

THE DEVELOPMENT AND STRUCTURE OF STUDENT COMMUNITIES IN THE
SECONDARY BLENDED LEARNING SCIENCE CLASSROOM

by

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(Under the Direction of David F. Jackson)

ABSTRACT

Blended classes have found a home in the arenas of higher education and the corporate world and are quickly gaining ground as a widespread method of delivering educational content. These fast-changing, technology-enhanced classrooms are providing both students and instructors new avenues for exploring a rich and diverse online world while simultaneously reinvigorating the traditional classroom. Researchers have determined that students enrolled in blended classes typically have a greater engagement with the class, a greater understanding of the material, enjoy the class more, prefer its structure over traditional classes, and generally do it in less time. It is commonly easier for learners in the blended class to access its materials, have greater flexibility for when and how they work, and have more control over their pace. However, few of these studies have occurred at the primary or secondary levels of education. Part of this is due to the newness of blended classes at these levels. They are simply not as readily offered or implemented at these levels. As a result there is little rigorous or relevant guidance in creating, implementing, sustaining, and improving blended classes. This study investigated how students create and interact in online communities in four Advanced Placement Physics blended classes. It was revealed that students were initially confused and resistant to the idea of an online

component to the class, but soon realized they had access to a powerful new tool. Once this was apparent, students actively and quickly engaged in building an online community for homework and class work support, socialization, problem solving, and even regulating behavior within the community. Enjoyment of the class was attributed to its online component, including making new friends, helping students understand the material, and giving community support. Students participating in these blended classes feel a sense of connectedness to their class, peers, and class work even while away from the classroom. Learning becomes a more collaborative endeavor and students commonly create and manage online communities for support, socialization, and increased learning.

INDEX WORDS: advanced placement physics, blended class, blended learning, classroom community, computer-mediated communication, hybrid classroom, online learning, physics education, secondary physics, students, student community, student satisfaction, webassign.

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DEDICATION

This dissertation is dedicated to my family and friends who have stuck by my side all of these years. To Mom and Dad, Jen, and Joseph, thank you for always making me feel like I'm someone others can look up to and for the love, always the love. To my daughters, Celeste, Isabel, and Mikalah, you are my joy and my breath. You three are the greatest blessing of my life. To my friends and the depth, durability, and faithfulness of their friendship—it still boggles my mind how long we've known each other and the joy of seeing our own “children growing up, old friends growing older.” So, I humbly bow to all of you, but mostly to Steve, Mike, TJ, Bobby, and Greg—there's well over 120 years of friendship right there. Where does the time go? Further thanks to my Dad for all of the physics conversations, I wouldn't have become a physicist without your knowledge, expertise, and interest. To Mr. 'D', my seventh grade science teacher, for teaching me that teaching is fun!

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You're all a glimpse of Heaven.

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I would also like to thank my students at Dacula High School. They have put up with a really stressed out teacher these past few years and never once were they not supportive in my goals. What an amazing group of teens!

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CHAPTER 1

Introduction

One of the problems confronting contemporary teachers and teaching is creating a classroom that is *not* without heart, feeling, and humanity and yet still adheres to the rigors and high-stakes testing of the No Child Left Behind Act (NCLB). This is no small challenge given that teachers are finding themselves in the crosshairs of accountability with the only protection being the performance of their students on standardized tests. Little room is left for teachers to perform the very human task of teaching children. Instead they find themselves bowing not to the needs of the students as children, but to the government and a Scantron™. This is a deplorable state, and teachers need to incorporate methods that serve both, since one cannot go away and the other will not. The building of a classroom community through online work may well be a powerful component of a solution!

Blended classes, those that combine a traditional classroom with an online component, have found a home in both higher education and the corporate world and are quickly gaining ground as a widespread method of delivering educational content (Bonk & Graham, 2006; Cross, 2006; Palloff & Pratt, 2007). These fast-changing, technology-enhanced classrooms are providing both students and instructors with new avenues for exploring a rich and diverse online world while simultaneously reinvigorating the traditional classroom. Studies have shown that students enrolled in blended classes typically have a greater engagement with the class and a greater understanding of the material (Bonk & Graham, 2006; Hanson & Clem, 2006; Lindquist, 2006). The students enjoy the class more, prefer its structure over traditional classes, and generally do it in less time (Rooney, 2003; Seo, 2007; Swenson & Evans, 2003). Learners in the blended class benefit from easier access to its materials, greater flexibility for when and how

