

Teaching, Learning, and the Net Generation:

Concepts and Tools for Reaching Digital Learners

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Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

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Library of Congress Cataloging-in-Publication Data

Teaching, learning, and the net generation: concepts and tools for reaching digital learners / Sharmila Pixy Ferris.
p. cm.

Includes bibliographical references and index.

Summary: "This book provides pedagogical resources for understanding digital learners, and effectively teaching and learning with today's generation of digital natives, offering a much-needed resource that moves beyond traditional disciplinary and geographical boundaries, bridges theories and practice, and addresses emerging issues in technology and pedagogy"-Provided by publisher.

ISBN 978-1-61350-347-8 (hardcover) -- ISBN 978-1-61350-348-5 (ebook) -- ISBN 978-1-61350-349-2 (print & perpetual access) 1. Educational technology. 2. Generation Y--Education. I. Ferris, Sharmila Pixy.

LB1028.3.T3857 2012

371.33--dc23

2011032912

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

Chapter 15

Leveraging Multicommunication in the Classroom: Implications for Participation and Engagement

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ABSTRACT

Computer-mediated classrooms are proliferating and instructors are finding creative ways to reach the digital learners of today. But with all these technology tools, making decisions that are guided by solid pedagogical practices are vital. This study relies on instructional communication, multicommunication practices, and interactivity research and how they play key roles when creating a participatory classroom environment. The tool used to address the problems outlined in this case study is webconferencing—a synchronous Web-based platform that allows the instructor to share slides, create real-time surveys (polls), and provide text chat opportunities for students who are co-located or dispersed. By leveraging the webconferencing tools and the desires of the Net Generation, the classroom in this study became more inclusive, communicative, and interactive.

INTRODUCTION

Technology has infused the contemporary classroom. Whether the instructor chooses to incorporate technology as *part* of the physical learning environment, as the *conduit* for computer-

mediated instruction, or if the *students* bring their technology into the classroom, teaching is a different experience than it was five years ago. Many scholars have raised concerns about communication issues that have become more relevant in a computer-mediated communication (CMC) classroom environment (Allen, 2006; Patterson & Gojdyez, 2000; Mathiasen & Schrum, 2010;

DOI: 10.4018/978-1-61350-347-8.ch015

Schwier & Balbar, 2008; Sherblom, 2010; Spector, 2001). Yet there are also several key learning areas where CMC classrooms might enhance learning including improved interactivity, team-based and collaborative problem-solving, and engaging with the content more completely (Anderson et al., 2007; Bernard et al., 2009; Schrire, 2004; Stephens & Mottet, 2008; Vess, 2005; Vogel et al., 2006; Wood & Fassett, 2003). But so far, there is little agreement on whether there are any significant differences between courses using technology and those in a traditional instructional classroom environment (Benoit, Benoit, Milyo, & Hansen, 2006). This study adds to the literature by investigating multicommunication and student learning

In this study, the technology medium used to deliver the educational experience is webconferencing. Relying on rhetorical and relational goal theory (Mottet, Frymier, & Beebe, 2006) the case study and survey findings are used to illustrate how instructors can use webconferencing to improve attendance and participation and harness the current multicommunication behaviors of students into learning practices. To accomplish these goals, first the guiding theoretical perspective is introduced. Next, the background elaborates on the role of the Net Generation learner and the changing needs in contemporary classrooms. The problem and solutions illustrate how technology can be used as a classroom extension without compromising the instructor-student relationship. We end with directions for future research.

BACKGROUND

Theoretical Rationale

Regardless of whether instructors are in a traditional or CMC classroom, the relationship they have with their students is an important component of the learning environment (Frymier & Houser, 2000; Pogue & Ahyun, 2006; Witt, Wheelless,

& Allen, 2004). Rhetorical and relational goal theory (Mottet et al., 2006) provides a theoretical reason to have instructors carefully consider the rhetorical and relationship strategies they use in a classroom. *Students* have multiple needs which rhetorical and relational goal theory groups into two areas: academic and relational needs. For example, students can have different learning objectives; some of which are grade-related and others are interpersonal in nature. Furthermore, students differ in the weight they place on these different types of needs. When the students' needs are met, many positive outcomes result including increased student learning, motivation, and more satisfaction with the classroom experience.

In the model depicting the interplay between the student and instructor needs, Mottet and colleagues (2006) provide a framework and suggest that there are many opportunities to expand this perspective and elaborate on the specific strategies used by students and instructors. Past research using webconferencing as the CMC classroom medium has found that interactivity plays a key role and influences the perceived credibility of the instructor (Stephens & Mottet, 2008). Yet this evolving theory highlights an important dilemma for instructors trying to incorporate technology into their classrooms: will using technology influence the instructor-student relationship and can technology be used to accomplish the rhetorical—or compliance-gaining—goals of the instructors? Mottet and colleagues (2006) claim that instructors who are able to use both persuasion and relationship building activities—e.g., compliance-gaining and immediate behaviors, are more likely to meet the needs of more of their students. The current study focuses specifically on these two types of instructor goals—rhetorical and relationship—and offers elaboration and additional contributions to this theory. To understand the particular needs of contemporary college students, we turn our attention to the literature on Net Generation students' expectations.

