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# *Using WebCT as a Supplemental Tool to Enhance Critical Thinking and Engagement Among Developmental Reading Students*

*The purpose of this research was to examine possible outcomes of developmental students' critical thinking and motivation to read when the online learning community, WebCT, was implemented. My role, in addition to instructor, was that of participant-observer. I implemented WebCT tools, such as discussion board and chat, over a four-month period into my instruction to enhance critical thinking and motivation to read in my Developmental Studies in Reading II classroom. A mixed-method approach for intervention evaluation was employed, and improvements were noted in both reading engagement and critical thinking skills by using these online tools. By incorporating this technology into the developmental studies curriculum, we, as developmental education instructors, will be encouraging and supporting our students' needs to become independent thinkers and learners.*

The motivation behind conducting this research lies within the need to examine further effects of online learning for developmental reading students. To date, only a few researchers have conducted studies in which they have investigated developmental reading and online learning despite the rapid implementation of online learning opportunites in many colleges and universities. This dearth of research studies is mainly due to the lack of controlled studies in community college developmental education programs. Until studies

are conducted, developmental education programs are adopting promising instruction by other community colleges and universities that have found them to be successful (Perin, 2005). Implementation preceding research could come at a costly price to developmental reading students in terms of learning and developmental education as a whole if the needed research is not conducted.

## Developmental Education and Distance Education

The National Association for Developmental Education (NADE) provides a current definition of developmental education, a field that has dramatically changed over the last 10 years:

> Developmental education is a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to individual differences and special needs among learners. Developmental education programs and services commonly address academic preparedness, diagnostic assessment and placement, development of general and discipline-specific learning strategies, and affective barriers to learning. (NADE, 2007, "Definition of Developmental Education," p. 1)

Concomitant with this definition, Boylan (2002) suggested that colleges should give developmental students a variety of course experiences and not limit their learning to one mode of delivery. Other researchers have expanded this suggestion with the contention that students today must have computer knowledge to succeed in college and beyond. Leu, Kinzer, Coiro, and Commack (2004) stressed the importance in our global economy of equipping students with "new literacies" that support social communication and use of communication technologies where possessing these skills in our world today are vital. Leu et al. defined new literacies as

> the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others. (Leu, et al., 2004)

The communicative, social nature of online learning allows students to utilize and enhance these important skills.

According to a 2000-2001 report by the National Center for Education

Statistics (NCES, 2003), 13% of all institutions offered developmental courses through distance education. The following is a breakdown of institutions offering developmental education through distance education: 25% of public 2-year colleges, 8% of public 4-year institutions, and 4% of private 4-year institutions.

Between 1995 and 2000, statistics indicated a substantial increase of distance education use in developmental education in all institutions (from 3% to 13%). Also, during this time period the proportion of public 2-year colleges offering remedial courses through distance education increased from 6% to 25%, and the proportion of public 4-year institutions increased from 4% to 8%.

In Fall 2000, 64% of the institutions overall used Internet courses using asynchronous communication as a primary mode of delivery for remedial instruction. It can safely be assumed that these numbers have increased from 2000 until now and will continue this ascending trend.

Despite the rise in online developmental education, implementation has been a concern for many in developmental education due to apprehensions relating to (a) attrition rates, (b) prior knowledge to utilize effectively the technology, and (c) the independent nature of this type of learning (Petrides, 2006). However, recently researchers have suggested that online learning yields student success in a number of areas. Wadsworth (2007), in a study of online developmental mathematics, reported that study skills instruction increased student success rates and that the autonomy of this particular learning environment supported students' motivation to learn. Lee (2007), in a study of online collaborative case study learning, demonstrated that critical thinking skills can be achieved through online case study instruction. The collaborative nature of online discourse afforded the opportunity to glean varying perspectives. Osterman's (2005) comparison of online versus traditional instruction in a developmental reading course established that the results were not statistically significant between the success and completion for both learning environments. Many students in the course gained enough self-confidence in their newfound technology skills that they invested in computers with the hope of continuing their learning success. Caverly and Peterson's (2005) look at building literacy through online discussions forums indicated that online interaction sets the stage for social presence, cognitive presence, and teaching presence, thus building the necessary college literacy skills that many developmental education students need. Students perceived increased time management skills and ability to read text more accurately in Krech's (2001) study with online developmental writing students. These important self-regulatory skills ultimately afforded them the opportunity to become independent

learners in charge of their own learning. Researchers have shown that self-regulation is vital for developmental education students, as it serves as the foundation for support in learning, motivation, and performance (Pintrich & Garcia, 1994).