they work, and more control over their pace. Few of these studies, however, have focused on K-12 education for several reasons: novelty of blended classes at these levels, a more rigid curriculum found in the K-12 level making manipulation of the class more difficult, and the greater problems of gaining access to a K-12 classroom for study (Bonk & Graham, 2006). Finally, part of it may be due to the observation of Loucks-Horsley, Love, Stiles, Hewson, and Mundry (2003) that it “is difficult if not impossible to teach in ways in which one has not learned” (p. 1). For blended classes to become more prevalent in K-12, all instructors, from student teachers to veteran teachers, need to be taught or trained in designing blended classes. In any case, blended classes are simply not as readily offered or implemented in K-12 education resulting in little rigorous or relevant guidance in creating, implementing, sustaining, and improving blended classes at this level.

Background of the Study

I am a “technology junkie.” Since I began teaching physics eighteen years ago, I have tried, with varying degrees of success, to apply technology for the benefit of my students. I have used gradebook programs, beta-tested and even written my own assessment software, operated computer based labs, installed internet-ready computers in my classroom, tested interactive whiteboards, converted my overhead lessons to Power Point, and even purchased a projector for my room. All of these ventures took place years before they were to become standard fare for the classroom.

I was fortunate enough to come into teaching just as the second computer technology boom occurred in education—the time when multiple internet-connected computers could be found in the classroom. Though my grade book, lectures, and assessment were all modernized, one of my biggest challenges remained untouched. As I observed my physics classes, I realized

that homework was in an abysmal state. Grading homework and returning it in a timely fashion was impossible. Students were pretty much on their own to try and figure out the problems. They had no opportunity to make honest mistakes without it negatively affecting their grades or, if I did not grade their homework, they had no real compunction to do it. When I did grade, there was no incentive for them to go back and rework problems. Offering to regrade the assignment merely added to my already unmanageable workload and few students took me up on that offer. The so-called ‘completion grade’ was equally unsatisfying and offered little evidence of student learning. Cheating was rampant in any of the situations. No scenario made homework a valued learning experience or provided a valid grading process. Fortunately, the subject itself offered a solution.

Physics homework commonly involves mathematical word problems. I realized that I could write a homework program that would give each student a personalized assignment. No two students would have the same problems and, furthermore, the computer could grade it, giving immediate feedback, and even let the students practice the problems. Luckily this time, technology was ahead of me. After writing the first set of homework programs I discovered an online service called WebAssign (<http://www.webassign.net>) (which will be briefly discussed later). I was not the only physics teacher with this idea. Dr. Larry Martin, working out of North Carolina State University also had completed and operated just such a program with the added bonus of it being delivered via the web. I jumped on it, never to return to paper and pencil homework. However, none of the benefits that I realized through online homework were the most significant benefit for my students. In fact, likely the greatest help my students received in learning physics emerged from an area that I had utterly ignored: the online forums.

The online forums provided a safe venue outside of class where my students could discuss their homework problems with each other as well as anything else that came to mind. They asked questions about homework problems, the class lectures, labs, and each others' lives. Sometimes they simply conversed on whatever they wished. When they talked about physics, their collaboration was spontaneous, not teacher-mandated or directed, and brought together the students from all of my classes. Friendships grew, online personalities developed, and, most importantly to me, the students became the teachers. I did not know it, but my classroom's meeting time and discussions had extended well beyond the traditional setting into the online world in a substantial and meaningful way. This discovery led me to undertake a pilot study as a project for one of my qualitative classes at the University of Georgia. I was interested in the opinions and experiences of students in my blended physics classes. When I spoke with students about what was happening in the forums, they frequently lit up with smiles, became animated, and related stories about the goings on in the forums. Time and again, they used the word "community" to describe the forums. If it had not been for the repeated use of the word "community," I may well have never noticed the true significance of what had come to pass. Certainly my goal of worthwhile homework had been attained, and that success kept my attention. But something more personal, more immediate, more active, and more valuable had been created by my students while I was distracted—a physics learning community.