Net Generation Students' Expectations in a CMC Learning Environment

Prensky (2001) coined the terms 'digital natives' and 'digital immigrants' to describe the students who grew up with computer technologies and the faculty and adults that did not. Given a distinction in their digital cultures and technology behaviors, it is important to understand how these digitally wired Net Generation students want to learn. There are five major expectations that the popular press and scholarly literature suggest are important to help us understand how a CMC learning environment might mesh well with their needs: preference for a blended classroom, technology that adapts to them, quick interaction with instructors, tendency to actively seek information, and a desire for fun learning.

Net Generation college students expect faculty to be experts in their fields but also want teachers who use technology to deliver knowledge (Roberts, 2005). Although there is an expectation of using technologies, Net Generation students generally prefer a balanced use of technology in their learning environment (Roberts, 2005) when technology is used to support traditional instruction (Belal, 2011). In other words, many of them like a blended combination of face-to-face interactions and mediated communication. They also expect technology to conform to their needs and situations 'as adaptive technologies' (Shute & Torrealan, 2003; Shute & Towle, 2003; Shute & Zapata-Rivera, 2008), instead of technological structures that require the students to change. The design and use of technologies should be learner-centered (McCombs & Vakili, 2005; Schiller, 2009; Soloway, Guzdial, & Hay, 1994).

Third, students expect speed in interacting with faculty. Net Generation students were raised in a technologically saturated environment, and while there is a debate concerning whether they can actually multitask (e.g., Ophir, Nass & Wagner, 2009 demonstrate they cannot), many reports claim that

they expect to be allowed to continue their multitasking practices well into the future (Connaway, Radford, Dickey, Williams, & Confer, 2008; Koffman & Eckler, 2005; Mason, Barzilai-Nahon, & Lou, 2003; Rainie, 2006). Their practices may have contributed to a relatively short attention span (Brown, 2005) and as a result, they are used to receiving fast information (McNeely, 2005), expect rapid responses, and instant gratification (Oblinger & Oblinger, 2005).

There is also evidence that Net Generation students are active searchers of information because of their need for instant gratification (Windham, 2005). It is likely that this need translates into the classroom as well. However, there is sometimes a gap in terms of how fast digital natives like to get information and the speed at which traditional classrooms are providing information (Palfrey & Gasser, 2008; Waycott et al., 2010). If there were ways to allow students to seek information during class without interfering with their attention to the lecture, this could be highly valuable.

Finally, like many young people before, this generation likes learning to be fun. They prefer games to 'serious' work (Prensky, 2001). This could be something more relevant for Net Generation students because they grew up playing many more computer games than prior generations (Lippincott, 2005). This tendency suggests that Net Generation students would enjoy a creative approach to teaching.

Need for Interactive Learning Environments

Oblinger and Oblinger (2005) used focus groups and found that Net Generation students are intuitive visual communicators, can shift their attention easily from one thing to another, have a fast response time, and demand fast turnaround time as well. Their learning styles include a preference for working in teams, interactivity at a rapid pace, as well as preference for visuals over text. Similarly, from an organizational perspective, Net Genera-

tion students' positive attributes are such that they are more accepting of diversity, have the ability to see problems and opportunities from fresh perspectives and, not surprisingly, are more comfortable working in teams than past generations (Howe & Strauss 2000; Gorman, Nelson, & Glassman, 2004; Tapscott 1998; Zemke, Raines, & Filipczak, 2000). It is the characteristics, desires and needs such as these that demand experimental, dynamic and interactive learning for the Net Generation students. Moreover, recent emphasis for studying in higher education (e.g., Virtual University) and working in companies (e.g., distributed global teamwork) set clear demands for developing pedagogical models, tools and practices to support collaborative learning in virtual environments (DeCorte, Verschaffel, Entwistle, & Van Merriëboer, 2003; Evans & Gibbons, 2008).

Unfortunately, scholars have discovered that the level of interactivity in a traditional lecture is low. Estimates are that students ask 1 questions per hour in a traditional class; faculty ask 3 per hour (Fletcher, 2003). Technology, like webconferencing, makes it possible to provide learners with anytime, anywhere content and interactions. Computer-based instruction, however, increases the number of questions posed from less than 1 per hour to 180-600 per hour (Fletcher, 2003). This dilemma poses challenges for many educators who do not use technology tools to reach the Net Generation learners.