## Characteristics of the Developmental Reading Students

Students who have been tested into a developmental reading course often need study strategies and reading skills necessary to deeply comprehend college texts (Elder & Paul, 2004). Not only are they not prepared for the rigors of college text reading, but they are also ill-prepared for other life challenges that require skills in reading. Researchers noted that underprepared students who successfully pass a developmental reading course "experience significantly greater success in college over the long term compared to similarly underprepared students who either do not take, or do not pass, such a course" (Cox, Friesner, & Khayum, 2003, p. 189). Developmental reading students who were explicitly taught reading strategies showed more academic success than those who did not receive explicit instruction. Students were also able to transfer the skills learned to college courses requiring intensive reading (Caverly, Nicholson, & Radcliffe, 2004).

Currently, there are estimates that "40% of first-time students entering the average community colleges are underprepared for college-level work" (National Center for Educational Statistics, 2003). Figure 1 shows the demographics of developmental education students:

> education demographic profiles typically include gender, ethnicity, enrollment status, age, level of deficiency, commuter status, and socioeconomic status.

Women make up over half of all developmental students, and the overall average age of developmental education students is 24 (Saxon & Boylan, 2004).

It is also clearly evident, according to this figure, that poverty is a significant characteristic, and researchers have shown "a strong correlation between poverty and academic under-preparedness" (Lavin & Hyllegard, 1996; McCabe & Day, 1998). According to the Texas State Data Center and Office of the State Demographer Web site, it is projected that by 2010, Hispanics will be the fastest growing population needing these courses.

*Figure 1 Demographic characteristics of community college developmental students*

| Students | Gender |
|---|---|
| Female | 55% |
| Male | 45% |
| Average age | 24 |
| Race | |
| White | 67% |
| African American | 23% |
| Hispanic | 6% |
| Asian | 3% |
| American Indian | 1% |
| Married | 25% |
| Income Less than $20,000 | 54% |

*Note.* The data in the column are from the National Center for Educational Statistics, 1996. Adapted with permission.

## Motivation and Critical Thinking Skills of Developmental Reading Students and Online Learning

In what ways can online learning facilitate engagement? In Flippo's (2001) study of research conducted by reading experts, it was found that access to reading materials, opportunities for self-selection, and social interactions about text were all important in fostering reading engagement. Gambrell (2006) suggested that technology can develop these characteristics. Despite research yielding comparable motivation levels of developmental education students to that of regularly-admitted college students (Ley & Young, 1998), in the *specific* area of developmental reading, the lack of motivation to read is a common issue and students need to be encouraged to acknowledge the value of their education to change this behavioral pattern (Fry & Ecung, 1998). In Moore's (2007) research on academic motivation and performance of developmental education biology students, lack of motivation was attributed to lack of academic skills and related experiences of traditional students. He further asserted that student choice in completing academic tasks directly related to motivation and, therefore, "any means that increase at-risk students' motivation and engagement should be pursued" (p. 32). Furthermore,

Lowery and Young (1992) suggested that developmental educators should provide students with instruction that is interesting and that will serve as a catalyst for self-directed learning. Both stimulating learner interest and offering instructional options are motivational strategies that are suggested and encouraged in developmental education.

Using distance education tools, such as discussion board and chat, has been shown to stimulate learner interest, thereby increasing motivation to learn. Specifically, interest has been demonstrated in online environments that are interactive—where students actively engage with others, hence refining, adding or creating new knowledge (Beeghly, 2005; Johnston, Killion, & Omomen, 2005; Pallof & Pratt, 2003). When students are actively involved, they are able to understand and apply what they have learned in real world situations (Eble, 1988). This understanding and application ultimately provides authentic reasons for learning, thereby creating student motivation and excitement to learn (Quitadamo & Brown, 2001). When students are interested in a topic or situation, they are likely to "process information in a meaningful, organized, and elaborative fashion—for instance, by relating it to things they already know, interrelating ideas, drawing inferences, forming visual images, generating their own examples, and identifying potential applications" (Hidi & Anderson, 1992, p.23).

Online learning also has been demonstrated to promote critical thinking skills—which are also cited as important skills that developmental readers need (Lee, 2007). Scriven and Paul (2004) defined critical thinking as analysis, synthesis, and application of learned information to various situations. Lee (2007) posited, "The ability to think critically is needed in this revolutionary age of technology change. Among the essential skills required to close the gap between the knowledge and skills students learn in schools and those required to function effectively in the workplace and community is the ability to think critically (p. 82).

When students are asked to apply and reflect on what they learn, they retain more content (Bereiter & Scardamalia, 1989). Smith, Ferguson, and Caris (2001) asserted that contrary to intuition, current Web-based online college courses are not an alienating, mass-produced product. They are a labor-intensive, highly text-based, intellectually challenging forum which elicits deeper thinking on the part of the students and which presents, for better or worse, more equality between instructor and student. Initial feelings of anonymity notwithstanding, over the course of the semester, one-to-one relationships may be emphasized more in online classes than in more traditional face-to-face settings (p. 4).

