to critically analyze social, cultural, and political frameworks.
- *Module 7: Argumentation in Multimedia Environments*: strengthen analytical skills by using rhetorical tools to evaluate the argument in film (documentary and feature), websites, news broadcasts, and other multimedia environments.

In the course description, we incorporated technological literacy as part of the course goals (see Appendix A). In the syllabus, we outlined the specific tasks that each student in the first-year

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writing class would complete. Below is an example of how the syllabus was structured, including class activities, what students needed to have read and completed before class, and what the lab activity would be. In the first example, during Week 4, students were introduced to writing a synthesis essay, and the lab activities were geared towards increasing students' understanding of the connections and intersections between Plato and Freire, strengthening their understanding of synthesis. In the second example, during Week 10, students were asked to rhetorically analyze a documentary that they all watched in the university's auditorium. In class, they worked on analyzing web advertisements connected to the documentary, and they focused on how arguments can be made visually. In every case, the technological literacy modules were intricately connected to the overall goal for the day, the week, and the semester.

Date	**What we'll do in class**	**Have this read**	**Completed homework for this class**	**Lab Activity**
W4	**Synthesis Essay**			**Module 3: Web Research/Use of Internet Sources**
Day1	Lecture: • Writing a Synthesis thesis • Making connections in Plato and Freire	• Re-read Freire and Plato	• Review the key points that Plato and Freire made • Check the internet to find biographical	• Do an internet search to find out what Plato's and Freire's main philosophical

			information on Plato. Write down the main points • Check the internet to find biographical information on Freire. Write down the main points.	and educational ideas were • Write a paragraph outlining the connections between Plato's and Freire's philosophical and educational ideas. • Send your paragraph as an attachment to your instructor

W10	**Argument Writing**			**Module 6: Analysis of Visual/Cultural Representation in Popular Media**
Day1	Visual Literacy • PP: An Introduction to	• Documentary: Killing Us Softly 3	• Outline the rhetorical appeals used in	• Find 2 websites that depict women's and

	the Nature… of Visual Literacy” • Rhetorical Analysis • Presenting an argument visually		the documentary • Outline the constraints that are at play in the documentary	men’s roles in advertisements. • Outline how the visuals appeal to an audience’s emotions.

However, despite the outline of activities we provided to the GTAs, we also understood that the implementation of these tasks would only work if the GTAs were willing to give it a try, and if they had specific lesson plans. Most of them were going to be new to the program (approximately 65 percent of the GTAs) and did not have any background in teaching in a university writing program. We considered the implementation of the technological literacy components as a pilot, fully expecting that we would need to modify and adjust our learning objectives and initial tasks based on teacher and student experiences and feedback.

Training GTAs in Connecting Technological Literacy to Rhetorical Principles

Graduate assistant orientation is always an exciting and challenging part of teacher training. We ask our new instructors to buy into a program that we established; we ask returning GTAs to support changes that happened over the summer (changes that they might have suggested or that might have been instituted based on administrative decisions); we want to create a strong community and support network, and we want to make sure that everybody is ready for the first few weeks of classes. Often, we have established a routine that has worked in

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the past, and we can be relatively sure that it will work again. However, when a curriculum undergoes major revisions, and when it is essential to get major buy-in for something that most GTAs do not necessarily intuitively connect to teaching writing, established routines might no longer be applicable.

Historically, GTA training at my institution was conducted by the WPA with the help of two one-year instructors. Although this structure was still in place, I convinced a colleague and the two instructors to help not only with the logistics of training GTAs in teaching technological literacy, but also with structuring and guiding the specific tasks we included in the training session, and with involving GTAs more actively in the training sessions. Our approach was influenced by Ward and Carpenter's (2002) participatory methods outlined in their sourcebook, as well as Johnson and Morahan's (2002) edited collection exploring successful training and teaching concepts.

As a result, we paid specific attention to clarifying not only what we intended to do, but also why we wanted to incorporate technological literacy into the first-year curriculum. We provided our reasons for establishing the goals, skills, and tasks, and we encouraged GTAs to comment on any or all of the information we provided for them. We also made sure to provide GTAs with time to discuss their perspectives in groups and to voice their concerns. Much of the discussions centered around being unfamiliar with technologies, and being worried that an emphasis on technology would reduce the amount of time that students would be able to work on refining their writing skills. However, despite these concerns, GTAs were willing to pilot the modules, and they brought up a number of useful ideas about facilitating the integration of technology that we incorporated into the training sessions.