Re-Conceptualizing Classrooms as Learning Spaces

Given all the expectations discussed above, how should we re-conceptualize the classroom for these Net Generation students and digital natives? Brown (2005) argues that the notion of classrooms needs to be expanded and re-conceptualized as 'learning spaces.' More specifically, "[l]earning spaces encompass the full range of places in which learning occurs, from real to virtual, from class-

room to chat room" (p. 12.4). Hartman, Moskal, and Dziuban (2005) concur and argue:

The mobility enabled by wireless communication, combined with an expanding class of wireless-equipped portable computers and PDAs, is leading to new instructional and social patterns. No longer do students need to go to a specific place, or even be seated, to use a computer. An array of multifunctional PDAs capable of wireless communication is allowing such devices to follow their users wherever they go... This is challenging the very definition of learning spaces because learning can now occur both in and out of the classroom, in both formal and informal settings, and by lone scholars or among groups. (p. 6.4)

These arguments are compelling, and with the proliferation of mobile computing devices, learning spaces beyond the physical classroom are increasingly becoming reality. Re-conceptualizing classrooms as learning spaces that can be enabled by technologies expand how faculty and students can participate in teaching and learning in the 21st century. Digital natives and Net Generation students have been networked most, if not all, of their lives. Prensky (2001) describes, "They are used to the instantaneity of hypertext, downloaded music, phones in their pockets, a library on their laptops, beamed messages and instant messaging" (p. 3). His argument provides a strong rationale for the need and timeliness of studying interactivity in this study.

More recently, Prensky (2009) talks about becoming 'digitally wise.' He explains, "Digital wisdom is a twofold concept, referring both to wisdom arising *from* the use of digital technology to access cognitive power beyond our innate capacity and to wisdom *in* the prudent use of technology to enhance our capabilities" (italics original, p. 2). In this study, we explore ways to promote teaching and learning in a blended classroom that demonstrate both types of digital wisdom. Furthermore, Brown (2005) suggests, "Wireless networking...

makes real-time or synchronous interaction (such as real-time polling) among all class participants a very real (and increasingly practical) possibility. Videoconferencing makes it feasible for an invited expert from a remote institution to join a class session” (p. 12.2). Brown’s (2005) argument prompted us to study a webconference tool that allows synchronous chats, real-time polling, and expert remote visits as strategies for a blended classroom.

PROBLEMS IN THE 2010 CLASSROOM AND BEYOND

This study uses a case study method (Yin, 2009) to depict the rich details associated with how decisions to implement webconferencing in a novel way were made. This detail is important since CMC learning tools are still emerging and there are so many divergent approaches using the exact same technology tools. There are elements of a narrative analysis (Fisher, 1987) present in this case, as well as analysis of survey data that reflects the perspectives of the students.

Case Study Context

The situation chosen for this analysis is intended to meet the narrative fidelity and probability (Fisher, 1987) needs of many college instructors. The year of the case is 2010. The subjects are college students who carry mobile devices to class and capturing their attention is requiring new educational tactics. This particular case occurred in a large state university, where 30 students were taking an upper-division elective course on technology use at work. The first author of this case study was the instructor of the course, the second author was the teaching assistant, and the third author provided an additional non-co-located classroom to further compare the case study findings. The description that follows explains the case in more detail.

The Problem: Disconnected Students

Teaching a technology theory class on every Monday, Wednesday, and Friday from 2pm to 3pm during football season can be challenging. Not only did attendance drop off on Friday, but discussions were anemic and the students seemed ready to be finished with their day. When these students attended class, they were often using their smart phone and laptop computers and it is doubtful that this use was course-relevant. The primary instructor had taught this course three previous times and never encountered such an apathetic group. Historically she has never had systematic problems with attendance, so she does not have an attendance policy. But this group, meeting from 2pm to 3pm three days a week, caused her to question the decision to have no attendance policy. Eight weeks into the semester she decided to gather feedback from the teaching assistant (TA) and the students to confirm her sinking feelings about the overall engagement of this class.

The TA was a first semester MA student who was new to academia, but had several years of work experience behind her. Her employment assignment time was split between two of the primary instructor’s courses, so she got to see the drastic difference between one course taught earlier in the day and the course of growing concern. Both courses were held in the exact same room and there were seven students (out of 40) who were in both classes. The course taught earlier in the afternoon was alive in every way possible. There were never more than one to two students absent, everyone participated, and quite often the conversations continued into the hallway long after class had officially ended. In her own words, the TA said:

Having witnessed students from the teaching perspective for the first time, it was amazing how clearly you can get a read on the students’ attitudes and willingness to engage in just a few lectures.

The technology class was so lackadaisical and unmotivated. Very few students took notes and asked questions. You could tell they were paying more attention to their devices, not doing the assigned reading and not willing to share or engage in discussion. It was such an unfortunate difference compared to the other class. I never knew that professors had to take responsibility for poor work ethic and overcome challenges such as this.