## Course Design and WebCT Tool Description

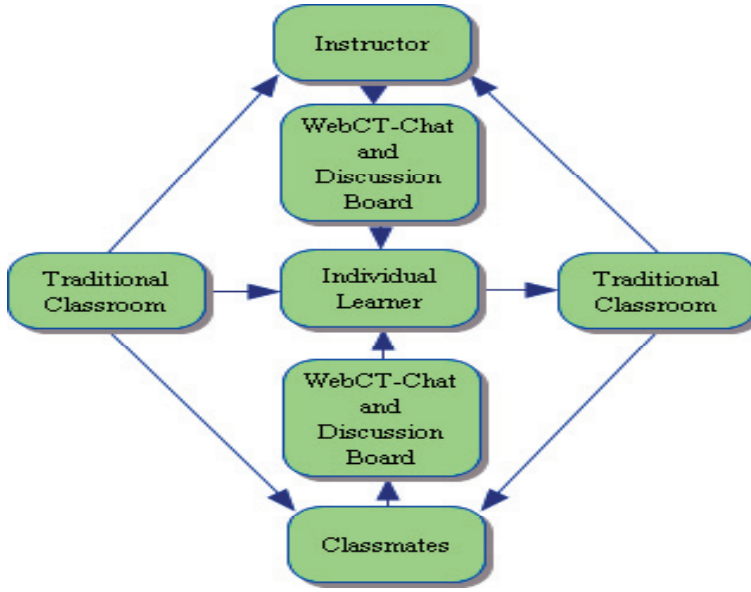
**Good practice.** For this research, I have drawn support for the course design from the Seven Principles for Good Practice in Teaching and Technology (Testa, 2000). These principles emphasize student-faculty contact, student-student collaboration, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents. The underlying presupposition guiding these principles is that by incorporating these into instruction, learning will occur (Frederickson, Pickett, & Shea, 2000).

By using WebCT discussion board and chat tools coupled with proper guidance and instructional direction, students are able to contemplate collaboratively and critically analyze course material and discussion topics. This higher-level learning, in turn, leads to active and interactive learning, which is an important component in the learning process.

To lay the foundation for the desired results of this research, it was necessary to design instruction incorporating both WebCT discussion board and chat sessions throughout much of the semester in addition to regularly-held traditional classes.

The course was taught using a hybrid online model. The hybrid online model gives flexibility with classes and increases interaction and contact among students (Garnham & Kaleta, 2002). This model illustrates the learner-centered nature of a hybrid class and serves as a solid foundation for introducing developmental students to online learning. See *Figure 2* below to view the dynamic nature of faculty-student interaction.

*Figure 2. The hybrid online model.*



I decided to use the backward design approach described by Wiggins and McTighe (2005). This curriculum design encourages the instructor to plan a course from the end to the beginning. It is effective in yielding specific results and can be utilized to plan a lesson, a study unit, or an entire course (Wiggins & McTighe, 2005). By following the backward design approach, I was able to design my course with the end result in mind: having my students motivated to read and having all or most of my students being able to understand and critically think about what they read.

Designs, management, and strategies in synchronous and asynchronous learning are good indicators of online learning success (Tu, 2003). If the design of an online course is easy for the student to navigate and implements clear, well-defined objectives for learning, students tend to feel comfortable with this mode of learning. Whereas chat sessions create a means for electronic communication (Martyn, 2003), the quality of chat interaction depends heavily upon the instructional delivery (Roberson & Klotz, 2001). Hence, by keeping chat sessions small in size (four to five students), I was able to monitor my students' engagement in inductive reasoning and understanding.

**Discussion board.** Discussion board provided an asynchronous communicative forum where students could work collaboratively and share thoughts and ideas. In traditional classrooms, time constraints and divided attentions sometimes prohibit in-depth discussions. By using the discussion board tool, students benefit in many ways. They have (a) "think time" before responding, (b) the opportunity to respond thoughtfully without interruptions, (c) opportunities to read other classmates' responses and think about them before responding, and (d) opportunities to converse without limits with fellow classmates (Lindsey-North, 2000, p. 4). Students have the ability to think and reflect on what they post to the discussion board, thereby increasing the quality of discussion.

**Chat.** The chat tool on WebCT is delivered synchronously, allowing students and teacher to discuss, converse, and share ideas. According to D'Eca (2003), different types of interactions are evident in chat sessions: (a) student-to-student (generates sharing of personal experiences, viewpoints, etc.), (b) student-to-teacher (allows for individual or group help), and (c) student-to-online-resource (encourages timely analysis and discussion of materials online). Other advantages included exercising communication skills and etiquette, expressing ideas and receiving immediate feedback, developing personal (independence and autonomy) and interpersonal skills (helping, discussing, debating, suggesting), and establishing time management skills (arriving to session on time). Both discussion and chat also encouraged students who are were typically shy in the traditional classroom to actively participate.