Purpose and Research Questions

The purpose of this study will be to look at the formation and nature of student-created communities in the secondary physics blended classroom with the objective of improving student learning. The developing and ongoing behaviors and attitudes of students in the blended class will also be explored. Primarily, the technology aspect of the blended class will center on the use

of an online homework service instead of traditional textbook and paper homework; online forums to extend class discussion and help; and in-class collaborative work among students using laptops. Several questions were used to guide the study: 1) What are the characteristics of the student community formed in the blended secondary science physics class? 2) To what extent is the blended class allowing students to create and manage this community? 3) How does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class? The responses to these questions through personal interviews, analysis of forum posts, and research questions posted online to the students, provided valuable and unique data for the design and improvement of blended classes. In turn, this knowledge can be used to guide the design, structure, and use of high school blended classes.

From these questions, there were two goals of the study: an action goal and an interpretivist goal. The action design goal focuses on creating and demonstrating a more effective blended classroom model that enables students to take greater control of their educational environment. The intent was to allow for a more student-centered, supportive, and effective learning experience resulting in greater understanding of physics as well as improved interpersonal skills. The interpretivist goal concentrates on describing the occurrence of community in the blended class. How students' social and educational interactions create and cultivate a learning environment was investigated. These goals lent themselves to examination through various mainstream ideas within qualitative research methods traditions of which grounded theory, constructivism, and constructionism were selected due to their close match to the analytical tools needed for this study.

Overview of the Theoretical Framework

Constructivism and social constructivism are the primary theoretical frameworks at use here. The terms constructionism and social constructionism share a good deal of ground with their constructivist counterparts, so much so that many researchers comment the differences are subtle and there is little agreement on just what those differences are (Ackermann, 2001; Crotty, 1998; Ernest, 1995; Phillips, 1990). In fact, Stone & Goodyear (1995) state that “constructivism is actually a rather loose assemblage of ideas about knowledge, learning and instructional design, some of which are far from new, and these ideas have to be assessed individually "on merit".” (p. 2). In an effort to be thorough, some time will be spent describing their similarities and differences.

Several theorists have noted and attempted to describe precisely what the differences are between constructivism, constructionism, and their social equivalents while acknowledging that the academic community has not yet followed suit and may never adopt such specificity. Primarily, Piaget is noted for his work in constructivism, Papert for his work in constructionism, and Vygotsky for his work in social constructionism (Ackermann, 2001). Each is given credit for providing foundational work in his respective theoretical framework.

In the world of the constructivist theorist, people not only learn through interaction with their environment, but must interpret what that interaction means to them (Guba & Lincoln, 1990). Emotions are constructed, correct and incorrect notions of the physical world are constructed, relationships are constructed, and they may be unique and highly divergent from person to person. As Patton (2002) put it “two people can live in the same empirical world, even though one’s world is haunted by demons, and the other’s by subatomic particles” (p. 97). To one person, an interaction results in a construct of the supernatural while another builds the

construct of a physical model. Neither the physical nor the metaphysical is spared from the creation of constructs because both are processed through the same consciousness. The same input does not result in the same product. This is an important point because it justifies Crotty's (1998) assertion that "constructivism taken in this sense points up the unique experience of each of us. It suggests that each of one's way of making sense of the world is as valid and worthy of respect as any other." (p. 58). Therefore, this is not to be confused with creating reality itself but "constructing knowledge about reality" (Shadish, 1995, p. 67), because "human perception is not real in an absolute sense, as the sun is real, but is "made up" and shaped by cultural and linguistic constructs" (Patton, 2002, p. 96). These constructs that determine our view of reality are, in and of themselves, real; real because they in turn shape our behavior, our lives, and our interactions with others. They have become a part of us as an internalized tool used to help understand what happens both outside and inside of us.

Constructionism starts at the same place and takes a similar view. Crotty (1998) states, "It is the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context." (p. 42). At first glance, this definition seems identical to constructivism, but it is not. Crotty's definition builds to and ends with the qualifier, "transmitted within an essentially social context," that does not appear in the constructivist theory. Whereas constructivism has individuals "actively construct their own understanding using existing knowledge as a starting point" (McGill, 2001, p. 21) and focuses solely on "the meaning-making activity of the individual mind" (Schwandt, 1994, p. 127), constructionism focuses on "the collective generation [and transmission] of meaning" (p. 127), a stance that opens the door into accounting for social interactions.