To gather the mid-semester feedback, the instructor asked students to take a note card and write three things that were working on one side of the card, and three things needing improvement on the other. She then did a quick content analysis and grouped the comments. She was concerned, but, following past procedure, she shared all the comments with the class and asked for their input in how to address these issues. In the discussion that followed, it became obvious that the students were disconnected from the course. In one specific example, students expected reminders for assignments even if they did not attend class. Only half the class attended on one Friday (the day the instructor reminded the students to look on Blackboard for their assignment due on Monday) and then almost a third of the class did not bring their assignment due on Monday. During the feedback session, the students attributed that to an instructor issue. One student said, “If you would send us an email reminding us of the assignment, we would remember it.” That was not the way this instructor taught. Her philosophy was to develop her students into responsible learners who want to participate in her classes. Despite the harsh realities learned in the student’s feedback the instructor and TA took immediate action and attempted to change the dynamic of the classroom by using technology tools. They hoped that they could increase attendance and improve the relationship they had with the students.

The Solution: Embrace Multicommunication to Improve Participation

Rather than introduce strict policies banning the use of technology in the classroom, or punishing students for not attending class, the instructor took a more collaborative, less coercive approach and considered how to leverage technology to solve the problems. She decided to use webconferencing to address the issues discussed earlier.

The Technology

Webconferencing is a technology medium most often used to connect participants from multiple geographic locations (Stephens & Mottet, 2008). In this situation, the instructor used webconferencing to provide distance participation opportunities, but she also actively sought ways to use the interactive features of webconferencing—chat and polling functions—to increase the students’ voices in the classroom. Multicommunicating (Reinsch, Turner, & Tinsley, 2008) describes the growing practice of carrying on multiple conversations simultaneously. This practice has exploded with the proliferation of mobile devices that facilitate these types of conversations while students attend classes. This type of communicating in class can be facilitated by using webconferencing tools. For a summary of how the specific components of webconferencing functioned in this study, see Table 1.

Webconferencing Environment

To accomplish the classroom interactivity objectives, the instructor used Adobe Connect webconferencing software. Because course flexibility is a key factor in learners’ perceived satisfaction (Sun, Tsai, Finger, Chen, & Yeh, 2008), this web-based product allows students to participate virtually and there is a mobile phone application that facilitates participation from anywhere. The instructor used

Table 1. Learning options in webconferencing

Learning Option	Advantages	Disadvantages
Virtual Participation Option	Increase participation from students who might not attend in person. Allows for “guest speakers” who are not local	Encourages students to prioritize other activities over class
Rolling Chat – displayed to physically present and virtual participants	Students asked more questions Student-to-student interaction Variety in questions Used students’ technology Often viewed as fun	Distracting Students purely in class and students purely online do not directly interact with each other.
Polling students	Provided anonymous forum for participation Normed responses Instructor gets feedback	Students purely in class cannot participate anonymously unless they log into the Internet. Difficult to track if students in the group that is both online and offline repeat their ‘votes’ when asked to show hands in class as well.

several key features of the webconferencing software to encourage interactivity and learning while controlling some of the potentially more complex features. For example, the only audio channel used was that of the instructor and video was not used at all. This was a conscious decision made to decrease the likelihood that students would have connection issues. Past research suggests that students must have early success with CMC classroom technologies to participate and be satisfied with the experience (Benoit et al., 2006). Webconferences also allow an instructor to project slides, share screens, and respond to questions raised in the chat or the classroom. In this case, certain interactivity features were used that would best facilitate student participation.

Key Decisions Surrounding the Use of Webconferencing

There were several key decisions made in how the webconferencing tool was launched. First, the instructor decided to allow students to provide text-based chat comments during the lecture and that chat was publicly displayed, as an integral part of the class lecture and discussion. The text chat tool in the webconferencing system was an optional tool, but in this class, the Windows were

re-sized to make the conversation readable and it was prominently displayed next to the more static, lecture slides. Regardless of their location, students who had logged into the webconferencing system could type and respond to others’ comments. This activity occurred simultaneously with the instructor’s verbal lecture.

A second key decision, to address the attendance issue, was to provide a mix of three different participation opportunities: (1) Students could come to class and use no technology, yet still respond verbally to questions. These students could also view the chat and were able to comment on their peers’ contributions. (2) A second participation option was that students could be physically present in class and use their laptops or mobile devices to connect to the webconference and participate via chat or make verbal comments during class. (3) Finally students could log onto the webconference remotely and participate using the chat function. This collaborative environment was prominently displayed on the large projection screen at the front of the classroom for all the physically-present class attendees to view.

A third key decision was that there needed to be controlled anonymous participation opportunities as well as the public chat; therefore polls were used to show aggregate responses. It is important

to note that students who were physically present and did not have laptops or mobile devices could not participate anonymously. This is a limitation of allowing participation in a physical classroom in addition to online participation options. The physically present students had to respond by showing their hands and their responses were added to those participating online. It was important to limit the anonymous participation to poll-type and practice quiz-type activities and make the text-chat identifiable. This limited potentially problematic online behavior because every comment was directly linked to an individual with a real name.