## Disadvantages of Chat and Discussion Board Tools

Some of the documented issues with discussion board and chat include (a) organizing chat times around busy schedules; (b) Internet access at home; (c) previous exposure and use of computers; (d) computer glitches (i.e., DSL, dial-up); and (e) cost (as more and more institutions use hybrid courses, there will be pressure to develop more computer labs) (D'Eca, 2003). College students lead busy lives with many working full or part-time jobs; therefore, trying to organize chat sessions around these schedules can be cumbersome. Some students may not have Internet access or be able to afford Internet access. However, many campuses today offer Internet-ready computer labs or free wireless connection for laptop computers. Also, by offering pre-course orientation, many of these issues can be addressed before the inception of class, thereby eliminating much of the frustration associated with computer-use.

## Identifying Engagement and Critical Thinking When Using Discussion Board and Chat Tools

**Engagement.** It is well established in research that a well designed online learning community creates a strong sense of community among students (Hasselbring, Lott, & Zydney, 2004). As an online instructor, it is necessary to ensure that learning is actually occurring in an online learning community. In that respect, it is important to define the depth of learning students will glean when using the discussion board and chat tools by identifying and measuring student engagement. This measurement can be achieved by examining levels of participation, student perceptions, and completion of assigned tasks.

**Critical thinking.** Conrad and Donaldson assert that "evaluation of critical thinking and reflection requires assessment methods that encourage individual expression" (p. 25). This evaluation was accomplished by assessing responses in chat sessions and on the discussion board with Perkins and Murphy's (2006) *Model for identifying engagement in critical thinking.* This model serves to identify indicators in four different categories: clarification, assessment, inference, and strategies that can be used by developmental reading instructors to measure critical thinking in the context of online discussions and chats. See Table 1 below.

With discussion board and chat, depth of understanding can be assessed by monitoring the conversations and recording key words or phrases indicative of higher-order thinking within these four categories.

*Table 1 Model for Identifying Engagement in Critical Thinking*

| | | | | |
|---|---|---|---|---|
| **Clarification**<br>All aspects of stating, clarifying, describing (but not explaining), or defining the issue being discussed. | | | | |
| Proposes an issue for debate. | Analyzes, negotiates or discusses the meaning of the issue. | Identifies one or more underlying assumptions in a statement in the discussion. | Identifies relationships among the statements or assumptions. | Defines or criticizes the definition of relevant terms. |
| **Assessment**<br>Evaluating some aspect of the debate, making judgments on a situation, proposing evidence for an argument or for links with other issues. | | | | |
| Provides or asks for reasons that proffered evidence is valid. | Provides or asks for reasons that proffered evidence is relevant. | Specifies assessment criteria, such as the credibility of the source. | Makes a value judgment on the assessment criteria or a situation or topic. | Gives evidence for choice of assessment criteria. |
| **Inference**<br>Showing connections among ideas, drawing appropriate conclusions by deduction or induction, generalizing, explaining (but not describing), and hypothesizing. | | | | |
| Makes appropriate deductions. | Makes appropriate inferences. | Arrives at a conclusion. | Makes generalizations. | Deduces relationships among ideas. |
| **Strategies**<br>Proposing, discussing, or evaluating possible actions. | | | | |
| Takes action. | Describes possible actions. | Evaluates possible actions. | Predicts outcomes of proposed actions. | |

Based upon the literature review, supplementing the discussion board and chat with instruction has the potential to increase engagement and critical thinking skills for developmental reading students. The design

and development of the course is crucial and must have catalytic components which spark active learning. Online learning holds promise as a strong influence in developmental education in both reading and writing success, and may effectively prepare developmental reading students for college-level courses and thereafter.

## Research Question

The following research question guided this study: Can chat and discussion board foster engagement and critical thinking among developmental reading students?

## Method

### *Participants*

Participants involved in this study include one section of Developmental Reading at a community college in Southeast Texas during the spring 2007 academic semester. There were initially 20 students total: 12 males and 8 females. However, 2 males dropped the course, leaving the total at 18. There were no ESL or Learning Disability students in the class. Traditional class time was held on Mondays and computer lab time to work with WebCT tools was held on Wednesdays. The division of time provided a balance where students could gradually get their feet wet with the online learning tools without feeling pressure to jump right in.