To take constructionism and constructivism a step further, introduce social constructionism and social constructivism. Though, once again, the distinction between social constructionism and social constructivism is disputed, unrecognized, or ignored, just as their antecedents are (or “the N [constructionism] and the V [constructivism] word” as Papert (as cited in Ackermann, 2001, p. 4) has glibly labeled them); many theorists recognize and attempt to detail and define their differences (Crotty, 1998; Ernest, 1995; Gergen, 1985). Crotty states it succinctly: “the terminology is far from consistent.” (p. 57). Social constructionism and social constructivism are simply constructionism and constructivism taken into the realm of social interactions and language conventions. This is to say that whereas constructivism’s primary focus is on the edifice created and internal to the learner, constructionism takes those constructs and reapplies them back into encounters with other learners. von Glasersfeld (1989) points out “that a human subject’s experience always includes the social interaction with other cognizing subjects.” (p. 126) and this is precisely what social constructionism and social constructivism proponents claim. The primary difference between them stems from the same differences in their constituents: one emphasizes the individual more than the other. Ernest (1995) states “social constructionism resembles social constructivism, but prioritizes the social above the individual” (p. 481). There is also an aspect showing constructivism is more concerned with the validity of the individual’s unique experiences. This idea comes into play here as another distinction between social constructivism and social constructionism (Crotty, 1998; Ernest, 1995; Patton, 2002). Not only is the individual simply the greater focus, there is a tangible result—the “critical spirit” (Crotty, p. 58) is treated differently. Crotty states that in the social realms constructivism taken in this sense points up the unique experience of each of us. It suggests that each one’s way of making sense of the world is as valid and worthy of

respect as any other, thereby tending to scotch any hint of a critical spirit. On the other hand, social constructionism emphasizes the hold our culture has on us: it shapes the way in which we see things (even the way in which we feel things!) and gives us a quite definite view of the world. This shaping of our minds by culture is to be welcomed as what makes us human and endows us with the freedom we enjoy. For all that, there are social constructionists aplenty who recognize that it is limiting as well as liberating and warn that, while welcome, it must also be called into question. On these terms, it can be said that constructivism tends to resist the critical spirit, while constructionism tends to foster it.” (p. 58)

Once again, when compared to social constructionism, constructivism is argued to be a more individualistic occurrence. In this instance, constructivism looks at the fortitude and resilience of the individual while the constructionist views looks at how it is instilled. These differences and similarities in constructivism, constructionism and their social counterparts outlay the theoretical framework of this study.

This dissertation takes a social constructivist grounded theory approach since it emphasizes the social context of cognition (Duffy & Cunningham, 1996). Though by this point it is obvious that there is little agreement on *how* the constructivist and constructionist terms are applied, this does not diminish the ideas behind them. As Crotty (1998) says, “Whatever the terminology, the distinction itself is an important one.”(p. 58). One can readily observe the creation and use of constructs either from a more individual stance or a more social stance. Though this study is more interested in the social aspect of student interaction, the study is not focused on adding to the terminology debate.

However, before we begin, it must be noted that database searches reveal a higher number of “hits” for the use of “constructivism” in “blended learning,” “e-learning,” “distance learning,” and “online learning” (e.g., Google scholar, education fulltext, ERIC, web of knowledge, web of science). It seems that researchers in this area are either strongly constructivist or have found the use of the term constructivism simply preferable to constructionism. If it is merely a preference, it may be due to what Ackermann (2001) delineated in that the terms are not commonly recognized as different. Since the terminology is not fixed and since research in blended learning and its companions (such as e-learning and online learning) are much more commonly described as a constructivist activity, this dissertation will do the same, bowing to Ernest’s (1995) warning that “there is a risk of wasting time by worrying over the minutiae of differences.” (p. 459). This study posits that the subjects of the study and their exchanges are conforming to a social constructivist behavior in shaping their community, their knowledge of physics, and their knowledge of the natural world. It also posits that the researcher is doing the same.

My personal background is one of constructivism and I teach from this perspective. It has always seemed natural to me to view the universe and the investigation of its properties and laws from a constructivist stance since this is precisely the vantage point of physical scientists: investigate properties, observe interactions, and attempt to create patterns from the data. For the purpose of this study, since 1) there is as yet no widely accepted differentiation between the constructivist and constructionist terms and 2) the use of the term “constructivism” aligns with the currently demonstrated trend in blended and online learning, the term social constructivism will denote the guiding theoretical framework to analyze the constructs and interactions students use to build and maintain their online community.