The final decision was to expand the webconference class concept beyond the blended situation (designed to address the problems mounting in this classroom) and include an additional class taught entirely virtually. This class functioned as a source of additional information on the perceived interactivity of the text-chat, the polling, and the usability of webconferencing when the instructor was not co-located. The instructor worked with an instructor located in another state to deliver a webconference-based lecture in this comparison format. There were many similarities between these slightly different formats and they will be further discussed.

To compare the students' opinions across participation options, the study also incorporated an anonymous survey. This instrument was designed with multiple item measures, used published scales for all variables except one (the instrument details are available from the first author), and was administered to the problematic class ($N = 22$, a 76% response rate) and the additional class where the instructor was not co-located ($N = 14$, a 71% response rate). The resulting sample was 60.6% ($N = 20$) female and the majority of the students 73.5% ($N = 25$) were seniors in their retrospective universities. They rated themselves as fairly strong users of online technology tools such as Skype and instant messaging $N = 34$, $M = 4.62$, $SD = .78$ (on a scale of 1-7) and no one rated themselves as a poor or novice user. Because

there were differences in participation options, a series of t-tests confirmed that there were no significant differences between the samples in the two locations for any of the reported variables, thus they were combined for analyses.

ANALYSIS OF THE SOLUTION

Meeting Instructor Goals

A primary rhetorical goal (also known as a task goal, Mottet, Frymier, & Beebe, 2006). of the instructor in this case was to increase attendance and provide opportunities for students to actively engage with course content. She sought to expand these opportunities to allow students to connect to class remotely. During every class where webconferencing was offered, attendance increased between 10 and 25 percent. In addition to attendance improvement, only two assignments were turned in late during the second half of the semester. While it could be argued that the improvement in assignments was at least partially due to the mid-course feedback conversation, the increased attendance is likely due, we believe, to webconferencing. These results suggest that the incorporation of webconferencing into the classroom may have helped the instructor meet her rhetorical goals.

This instructor also had relationship goals concerning her students and her TA. In many ways, having students willingly attend class is a type of instructor relational goal in addition to a rhetorical goal. There was an increase in the number of emails and after class conversations that resulted after the implementation of webconferencing. It is difficult to say that these changes were caused by the use of webconferencing, but considering that no other significant course changes were made, it is likely due to this new classroom experience. This is an instructor who also values how the students evaluate her performance in the classroom. She had never seen mid-semester evaluations and student

behavior as troubling as they were this semester. At the end the semester, the students rated the course and the instructor as highly as they had in prior semesters. One interpretation is that the relationship was re-built and webconferencing played a role in that process.

Students' Reactions to the Webconferencing Format

Students appeared to be making connections between the course content, and those connections were visible to the other students through the use of public text chat. This egalitarian environment gave the students permission to participate in ways that would not be enabled in a traditional classroom. One open-ended comment from the student survey explains this situation well, "It was great being able to type and send a question during the presentation or make a comment, rather than interrupt the presentation or waiting and allowing it to become irrelevant. It made conversation easier and greatly successful."

Other quotes from the open-ended responses reflect the students' opinions on variety and how they link that to a fun learning environment. One student remarked, "I think it was a great way to add variety to the monotonous routine of attending class in a room." Another student said, "I felt like the novelty of the conference made class extra interesting. I really enjoyed this." In the class where only a single webconference was conducted, the students openly requested that webconferencing be used again because they thought it was an effective way to engage students and promote learning. Using a webconferencing tool to bring a virtual speaker into the classroom also promoted the sense of variety in addition to the new technology.

Interactivity and Perceived Learning

We further tested the students' perceptions that the interactive environment influenced their learn-

ing perceptions. Using hierarchical regression equations, in the first step we entered technology problems and webconference satisfaction, and in the second step we entered interactivity. Technology problems were insignificant, so they were removed as a predictor. Webconference satisfaction explained 33 percent of the variance in perceived learning ($\beta = .70, p < .001$). The second step of the regression represented the test of our prediction because we introduced the variable of interactivity into the equation. It accounted for an additional 14.8 percent (R^2 change = .148) of the variance ($\beta = .44, p < .01$). The overall model explained 48 percent of the variance in perceived learning. The survey results supported what we had observed in both of the classrooms. Interactivity plays a key role, even beyond the satisfaction they felt with experience, in the Net Generations' perceptions that they are learning.

Bringing the Backchannel Communication to the Forefront

In many traditional lecture classrooms students sit quietly, listen, and a select few students ask questions. In this case, the instructor openly displayed the backchannel communication via a chat log rolling behind her on a large screen while she stood in front of the classroom lecturing and periodically monitoring the rolling chat. She admitted that this was very nerve racking at first because she had no idea how the students would respond and if their behavior would be productive. The result was one of giving voice to students often unheard. The students communicated with one another by actively participating in the live chat instead of simply responding to the instructor's questions. Learning seemed to occur *student to student* in addition to instructor to student. Whether participating virtually or in class, there were options that addressed multiple learning styles and the voices of completely different students emerged through chat.