### *Design and Procedure*

Both qualitative and quantitative methods were used to categorize the research. The crux of the quantitative data included transcripts from both WebCT chat and discussion board tools. The Murphy and Perkins (2006) model was used to measure critical thinking and engagement by analyses of data from the discussion board and chat transcripts and by the number of discussion posts, respectively. Critical thinking was also measured using pre- and posttest scores taken before using discussion board and chat and after using discussion board and chat. Inter-rater reliability was utilized by recruiting three developmental reading evaluators to assess discussion board posts, pre-discussion board test scores and post-discussion board test scores. These "calibration sessions" were regularly held meetings among the developmental reading instructors to ensure consistent scoring procedures. Qualitatively, observations were recorded in weekly journals and were interwoven with interviews, which provided thorough information about the data. It also served to cross-reference the data compiled in observations. Formal and structured interviews were audio recorded, conducted individually, and then later transcribed. The survey at the end of the activities included questions

reflecting student satisfaction and perceived learning using WebCT tools. Names of those persons involved in the research were changed to protect confidentiality.

A preliminary questionnaire was given at the beginning of the course. By using a questionnaire, I was able to collect large amounts of data within the time constraints of a semester. The questionnaire indicated that all of my students had a computer at home with Internet capabilities; however, none of my students had previous experience working with WebCT and most were unsure of its purpose and structure: Angie (student) said, "I'm not sure yet but I will give it a try! It would be a great thing for me personally because I get bored easily, so I like stuff that I have to figure out!"

**Course preparations and adjustments.** Before beginning the research, I was aware that the motivation to read and a lack of critical thinking were underlying issues with some of my developmental students. This awareness prompted the decision to supplement WebCT into my classroom. Having taken online courses myself and having a pleasant learning experience while doing so, I felt the need to see if I could provide a learning experience for my developmental students that equaled or even surpassed what I had experienced—both in learning and enjoyment. I wove activities into my course design in such a way that both critical thinking skills and motivation would be encouraged and evidenced. By trying chat and discussion board with previous semester's students and experiencing some of the "kinks," I was able to make adjustments and enhancements and proceed with the research with the following semester's students. One of the issues I encountered the previous semester was conducting chat sessions outside of classroom time. For the research group, I decided to hold chat sessions in the computer lab instead of having the students "meeting" with me outside of class. Students' scheduling conflicts with work and families caused me to change this aspect of chat and by doing so, a few of the problems were eliminated.

After the course was designed to my satisfaction and for the purpose of this study, I divided my students into four groups of five for both discussion board and chat session activities. I decided to use the same groups for both ease, consistency, and to strengthen student interaction.

**Orientation and follow-up.** Before engaging in any of the WebCT activities, I devoted an entire class period to introducing WebCT and its various components. I inserted a "welcome to class" video that outlined a description of the entire course, course objectives, and requirements as well as readings and materials. We visited the chat room, the discussion board, and I also showed them our Intranet email. They were fas-

cinated by knowing that they could access their grades under the tool "My Grades" at any time to keep track of their progress. By installing an assignment section where each daily assignment could be posted, students could keep informed if they happened to be absent on a certain day. By the end of class, everyone had successfully navigated the course, and I felt confident that they were comfortable using it.

I also adhered to course management tips to ensure the experience was positive for my students. I made certain to do the following on an ongoing, regular basis:

1. Logging onto the course everyday.
2. Checking and immediately responding to student email several times a day.
3. Grading and returning assignments, quizzes, and tests as quickly as possible.
4. Checking with each student periodically via WebCT to answer any questions and to see if he or she had any concerns about either the traditional class portion or the WebCT portion.

*Data Analysis*

**Chat quiz scores (data #1).** Before entering a chat session, students were required to read an assigned essay each week from one of our texts, *Essays from Contemporary Culture* by Ackley (2001). Among the four chat sessions, this research specifically focused on the essay, "Making the Grade," written by Wiesenfeld. The students prepared for chat sessions by (a) reading the text and (b) taking an online quiz on the reading. Each online quiz was worth 20 points and accounted for 20% of their overall grade. Thus, after the course overview at the beginning of the semester, students understood that the quizzes comprised a good portion of their grade. These preliminary activities encouraged students to read the material in order to perform well on the quiz and then be prepared for thoughtful discussion.

**Discussion board post scores (data #2).** The discussion board provided space where writing skills were also used and where there was potential for further research. For discussion board activities, each group was assigned a weekly reading from *Essays from Contemporary Culture* over the course of four weeks (four readings/discussions per week). Different questions were posed to each group to answer and discuss and came from the "Reader Response" section of the essay, which represented questioning levels conducive to critical thought. Among four discussion board readings, the short story "Silence" by Watson was used for this research. There were two requirements for this reading

assignment: (a) that the student write a well-developed posting to the original question and (b) that the student write two insightful responses to two other classmates' responses in any of the other three groups. This expanded opportunities to respond to other groups as well as encouraged the reading of most or all of the other discussions. I also chose *not* to participate in these discussions as I did not wish to squelch student interaction.