Providing space for GTAs to address their concerns and to contribute to the way in which

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the module approach developed over the course of the training session and throughout the semester let us move to the next steps (what Selber would call critical and rhetorical technological literacy in his 2004 work). Although the GTAs had only peripherally participated in deciding on the general concepts of the modules we wanted to pilot for the course, we underscored the importance of their involvement by asking them to contribute to how these modules would be taught, what the specific components of the modules would be, and how they would connect the modules to the teaching of writing. Instead of providing them with a finished product, we provided them with a framework that needed to be filled in (outlined as seven modules above). In addition to providing GTAs with readings that focused on learner-centered education, we also provided them with readings that discussed the integration of technological literacy into the writing curriculum, especially Cynthia Selfe's (1999) *Technology and Literacy in the Twenty-First Century*, Barbara Duffelmeyer's (2000) "Critical Computer Literacy," Laura Gurak's (2002) "Cyberliteracy," and case studies involving multimodal literacies in the composition classroom (e.g., Gruber, 1995; Regan, 1993; Romano, 1993) to make sure that GTAs could see some practical applications of technology use in the classroom.

This approach—a basic theoretical and practical framework established by the WPA, and specific means provided to the GTAs to participate in how the modules would be taught and integrated—was based on Jeanne Gunner's (1994, 2002) ideas on collaborative approaches to administration, and Irene Ward's (2002) work on management and leadership styles. Since we wanted to ensure that GTAs felt invested in and committed to the program without being left exclusively to their own devices, we asked them to take the module idea and provide hands-on exercises and information that would be shared with everybody. Their experiences were invaluable in putting together the content of the modules, making sure that the strategies and

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examples used to teach technological literacy related to students' current technology experiences. Once they taught these modules for which they provided the details, we would revise them and update them based on their feedback and the feedback of the students in their classes.

Since the integration of technological literacy was a pilot project, everybody involved knew that we would be changing and adapting specific exercises and tasks throughout the semester and over the next few years. Although we wanted to provide a successful initial model for the integration of technology, we also knew that the first year of implementing the project would provide us with important information for changes that needed to be considered for subsequent years. This knowledge alleviated some of the pressure we all felt about this monumental project. As a WPA, I knew that I couldn't control the quality and execution of each module, but I could count on everybody trying their best to make this a successful pilot project. Similarly, the GTAs knew that the content they created during orientation would be tried out in each classroom and would be discussed in the practicum class. They also knew that the program would conduct surveys to find out about the effectiveness of teaching technological literacy in the composition classroom.

To start the process of putting together the content for the technological literacy modules, we provided GTAs with a module template that asked them to think about the reasons for including the specific module into the curriculum, who their audience would be, and what that audience might already know and might need to learn. We also wanted to make sure that GTAs thought about the specific steps that would be necessary to lead students through the module. We provided them with a definition of technological literacy adapted from Cynthia Selfe's (1999) definition as a functional, analytical and critical skill influenced by social and cultural factors. Furthermore, to ensure consistency across modules, we asked GTAs to use specific questions for

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thinking critically about and creating the technological literacy modules (see Appendix B).

With the questions we posed we wanted to make sure that GTAs would approach technological literacy from a critical perspective, moving from "how to teach" to "why do we teach it the way we teach it." We made sure to create groups of three to four that included returning and new GTAs who had large ranges of technology backgrounds. Each group was charged—over a one-week period with lots of meetings and conversations, and while we also learned about teaching methodologies and pedagogies—to provide specific detail for one of the modules that would then be used by the whole group. Then, after conducting usability testing on each module, and revising each module based on the suggestions and feedback, GTAs would be able to incorporate the handouts, PowerPoint presentations, and web pages to teach students about the specific aspects of technological literacy in conjunction with the rhetorical principles addressed during that lesson.