This case represents an example of how multicommunication can be used productively in the classroom. Thus far, multicommunicating has been explored predominantly in a workplace context and while some studies have shown it to be beneficial, especially in the case of instant messaging (e.g., Reinsch et al., 2008; Rennecker, Dennis, & Hansen, 2006), other research has demonstrated that it can be perceived as uncivil (Cameron & Webster, 2010) and can cause disruptions to practices like organizational meetings (Stephens & Davis, 2009; Turner, & Reinsch, 2010).

Issue-Relevant Backchannel Multicommunicating

The instructor was pleasantly surprised at the high degree of issue-relevant chat conversation that emerged. Less than 5% of the comments were off topic and those could be viewed as rapport building chat. The chat had a fun tone (e.g., references to popular TV shows), but the comments were still issue-relevant. The instructor and her TA believed they had channeled the students' desires to multicommunicate and engaged them in the course content.

Mentally Finishing Class Early

While the text-based conversations were generally on-topic, students appeared to drift off-topic in the last five minutes of class. For example, during one class, a student typed the text: "What is your favorite cereal?" Other students responded and there was laughter in the classroom when the instructor turned around to see that the students were debating the value of Captain Crunch versus Frosted Flakes. These types of off-topic behavior were observed in each of the five classes where webconferencing was conducted and at first, the instructor did not recognize what was happening. Essentially, the students were using their conversations to disconnect mentally from the current class, and prepare to transition for their next activity.

This is very common in traditional classrooms and typically takes the form of students putting away their notepads and making noise as they pack up their backpacks and prepare to leave class.

This is obviously a very distracting behavior and when the text is displayed for the class, it is vitally important for the instructor to recognize the behavior and re-direct the students quickly. In a traditional classroom, an instructor might say, "I know you are all anxious to get to your next class, but remember that I always let you out on time, so you can wait to put your books away and still not be rushed." In this case when there was a visual display of off-topic behavior, the instructor laughed with the class, looked at the clock, and reminded the class that they really needed to wrap up this final topic and do a preview for the next class. In one case, the off-topic conversation continued and it was likely distracting to the class. In retrospect, the instructor probably should have quickly clicked a button on the chat feature and disallowed it. Another option would be for the instructor to join the chat, and type in the preview for the next class, while verbally stating the same content. We make these recommendations based on observations that when the instructor joined the virtual chat, it seemed to re-focus the group. This was different from simply stating a verbal comment. This will be further addressed in the directions for future research.

Trends in Participation

When observing the students engaged in this webconference, there were several main trends. First, students who typically did not speak in class participated in the chat, and many of their comments are equally insightful as those shared verbally in class. For example in one lecture on the implications of culture and information and communication technology use, two different students mentioned theories that were discussed in the class over a month earlier in the semester. In the case of the other university included as a

comparison in this study, that instructor taught the same course and used a common textbook, but supplemented it with additional materials. During the webconference, this group also raised questions and used key terms that connected to the common textbook. That instructor also noticed that the students integrated that lecture content with his supplemental materials. In both classes, students were making connections between the course content and those connections were visible through text chat and verbal questions asked.

A second trend was that the students seemed to enjoy the lectures and each other more. Not only were quiet students participating for the first time but there was more discussion overall. Some students sat in the back of the traditional classroom and participated exclusively via their laptops and some of those students seemed to enjoy the novelty of their comments being displayed on the “big screen.” Students at the comparison university also demonstrated a high degree of participation. Perhaps the mediated dimension of a webconference made the discussion more fun because the instructor observed that a usually quiet student came to the front of the classroom to ask the virtual instructor a question via the audio feature of the webconferencing system. The instructor also noticed that one student logged out and logged back in with a new and more creative username for the rest of the chat session. These learners not only felt motivated to perform tasks, but they possessed a level of control over those tasks, key components to learning components learning (Frymier, Shulman, & Houser, 1996). Empowered students should be more likely to see the meaningfulness of course content and activities, feel a greater sense of self-efficacy in performing classroom tasks, and be more likely to perceive that learning course content can have an impact (Schrodt et al., 2008). The novelty of incorporating webconferencing into a traditional classroom created new rhetorical and relational dynamics that were generally quite positive.

In addition, students thrived on the quick, threaded discussion in the chat. Despite being short-lived, the comments were interpersonally significant and allowed the students to connect to one another. The format also added additional visual communication; thus displaying course content in line with students’ preferences. When students’ brief comments were displayed on the big screen, some students simply expressed agreement with their peers, in the form of “I agree with so and so about...” Although one can argue that these kinds of statements do not fully constitute unique intellectual contributions, a balanced amount of simple agreement from peers can psychologically motivate the students whose comments appeared to represent their peers’ opinions. The relational dynamic can also encourage more students to share their opinions online in future sessions.