**Journal entries (data #3).** During the chat sessions, personal thoughts, reactions, concerns, or ways to improve chat were noted.

**Student interviews (data #4).** Interviews were conducted in order to speak individually with students to learn specifically what they liked or disliked about discussion board and chat and if they perceived that they were learning.

**Student survey (data #5).** Students responded to survey questions that addressed their satisfaction and perceived learning using discussion board and chat at the end of the semester using a Likert scale of 1-5 (1 = strongly disagree, 5 = strongly agree).

**Chat and discussion board transcripts (data #6).** A feature of WebCT chat and discussion board tools is that discourse is automatically recorded. An instructor may go back and analyze a chat transcript or discussion board post for a number of instructional purposes. Discussion board and chat transcripts were analyzed using the Perkins and Murphy (2006) model for identifying engagement in critical thinking.

**Pre- and posttest scores (data #7).** One of the primary research objectives was to see if students were able to master effectively a test similar to the District Common Final (DCF), which is a final exam administered to all of the Developmental Reading classrooms within this particular college district. The final is a large determinant of whether the student passes or fails the course. The DCF consists of a reading passage and multiple-choice and short-answer questions, which require critical reading. Students must demonstrate critical thinking skills in their answers as well as to be able to identify various literary elements such as tone, pattern, mood, and intended audience.

## Results

**Chat quiz (data #1).** The distribution of chat quiz grades was as follows: 8 students made an A, 4 students made a B, 4 students earned a C, and 2 students earned a D. As 80% of my students passed the online quiz, it may be interpreted that these students had an understanding of the reading material.

*Table 2 Quiz Grades for "Making the Grade" Online Quiz*

| Number of Students | Quiz Grade (out of 20 points) | Grade Percentage |
|---|---|---|
| 2 | 12.0 | 60% |
| 4 | 14.0 | 70% |
| 4 | 16.0 | 80% |
| 6 | 18.0 | 90% |
| 2 | 20.0 | 100% |

**Discussion board post scores (data #2).** The scores from the discussion board posts provided confirmation that most of my students were able to use many of the critical reading skills from the Perkins and Murphy model. The distribution of final grades was as follows: 11 students earned an A, 5 students earned a B, and 2 students earned a C.

*Table 3 Scores From "Making the Grade" Discussion Posts and Responses*

| Number of Students | Grade Received | Grade Range | Letter Grade Equivalent |
|---|---|---|---|
| 8 | 25 | 20-25 | A |
| 3 | 20 | 20-25 | A |
| 5 | 19 | 14-19 | B |
| 2 | 13 | 8-13 | C |

**Journal entries (data #3).** From this data, I (a) observed my students' reactions to chat and (b) recorded any indicators of active engagement. What I learned from journal entries supported both my goals:

> February 6, 2007, Journal Entry
> Wow, lots of grading lately, but have finally put WebCT discussion board and chat to work. The students love it. I've seen more positive reaction coming from chat over discussion board, but overall the students like it. (Burgess, 2006)

**Student interviews (data #4).** Consider the following questions and comments from the interview with one of my students:

**Melissa (M.):** Do you feel that WebCT has improved the learning community within our classroom?

**Brittany (B.):** Yes. When I get on the discussion board and answer the questions you put on and someone else responds with a comment or says something different than what I say, it helps me to get to know

them better. I don't talk much in class so I do better by typing it on the computer.

**M.:** When I post discussion questions to WebCT for discussion, do you read the assignment or essay before posting? Why or why not?

**B.:** I do read the essays before putting a post on WebCT because I won't know what to say unless I read the assignment.

**M.:** On the WebCT Discussion Board, do you read other classmates' postings to discussion questions as the assignment asks?

**B.:** Yes, because I am curious to know what they said too. Sometimes I see something that I can relate to and post something back to that person.

**M.:** Do you feel that your motivation to post your responses is high or low, knowing it will be posted for all to see? Please explain.

**B.:** Well, when I know that everyone in class might be reading what I write, it makes me write better. I also want to make sure that I understand the assignment, so I make sure I can understand what I read too.

**M.:** About how many postings do you read?

**B.:** I actually try to read all of them—I like to see what other people wrote.

**M.:** We also use the chat tool to discuss the essays we have read. Do you like this tool? Why or why not?

**B.:** I love getting on chat. At first I'm nervous because I know that I could be asked something that I don't know the answer to, but after a few minutes I get comfortable and what I read comes back to me. Sometimes other people ask the same question I was going to ask.

**M.:** Do you prepare for the chat session by reading the essay beforehand? Why?

**B.:** Yes, just like for discussion board. Like I said before with discussion board, I want to know what I'm talking about.

**M.:** When we chat as a group, do you feel you are learning? Specifically, do you feel that you comprehend the essay more by discussing it via this format? Why or why not?