At the end of the two-week period, every GTA had very specific lesson plans in hand that would guide them through the technological literacy modules. GTAs had worked on them with great dedication and much more enthusiasm than we had initially expected. GTAs who worked on Module 5, for example, created a detailed PowerPoint presentation and provided their colleagues with a step-by-step process to answering "Key Questions when Designing a Website," specifically focusing on author, audience, purpose, media, and content. In addition, the group created a website that explained the functional aspects of creating a website. For Module 6, the group decided on creating a presentation titled "An Introduction to the Nature of Visual Rhetoric," including a definition of visual rhetoric, journaling activities for students, images and videos with questions, a brief guide to argument and persuasion in visual media, group project ideas, as well as discussion questions that encouraged students to analyze images. And Module 7

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included a visual presentation of "What Do Documentaries Have to Do with Writing," which specifically focused on exploring structure and organization of thoughts, thesis statements, rhetorical triangle and rhetorical appeals, and the presentation of arguments through multimodal texts. Additionally, for each documentary that we showed in the writing program, the GTAs created a handout that provided specific questions to consider before viewing the documentary, while watching it, and after having viewed it.

GTAs' direct involvement in working on the technological literacy modules contributed much to the initial success of integrating multimodal teaching into the writing curriculum. Furthermore, the collaborative nature of creating the modules, as well as the very detailed lesson plans that resulted from the hard work of every GTA, encouraged collaboration among the GTAs throughout the semester. Because of this collaboration, and because GTAs's were willing to discuss the effectiveness of some modules and the difficulties they had with other modules, we were able to improve our approach over the next years, also taking into account student feedback and changes in students' technology use and knowledge.

Assessing Students' Technological Literacy

We identified functional and analytical technological literacy skills of incoming NAU first-year students over one semester of the composition course, and also compared functional and analytical technological literacy skills of students in Fall versus Spring semesters. We decided to conduct a self-assessment (an online questionnaire for students at the beginning and end of the semester) of students' skills to better understand whether we actually met students' learning needs. We wanted to use GTA survey results and student questionnaire results to make changes to the technological literacy modules and to how we integrate the modules into the writing curriculum.

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The self-assessment outcomes showed us that students improved their functional technological literacy skills in all areas taught, and most significantly in the area of webpage design. Students rated their skills at the beginning of the semester at 1.6 on a 5 point scale, and at 3.75 at the end of the semester. Their multimedia presentation skills improved from 2.8 to 4.2 on a 5 point scale. In terms of students' assessment of their functional technological skills, we saw big improvement in how students perceived their skills. Furthermore, the GTA survey confirmed the vast improvement in students' use of technology. However, in terms of analytical and critical skills, it was more difficult to confirm students' self-perceived improvement. Although the self-assessment outcomes conducted over 40 sections of the introductory writing course showed that students saw themselves improve considerably in such areas as web analysis and analysis of cultural and visual online representation (from 2.8 to 4.0 on a 5 point scale), GTAs did not see consistent improvement of students' analytical and critical skills over the course of the semester.

The results from the GTA survey showed us that many did not see this as a student shortfall, but as a problem with how technological literacy was introduced into the curriculum. Despite many discussions about the importance of teaching critical literacy skills in the practicum course, many of the GTAs were much more comfortable teaching basic technology skills. To them, critical literacy in a wired world was a much more ephemeral concept than teaching students how to create a PowerPoint presentation or webpage. They could see that students embraced the functional skills of the technological literacy modules, and they could see that students were able to create a web page. Interestingly, however, many of them saw a disconnect between analyzing a written text and analyzing a web page, documentary, or news broadcast.

The assessment of the pilot program provided us with many useful lessons. It became

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clear that even though we thought that we did a fabulous job, we needed to provide a more coherent integration of critical and rhetorical technological literacy into the writing curriculum. We also needed to rethink instructional strategies and provide instructors with additional hands-on information on how to teach critical and rhetorical technological literacy while de-emphasizing students' functional literacy in an environment where almost all students were familiar with more programs, web applications, and gizmos than we would ever be. We were especially indebted during this process to the very accessible approach outlined by the Center for Media Literacy's theory, practice, and implementation approach (Center for Media Literacy). When we re-structured the GTA preparation, we de-emphasized the how-to approach and emphasized an approach that stressed the overall applicability of rhetorical principles in teaching technological literacy skills, the similarities between text analysis and website analysis, and the similarities between writing a paper essay and writing/creating a web page for academic purposes.