Overview of the Methodology

Grounded theory will provide the methodology of this study rather than the theoretical framework. This is due to its constant comparative method of simultaneously collecting, analyzing, and reanalyzing data to form the theories of community creation and student interaction. Simply put, although student behavior is viewed from a social constructivist theoretical stance, the method of data collection and analysis followed a grounded theory methodology (Charmaz, 2006).

In addressing the research questions, the methodology used here was based on the theoretical and methodological framework of grounded theory (Charmaz, 2006; Glaser & Strauss, 1967) from a constructivist (Charmaz, 2006; Denzin & Lincoln, 2007; Lincoln & Guba, 2000) and social constructivist (Charmaz, 2006; Crotty, 1998; Gergen, 1999) view using the constant comparative method. A group of approximately 50 Advanced Placement Physics B students in four classes were studied. Qualitative data were collected three ways to allow triangulation of data (Mathison, 1988): personal interviews, online interviews, and forum posts. Analysis of the data occurred both during and after data collection. The online interviews and forum posts were collected through a web-based program called WebAssign. These methods will be discussed further in Chapter 3.

Introduction to WebAssign

WebAssign is primarily an online homework tool. Students from high schools and colleges purchase an account for about 10 dollars, and WebAssign generates individualized problem sets for them. Though WebAssign can do many things, integral to this study are two aspects. First is the capability of WebAssign to instantly grade a student's answer to a problem, inform the student whether she/he got it right or wrong, and *allow one to try the problem again*.

The teacher chooses how many chances a student is given to get a problem right. Personally, I now consider homework to be an opportunity to make as many mistakes as possible while collaborating on an answer. This allows for practice, teaching, and reflection, most importantly, without penalty. This has always made sense to me because grading someone on their first attempt at something quite difficult merely invites failure and frustration. It has not been until the advent of WebAssign that I had an avenue to implement a solidly collaborative philosophy. Because students can try a problem multiple times and are allowed to work together, this opens the door to the second aspect of WebAssign which is open and free collaboration.

Incorporated into WebAssign are online forums where students can gather for classroom discussions. The discussions can be about anything, but in my classes they are primarily about the homework. Students can post questions, ask for help, post answers, discuss ideas and concepts, and, possibly of most importance, socialize. These online forums are also inclusive of all classes so students from one class get to know, help, and work with students from another class.

Definitions of Important Terms

There are terms used in this study which are either poorly defined in the literature, have a wide variety of meanings, or may be unfamiliar. The more important ones are introduced here and will be further discussed in Chapter 2. Additional terms will also be defined in Chapter 2. To begin, the meaning of blended or hybrid class as well as community and asynchronous environment are presented here.

A blended class is sometimes, though much less frequently, called a hybrid class. It is not to be mistaken with a distance education or an online class, which is where the majority of contemporary research has been and is being done. Although “blended class” generally has a less

specific connotation in research than hybrid class (Driscoll, 2002), the term hybrid class has not caught on significantly enough to warrant use throughout this dissertation. However, each will be explained here because several significant articles and quotations employed in this study use the term hybrid class. When these other sources are in fact using the term “hybrid class” in the same manner that this dissertation uses “blended class,” this dissertation will use the term “blended class” unless it is a direct quotation. According to Backer (2005), Garnham and Kaleta (2002), and Swenson and Evans (2003), a hybrid class is one in which students have a balance of online learning and traditional classroom sessions. In the minds of these researchers, balance is the key. Too much time in either the online or traditional realm results in an online only or traditional only class, not a hybrid class. Merely allowing for some time to be spent in the other venue is not enough. Both must have a significant share of the class’ time, though there is no set percentage (Cross, 2006). Meanwhile, Graham, and Ure (2003) compiled the common definitions of blended learning used by various researchers, pointing out their similarities and differences in an effort to come to a working definition. Their paper served as a foundation for attempting a standard definition of the blended class. In the first chapter of *The Handbook of Blended Learning*, Charles Graham (2006) revisits the problems in these myriad definitions of blended learning, and settles on this definition: “Blended learning systems combine face-to-face instruction with computer-mediated instruction.” (p. 5). This is the definition that matches the hybrid definition and will be used from this point forward in this dissertation. Further discussion of the details of the blended class will be done in chapter 2.