Expanding Learning Spaces to Include More Students

It is clear in both the scholarly literature and the popular press that the traditional classroom-style lecture format does not provide students with the new learning spaces that some desire and expect. This phenomenon has called instructor training into question and adds uncertainty to the classroom in regards to instructor and student rhetorical and relational goals. However, to overcome the challenges faced in the present case study, the three participation options allowed the instructor to tap into the needs of nearly every student’s ideal ‘learning space.’ This freedom of choice flexibility enhanced the relational goals of both the students and instructors to connect in fresh ways. In addition, this newly created learning space environment set the stage for ‘sharing the podium’ where new voices emerged and empowered learning occurred among the professor, teaching assistant, distance guest lecturers, and students. Furthermore, empowering students to co-produce a blended classroom learning environment generated an environment of mutual respect

which, in turn, created an informal setting where students became more comfortable speaking up in class discussion whether that was through chat or verbal comments.

In sum, the webconferencing format dovetailed with subject matter, students' interests, and communication workplace technologies in more ways than one. It provided a co-created learning space, freedom of choice in participation, experience and practice with interactive technologies, opportunity for informal and yet productive discussion, engagement and empowered learning in the Net Generation's preferred ways, and influenced the instructor-student relationship in a positive light.

FUTURE RESEARCH DIRECTIONS

Limitations of Current Study

It is important to consider the findings from this study in light of the small sample and limited number of locations. It is difficult to say if the classroom in this case could have been turned around using other techniques, but it appears that webconferencing offers one viable option. Another consideration in this study is to understand and listen to a range of voices and opinions because incorporating technology into the classroom will not be helpful to all students. For example, one student said, "It was easy to get distracted if you were connected online, self discipline is needed." It is important to listen to the potential pitfalls associated with webconferencing and continue to incorporate solid pedagogy and technology use practices into our CMC learning spaces.

This study leads to several promising areas for future research. First, as educators of the Net Generation, we need to be leading the field with our use and research in CMC learning environments. To accomplish this task, we must carefully define our CMC tools, design robust studies using a variety of methods, and incorporate our expertise

in pedagogy into our research. It is important for our studies to focus less on the specific technology used (other than to define and limit the scope of possibilities), and more on how the technology is used. For example, researchers are beginning to understand how interactivity can play a role in learning when CMC technologies are used. We should further explore these and make sure that what we are observing are not novelties that will fade away as students become accustomed to CMC use.

Understanding How to Use Multiple Modes to Re-Direct Classroom Learning

In the case presented, the instructor noticed that students would use text chat to visually display their mental disconnection from course content during the last five minutes of class. This observation provides the stimulus for a range of future research that focuses on how instructors use multiple modes to re-direct classroom learning. Experienced instructors use related techniques in a traditional classroom and these include, stopping lecture and asking the class to write a minute paper reflecting on the topic, or asking students to share a question they have with the person sitting next to them.

In a CMC classroom, there is very little research into strategies for how instructors can use technology tools to provide a different type of learning stimulus for students. It is possible that by joining the disruptive students in their modality of choice (text chat in this particular case), changes the dynamic of the CMC classroom and the off-topic conversation dissipates. Studies of this nature should go beyond a survey design, because students may not be aware of how this modality matching behavior affects them. Carefully designed experiments could likely capture actual behavior and provide considerable guidance for instructors in a CMC classroom.

This concept extends beyond the situation in the current case and into basic classroom management issues. If the Net Generation students really do crave diversity of experiences, simply moving a lecture on-line will not be sufficient to engage these students. The interactivity tools in webconferencing offer simple, fairly spontaneous opportunities to ask for anonymous aggregated feedback through polling. If all students have access to the Internet-portion of the webconference, they can participate frequently and there is a natural social pressure to respond because the results are displayed with only a couple of second delay. It is even possible to use the polling to create an end to an unproductive line of text-based conversation. For example, the instructor could have created a poll asking about favorite cereal, had everyone vote, and reported a result all within two minutes. That creates a natural way to move on to the next topic.

Cyberlearning Opportunities

Given the availability of and accessibility to information, knowledge, datasets, and experts online, it is likely that teaching and learning will further move away from the traditional model. Earlier in the chapter we argued that a bold attempt would be to support traditional instruction by letting students explore these resources online. Future research could further explore strategies for promoting interactivity with remote information sources and datasets to create engaging virtual learning beyond the classroom. In a National Science Foundation report on 'cyberlearning,' Borgman and colleagues (2008) argue, "Content is no longer limited to the books, filmstrips, and videos associated with classroom instruction; networked content today provides a rich immersive learning environment incorporating accessible data using colorful visualizations, animated graphics, and interactive applications" (p. 5). Strategies discussed in this chapter and similar webconferencing tools can

help facilitate cyberlearning, a model that involves "the use of networked computing and communications technologies to support learning" (Borgman et al., 2008, p. 5).