Future Goals/Future Changes

After integrating technology into the writing curriculum for several years, we no longer have graduate assistants questioning the usefulness of "teaching technology." We have started to address computer anxiety or frustration early on, worked on troubleshooting strategies, expanded our online resources, and focused on developing a teaching practicum approach that fully integrates the technological literacy modules we teach in the first-year writing course. Instead of discussing how graduate students should be approaching technology, GTAs now test every module before teaching it and then discuss what they learned from it. This provides them with an opportunity to anticipate student questions, and it gives them language for addressing student concerns.

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We still have faculty who do not see the connections between teaching writing and "teaching technology," but we have also learned to explain the connections more succinctly. We have participated in many talks, presentations, and discussions at our institution attended by a wide range of faculty and administrators who are interested in improving technological literacy skills of students. Although the integration of technology into a first-year writing course has posed some challenges, our experiences have also been very rewarding. Students' progress in understanding the importance of critical and rhetorical technological literacy has shown us that the writing curriculum was able to integrate a multimodal approach to teaching first-year composition.

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Appendix A: Excerpts from Revised Course Description

English 105 is a four-credit-hour survey course that introduces you to critical reading and writing in the academic community. Throughout the semester we practice the *reading process*: generating questions or deriving answers from written texts, documentary films, and web texts; summarizing texts; identifying examples, drawing inferences, and making logical or comparative connections; organizing information in a variety of ways; seeing and learning rhetorical skills used by effective writers; and evaluating the merits of what we read and see. At the same time, we practice the *writing process*: identifying audience and purpose when using different media; gathering or finding ideas; organizing and interrelating those ideas for readers; drafting in order to develop, support, and illustrate ideas; revising from trial-and-error and in light of peer input; editing for clarity and accuracy.

Course Goals

- To introduce fundamental writing principles used in academic settings.
- To understand the connections between critical reading and writing skills through close attention to the production and interpretation of texts.
- To apply critical reading and writing skills to formal writing tasks, including an extended writing project.
- To develop technological literacy skills to rhetorically analyze online resources based on the audience addressed, the purpose explored, and the language used.

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English 105 incorporates computer literacy as an integral part of teaching critical thinking, reading, and writing skills. The computer modules are not intended to teach you computer skills, but are intended to teach you to look more critically at how technology influences our understanding of the writing process and our thinking about reading and writing in a technology-supported environment. You will create an online writer's profile which includes a reflection on your English 105 experience.

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Appendix B: GTA Questionnaire

What are your aims, objectives, goals:

- What are you trying to achieve? How do your aims and objectives for increasing students' technological literacy fit with the aims and objectives of the course in general and the various lessons/rhetorical strategies/readings you are teaching during that time period?
- What do you want the outcome to be? What do you want students to know and be able to do after they finish the module? How do you want them to be able to apply their technological literacy skills in a writing course?

What do you expect students to know already?

- Why do you think they know this? Can you make these assumptions? What do you need to do to find out whether they already have this knowledge?

What do students need to know from you before you start this module?

- What initial instructions do you need to give them to prepare them for what you want to do?

What do students need to know in order to successfully complete this module?

- What skills do they need to have? What information do they need to have?

How do you ensure that students behave appropriately?

- What are the guidelines you need to figure out? Are you going to establish the guidelines? Do students have input?

What specific steps do students have to go through to complete the project?

- What do they need to know/be able to do first, second, third,…

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How are you going to get them through the different steps?

- How are you going to teach them the skills they need to have to fulfill your goals? Be as specific as you can here. Your students will appreciate it.

How do you introduce the module? How do you round up the module?

- Are there specific exercises that they will do? Are they going to present their acquired knowledge to you/the class?

How do you accommodate different skill levels/different learning styles?

- How do you profit from different skills/learning styles? Can you let students teach other students? How so?

What else do you need to learn about in order to make this a successful module?

- What do you need to do to become more familiar with technology? What are some possibilities for networking with your peers? How might you share your tech. knowledge/ expertise with your peers?

What alternative plan do you have if the technology isn't doing what you want it to do?