The definition of a community is a much older and broader definition. The numerous viewpoints and disciplines from which a working definition can be derived pose a particular problem. As Barab, Kling, and Gray (2004) stated “Too little of the education literature provides

clear criteria for what does and does not constitute community; the term is too often employed as a slogan rather than as an analytical category.” (p. 3). Furthermore, in the specific area of blended learning, Hanson and Clem (2006) state that “Although there is descriptive and prescriptive literature regarding fully online learning communities...it is difficult to find applicable research about the dynamics of learning communities in blended learning (mixed media) environments.” (p. 138). Since agreement on what a community *is* is in debate, and since the dynamics of blended learning communities have not been researched, to then try and delve into the definition of a specific form of community, both an online community as well as a traditional classroom community, is a poor plan, lacking in foundation. Since one of the primary purposes of this study is to determine what the characteristics of a blended secondary science class community are, it is hoped that the grounded theory methodology will uncover a viable definition from the data, not that data emerges to match a definition. However, I cannot proceed wholly directionless, so I will use as a guide the definition of an online learning community found (and generally accepted) within the sphere of online learning. Charalambos, Michalinos, and Chamberlain (2004) as well as Moore and Brooks (2000) and Palloff and Pratt (1999) define the online learning community as having these characteristics: students interact with the course material as well as each other, the majority of student interaction is student to student, learning is collaborative, resources are shared, and students reflect on their experiences. In fact, it should be remembered that this study into blended class community originated from the students’ own unbidden usage of the word “community” when describing their interactions in my blended physics classes. Certainly this is an excellent example of the grounded theory phenomenon of the data leading the researcher. A more complete description of the commonly accepted definition of an online learning community will be presented in chapter 2.

An asynchronous (non-real time) environment in its most general sense merely means a technology enhanced environment where the interactions are not fluid. Common examples include email and listservs. Unlike a face-to-face discussion or an online video conference where communication happens in real time (synchronous), asynchronous communication is controlled in its pace. Either an online tutorial where the participant must click to proceed or can rewind a video clip or a discussion board where posts occur in irregular time intervals, the asynchronous environment can be an odd mixture of organization and disorder. Typically, most or all of the information and dialogue in the asynchronous environment can be readily revisited.

Researcher Biases

Throughout my career I have passed on several jobs that would have provided more money and less stress. Some I even tried for awhile. But I knew that accepting them would result in a life that was boring and unfulfilling. I wanted a job where getting out of bed each morning offered hope and excitement and not merely a paycheck. I wanted to be in the thick of activity and, to be honest, in charge of what was happening. At least that's the way I started. My beginning years as a teacher were challenging. I truly did not know what I was doing and there was no real help to be had. So I fell back on teaching the way that I had been taught—teacher-centered. Over the years, through staff development and my own observations, I realized that spoon-feeding my students was about as bad a way of teaching, if you can call it teaching, that exists. There was mere regurgitation of facts from the students and plug and chug problems. My students had no clue what physics was or what they were doing, and I naively puzzled over why they didn't "get" physics. Additionally, the necessary rush to cover state mandated material wasn't conducive to letting students truly learn the material. So I set out to change my teaching.

After several time-consuming and disastrous attempts at finding a pedagogy and methodology that worked for my students and me, I realized that many of my goals could be attained by relying on technology to present concepts to students in an efficient, informative, and effective fashion. This method killed memorization of disconnected facts and freed up time for more hands-on activities, open discussions, questions, and inquiry. I was pleased with myself to say the least. I even learned how much physics I did not understand! In spite of this, after a few years I realized I was not offering anything new for my students. I had hit another wall in my teaching. My students still didn't understand physics at the conceptual level I wanted. They needed more interaction with each other. They needed less of me leading. Most importantly though, this meant they needed to get there themselves! I had no idea what to do. Although I would like to say the next step in my methodology was carefully designed and successfully implemented, I can't. It caught me completely unawares because it was already hidden inside one of the technologies I was already using.

The online forums have provided a way of breaking through the next barrier in my students' learning and, what's more, it is initiated and governed by them. It is student-centered. The students have been using the forums for years and I have come to see the great value of this extended, external collaboration. In the forums, students can safely and appropriately interact at any time, day or night, and from wherever they have an internet ready computer. They can discuss physics or not discuss physics. It is a free and open classroom. It's far from perfect, but so far I feel the benefits outweigh the problems. Yet the application of a tool or method without analysis or careful reflection offers nothing more than chance benefit and unnoticed harm.