**B.:** Yes, I feel I am learning because I also learn from other people in my group. They may say something about the essay that I hadn't thought of before. I seem to understand more because I ask more questions with chat than I do in the classroom.

Not only is there perceived learning shown in this interview, but there is motivation to know more and to read more through piqued curiosity at "what other people wrote." The collaborative nature of both the WebCT chat and discussion board tools fosters the social aspect of learning, thereby increasing the opportunity to build new knowledge from others or add to preexisting knowledge.

**Survey (data #5).** All 18 participants in this study completed the survey. Table 4 shows the averages of the Likert scale responses.

*Table 4 Survey of Students' Perceptions of WebCT Discussion Board and Chat Tools*

| Survey of students' perception of WebCT discussion board and chat tools | Average* |
|---|---|
| Participation increased scores on practice tests, tests, and quizzes | 4.2 |
| Participation increased total course points | 4.0 |
| Participation increased understanding of content | 4.0 |
| Participation increased reading comprehension | 3.8 |
| Participation increased motivation to read | 4.0 |
| Participation increased understanding of technical aspects | 4.3 |
| Participation increased interaction with instructor | 4.1 |
| Participation increased feeling of community | 3.3 |
| I enjoyed participation in online chat sessions | 4.4 |
| I enjoyed participation on the discussion board | 4.8 |
| Chat sessions should be used again for this course | 4.3 |
| Discussion board should be used again for this course | 4.0 |

*Scale 1 = Strongly Disagree. 2 = Disagree. 3 = Unsure. 4 = Agree. 5 = Strongly Agree.

The results from this survey reflect 100% response rate and also included comments such as "At first the WebCT was a small concern for me. But then as time went on I [became] fairly good with it. Now it's a lot of fun, especially checking out grades, assignments, and chatting with others"; and "I enjoy chat. It's cool! I like when we interact with each other, and talk. It's another side of the teacher, than just [lecturing]."

**Chat and discussion board transcripts (data #6).** In the chat session covering the reading "Making the Grade," critical thinking was measured in the ongoing discourse with my students. I required that the student attend the chat session, come well equipped with questions and insightful thoughts about the story, and respect others' opinions and thoughts. I was pleasantly surprised that my students went above and beyond in chat sessions by asking each other probing questions, analyzing actions by the characters, and being able to identify key literary elements of the reading:

**M.:** What does Wiesenfeld think about those students who ask for a higher grade (without really earning it)?

**Betty (B.):** They don't deserve to have a higher grade if they didn't put any effort into [sic] class.

**M:** That's right.

**Susan (S.):** [T]hat they are just asking for a grade when they do not try.

**Nathan (N.):** He thinks that it's sad that hard work is overruled by the sadness of a student.

**(M.):** I don't just hand out grades: I try to be fair...but at the same time, I want you to work for your grade. I am essentially holding you accountable for your own decisions.

**(M.):** According to Wiesenfeld, who is to blame for this "erosion?" Parents? Teachers?

**(N.):** Teachers.

**(B.):** I think it's the students that are to blame.

**(N.):** ...to tell you the truth, it should be both.

The chat session demonstrated comprehension of the story through discourse rich in inquiry and understanding of content as measured by the Perkins and Murphy (2006) model. Connections were made and students demonstrated metacognition by sharing their own beliefs about students asking professors for higher grades without deserving them.

Discussion board transcripts also elicited engagement and critical thinking. To measure critical thinking, I looked for evidence in any of the four categories of Perkins and Murphy's (2006) model for engagement in critical thinking of making connections to previous or current content or to real-life situations. I wanted to see rich and fully developed new ideas, connections, or applications. These higher-order thinking skills coupled with collaborative learning enhanced and supported the learning process. Although I saw many instances of critical thinking in other groups, I decided to use portions of Group 2's initial posts and responses for support. I saw several connections to real-life situations:

Table 5 presents a summary of the critical thinking engagement shown through the discussion board and chat transcripts using the Perkins and Murphy (2006) model for identifying engagement in critical thinking. Participants' engagement is shown by the total number of both discussion board and chat messages.

Descriptive statistics indicated total number of messages ($M$ = 7.94, $SD$ = 1.86) and total number of coded units ($M$ = 6.89, $SD$ = 1.94). Clarification ($M$ = 3.10, $SD$ = 1.34) and inference ($M$ = 2.76, $SD$ = 1.09) reported higher responses reflecting critical thinking. Both assessments ($M$ = 1.76, $SD$ = .75) and strategies ($M$ = .71, $SD$ = .59) reported lower responses reflecting critical thinking.