Classroom Multitasking

This case has danced around the issue of whether instructors should be encouraging students to use technology tools to actively participate in class. It is possible that some of these tools are disruptive for students who prefer to give their undivided attention to the instructor. Past research on multitasking paints a gloomy picture of any human's ability (including the Net Generation) to carry out two cognitive tasks at the exact same time without a decline in performance (Lin, 2009; Ophir, Nass, & Wagner, 2009; Rogers & Monsell, 1995; Stroop, 1935).

However, in a classroom context, if the two tasks are actually more of a multi-channel presentation of similar content, using webconferencing in class might enhance learning. Information theory scholars have explained that bisensory modalities (referred to as between channel redundancy) can be helpful (Broadbent, 1958). Several educational scholars have also relied on the concept of dual coding (Paivo, 1990) to demonstrate that when teachers want to improve retention, using different sensory modes can be highly productive (Kalyuga, Chandler, & Sweller, 2000; Mayer, 1997; Mayer & Moreno, 1998; Mousavi, Low, & Sweller, 1995; Paivo, 1990). Essentially, the webconferencing used in this study, provides visual stimuli in the form of text, in addition to an auditory channel. Prior research suggests that when the content is similar, the channels reinforce one another. Yet, as demonstrated in this case study, sometimes the content is not similar. It is important for future scholarship to examine exactly how these mixed modes contribute to learning and identify points where distraction is detrimental to learning.

Responsiveness to Questions and Needs

The text-based chat used in this study is very similar to instant messaging and prior research on this technology tool also provides guidance for future research. In this case study, students commented that access to others and receiving responses to questions more quickly made them enjoy the experience. While the research regarding instant messaging is mixed in terms of whether it is helpful or interruptive (Stephens, 2008), some research claims that instant messaging can be used to manage interruptions (Garrett & Danziger, 2007; Nardi & Whittaker, 2002). Their research supports the findings here that senders and receivers can interact when it is convenient for them and in the workplace, people tend to have shorter, more frequent interactions that result in little disruption (Garrett & Danziger, 2007). There are considerable research opportunities to explore how these timely, yet potentially interruptive conversations affect classroom learning. Research has established that Net Generation students use instant messaging to interact and manage activities (Baron, 2008; 2010) outside of the classroom, but knowing more about how they use these tools in the classroom can provide guidance as we implement tools like webconferencing into our classrooms.

These are just a few of the more promising areas for future research on webconferencing. In addition, the mobile device application use of webconferencing is virtually unexplored in the literature. In this study, one student reported that the polling function did not work on her smartphone, but she could access everything else. By linking the CMC classroom literature with knowledge gained from what scholars have learned about mobility and mobile device use, a CMC classroom approach could significantly impact the classrooms of the future.

CONCLUSION

Multicommunicating is quickly becoming the norm whether people are at work or trying to learn in the classroom. Webconferencing offers one way to leverage multicommunication for learning and engaging students by embracing digital learning options. If we can balance the use of these interactive classroom tools with the concern of overloading and distracting students, the potential for increasing meaningful classroom participation expands. The Net Generation learners want interactivity and they can be active participants if we think creatively about engaging them.

As instructors consider CMC classroom tools, this case offers a rationale for using webconferencing, advice on how to use this tool productively, and ideas for how we might study these growing trends in the classroom. The instructors in this case study learned that by listening to the concerns and desires of the Net Generation and by leveraging our knowledge of how they use technology, a classroom environment can be transformed. In the process, we did not compromise our learning objectives and we did not use coercive power in the classroom. This case provides a solid example of how we can use technology tools to reach digital learners.

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KEY TERMS AND DEFINITIONS

Backchannel Communication: Conversations occurring behind the main, often verbal, channel. This type of communication often occurs through mobile devices or instant messaging systems.

Blended Classroom: A classroom that utilizes face-to-face (FTF) interactions and computer mediated communication (CMC) to enable teaching and learning. In a blended classroom FTF and CMC interactions complement each other instead of serving as a replacement for one another.

Computer-Mediated Classroom: Any class where at least part of the instruction is delivered or enhanced through computer, mobile device, or web-based tool.

Cyberlearning: The use of a combination of emerging communication technologies, advanced computing/computational technologies (i.e., cyberinfrastructure tools), and digital datasets/information to allow students to share, collaborate, observe, manipulate, and model existing public datasets for educational simulations and research visualizations.

Learning Spaces: A range of physical, social, and virtual spaces where students can interact with instructors, peers, information, and other experts to achieve different learning goals, objectives, and outcomes. Learning spaces expands teaching and learning to anytime, anywhere.

Multicommunication: A communication practice where people carry on multiple conversations, often using different modalities, almost simultaneously.

Webconferencing: A web-based technology tool that allows a teacher or presenter to show PowerPoint slides, provide auditory explanations, and incorporate interactive tools such as text chat, polling (surveys) and whiteboard sharing.