Personally, I have seen first-hand the impact of many new technologies in my classroom and the classrooms of others. I know what has worked, what hasn't, and have already stated that

online homework will likely be preferred over traditional homework for the rest of my career. I cannot imagine what would prompt me to go back. However, it is one thing to recognize something as good and another entirely to demonstrate it to others. Furthermore, exactly what is good about it, what is not, and what can be improved? An instinctive recognition that something is better is wholly uninformative to everyone but the advocate. Why is it better? What is better about it? It is in this analysis that I hope to allay my prejudice and apply a critical eye, discerning among the beneficial, the harmful, and the irrelevant. With this knowledge, hopefully a superior, richer, and more rewarding experience can be developed for me and others to use in their blended classes.

Summary and Preview

This chapter established that although there are exhaustive amounts of research on the development and characteristics of online and traditional classroom communities, the research focuses almost exclusively on areas outside the focus of this study. Numerous studies have been performed on either online-only classes where students rarely, if ever, meet, or on traditional classes with no online component whatsoever (Barab, et al., 2004; Palloff & Pratt, 2007; Reisman, Flores, & Edge, 2003). Neither of these settings provides a parallel community dynamic. The blended classroom operates both simultaneously.

Furthermore, the vast majority of the distance education studies investigated online communities in either higher education or corporate environments. Though helpful, they cannot and should not be taken as inevitably informative of the communities formed by high school students where awkward social skills, teenage anxieties, and peer pressure are prevalent. A classroom or virtual classroom filled with undergraduate, graduate, and corporate employees representing a great range of ages will likely operate with a different set of dynamics and social

behaviors from both each other and the secondary school setting. The goals of these older students will be different, and maturity will likely create smoother roads of interaction both during the formative and operative stages of the community. Since many high school students are also experiencing the blended class for the first time, this will shape their future involvement in both blended and online only classes. What unique attributes are present in the secondary blended science class? What commonalities are to be found with the research in the online and traditional classes? How do students function in this blended class?

Therefore it is the purpose of this study to investigate 1) the characteristics of the student community formed in a secondary blended science class, 2) the extent that the blended class is allowing students to create and manage this community, 3) the similarities and differences of this blended class community to a traditional science class, and 4) to add to the body of blended class research. The remainder of this dissertation will continue with an expanded discussion and exploration of the relevant literature in the next chapter followed by a more detailed description in chapter 3 of the methodology employed. Chapters 4 and 5 will present the study itself, with a presentation of the study's results and a discussion of findings, respectively.

CHAPTER 2

Literature Review

This literature review will present the current state of blended learning research. Since there is a limited amount of research focused on the K-12 area, much of what is presented comes from studies focused on higher education and corporate staff development and training. Five categories will be discussed: the blended class, blended learning, blended communities, online communities, and asynchronous learning. There is a great deal of crossover among these topics. Ideas and findings presented in one section may appropriately fall under another heading.

Introduction: Why is this topic important?

Michael Moore (2006), a premier researcher in distance and blended learning, puts it strongly:

At last, it seems that the assumed superiority of classroom teaching, above all alternatives, a dogma that has been so pervasive for so long throughout academia, is beginning to give way to a more nuanced understanding of the suitability of non-classroom environments for formal study and the desirability of adding new forms of communications to enhance, and yes, sometimes to supplant, the professional lecture. The emerging view is of a mutually respectful relationship between teaching at a distance and teaching in the classroom, and the idea that “each can do its proper work” is now encapsulated in the concept of blended learning. (pp. xxiii-xxiv)