*Table 5 Numerical Summary of Participants' Engagement in Critical Thinking*

| Participants | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total # of messages | 10 | 6 | 8 | 7 | 12 | 7 | 6 | 9 | 10 | 7 | 6 | 7 | 8 | 11 | 9 | 5 | 7 | 8 | 7.94 |
| Total # of coded units | 7 | 8 | 9 | 7 | 6 | 7 | 4 | 10 | 9 | 6 | 4 | 5 | 5 | 8 | 7 | 4 | 9 | 9 | 6.89 |
| % of units coded as clarification | 3 | 4 | 2 | 3 | 2 | 2 | 1 | 4 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 6 | 7 | 3.10 |
| % of units coded as assessment | 2 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 2 | 1 | 1.76 |
| % of units coded as inference | 3 | 3 | 4 | 4 | 3 | 2 | 2 | 4 | 2 | 3 | 1 | 3 | 2 | 3 | 1 | 2 | 2 | 5 | 2.76 |
| % of units coded as strategies | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 71.0 |

*Table 6 Pre-Discussion Board Test Scores vs. Post-Discussion Board Test Scores*

| Student | Pre-Discussion Board Test Score (out of 100) | Post-Discussion Board Test Score (out of 100) |
|---|---|---|
| Student #1 | 75 | 82 |
| Student #2 | 78 | 80 |
| Student #3 | 83 | 85 |
| Student #4 | 71 | 83 |
| Student #5 | 90 | 95 |
| Student #6 | 88 | 89 |
| Student #7 | 96 | 98 |
| Student #8 | 85 | 83 |
| Student #9 | 89 | 92 |
| Student #10 | 66 | 69 |
| Student #11 | 79 | 84 |
| Student #12 | 91 | 93 |
| Student #13 | 56 | 60 |
| Student #14 | 88 | 90 |
| Student #15 | 73 | 74 |
| Student #16 | 80 | 83 |
| Student #17 | 77 | 85 |
| Student #18 | 79 | 81 |

Student 18 demonstrated seven units coded for clarification. Clarification is evidenced in her statement, "You know when you are about to do something wrong and you know that you are going to get into trouble for it, but sometimes it is worth it?" Student 18 also engages in inference when responding to student 4 and further deduces that "even if the mother disapproved of it, the father knew he was going to get caught and he didn't even run from the police. He just wanted his son to spend the night." Student 15 uses strategies when she predicts why the little boy decides to never speak again: "The boy probably won't ever talk again since he cannot forgive his father for kidnapping him. He wants him to know he's mad at him." Student 3's summation on why the father was sent to jail states "the father did the wrong thing and for that he should be punished for kidnapping a child." This summation reflects the inference category.

**Pre- and posttest scores (data #7).** An examination of the histogram

pertaining to the pretest scores indicated no serious departure from normality. Specifically, the standardized skewness coefficient and standardized kurtosis coefficients were -1.25 (i.e., -7.25/.54) and 1.74 (i.e., -.93/.54), respectively. Similarly, for posttest scores, the standardized skewness coefficient and standardized kurtosis coefficients were -.70 (i.e., -.73/1.04) and 1.39 (i.e., 1.44/1.04), respectively. Because these coefficients fell within the $\pm$ limits (Onwuegbuzie & Daniel, 2002), a parametric *t*-test was conducted.

The dependent samples *t*-test revealed a statistically significant difference between the pretest and posttest scores, $t(18) = -4.67$, $p < .0001$. This difference represents an effect size of .53. Using Cohen's (1988) criteria, this difference represents a moderate effect size. Table 7 presents the means and standard deviations for both pretest and posttest.

*Table 7 Means and Standard Deviations for Pre-Discussion Board Test Scores and Post-Discussion Board Test Scores*

| | n | M | SD |
|---|---|---|---|
| Pretest Scores | 18 | 80.22 | 9.88 |
| Posttest Scores | 18 | 83.67 | 9.25 |

## Conclusions and Further Research

This research presented anecdotal evidence that WebCT tools, chat, and discussion board aid in students' critical thinking skills and reading engagement. Motivation to use the chat tool sparked a willingness to know more and to read more. It is likely that motivation and learning are "mutually causal—those who are more motivated to learn learn more, and those who learn more become more motivated" (Richmond, 1990). It comes as no surprise that online communication methods such as chat and discussion board are so much more than electronic communications. They have the potential to be a key means to increase motivation, thereby increasing the desire to learn and to think critically.

Continued research in online developmental learning is important for students and instructors alike. Online learning communities such as WebCT and Blackboard offer an array of tools that could promote literacy skills (both reading and writing) that developmental reading students need (e.g., calendar, blog, wiki). Creating online literature circles via chat sessions may also serve as an interesting method or technique. My hope is that the research I have conducted will shine a positive light on using online learning communities, thereby encouraging more colleges

and universities to supplement this new literacy. When conducting this research, I also noted that there were a few students who did not favor online learning. Further research could analyze and correlate student perceptions to personality traits.

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