His view of the current state of blended learning is reflected in the issues encountered while researching for this chapter. Reviewing the literature for this study has proven difficult in some areas and relatively easy in others. There is a great deal of current research into blended learning classes, their benefits and pitfalls, theory, pedagogy, their communities of learners,

behaviors and attitudes of the learners, how to design these classes, cost analyses, use in higher education or the corporate world, and the list goes on (Bonk & Graham, 2006). Yet this is still not enough according to Jones (2006), who reminds us of the early failures in e-learning which were understandably due to the researcher being led by technology instead of theory and pedagogy. She also points out that trend is changing. Furthermore, she feels that as yet “there is insufficient research on the most effective blend in course designs” (p. 184). Hoffman (2006) states, “New conventional wisdom and years of academic research tell us that the best programs are a blend of learning technologies” (p. 29), but that “most organizations have yet to break the code and create a successful truly blended experience.” (p. 30). Many pieces of the puzzle have been identified but there is no agreement on what the completed picture should or will look like. Some pieces have not yet been looked at, and this is precisely where the problems arise that this study addresses. This study is unique because it involves a high school physics blended class community, and there is very little to no research on the K-12 area. In fact, no study on high school blended science classes was found. Reeves (personal communication, September 12, 2008) stated that a fundamental reason for this lack of research is due to the tremendous barriers researchers encounter when trying to study public school classrooms. A search of EBSCOHOST, Google Scholar, ERIC, etc., reveals a disturbing hole in blended class research. The vast majority of the literature involves only distance or blended education for business training or higher education.

The recently published *Handbook of Blended Learning* (Bonk & Graham, 2006) only mentions one instance of K-12 blended learning, and that one case primarily deals with elementary school classes in Mexico. Another problem pointed out by Hanson and Clem (2006) is that there is plenty of research in online-only learning communities but little “applicable

research about the dynamics of learning communities in blended learning (mixed media) environments.” (p. 138). Entire books, many of them edited editions, can be readily found on online-only learning communities such as Palloff and Pratt (2007), Luppicini (2007), Barab, Kling, and Gray (2004), and Riesman, Flores, and Edge (2003). Furthermore, a database search of “blended classroom” and “K-12” (or similar search words) almost always results in a paper looking at a higher education blended class comprised of K-12 teachers, not actual K-12 students! This is not altogether surprising given the difficulties associated with studying at the K-12 level, such as simply gaining permission to do research in these classes. Corporations and those in higher education simply have greater access to, and control over, blended classes, and it is there that the vast majority of the research is found (Reeves, personal communication, September 12, 2008). Furthermore, blended learning is newer than the online-only and distance learning classes. Progress in the K-12 levels is notoriously slow when compared to colleges and corporations for reasons such as the additional laws to be obeyed due to the compulsory nature of K-12.

This lack of research is regrettable because high school students have different views of and interactions with learning than do the college and the corporate learner. The college and corporate learners are older, more mature, and self-motivated. The high school student is typically required to be in school and is therefore less likely to take their education as seriously as their college and corporate counterparts. Yet, outside of K-12, blended learning is one of the “top ten trends to emerge in the knowledge delivery industry” (Rooney, 2003) according to the American Society for Training and Development. Graham (2006) points out that “the *Chronicle of Higher Education* quoted the president of Pennsylvania State University as saying that the convergence between online and residential instruction was ‘the single-greatest unrecognized

trend in higher education today' (Young, 2002, p. A33)" (p. 3). He goes on to say that the editor of the *Journal of Asynchronous Learning Networks* "predicted a dramatic increase in the number of hybrid (that is, blended) courses in higher education, possibly to include as many as 80 to 90 percent of all courses (Young, 2002)" (p. 3). Certainly blended learning has the attention of researchers and practitioners. But even with this great potential to expand or even reshape educational environments and learning, are K-12 classes to be left behind? When will researchers be hurriedly discussing the discoveries for the younger learner? It appears that the K-12 classes are being left out of this pioneering adventure. This study will hopefully offer K-12 practitioners and researchers one of the first steps on the trail.

An Overview of Blended Learning

To begin our journey, let us ask: what is blended learning and how is it different from online and distance education? A blended class combines the traditional class (four walls, desks, students, and a teacher) with online components such as a forum, webcasts, and online environments (like *WebCT* (a product of <http://www.blackboard.com>) and *WebAssign*), which are accessed by students outside of normal class meetings (Backer, 2004; Graham, 2006; Graham, et al., 2003). There is not a specified or defined amount of time that is split between the two environments (Cross, 2006). The online environment is typically a freer environment, loosely and informally connected, when compared to the traditional class (Collis, Bruijstens, & van der Veen, 2003; Morgan, 2002; Smelser, 2002). It is intended as a place where more student-centered activities can occur, but with greater cohesiveness among the participants, which include not only the instructor and students, but the technology as well (Schwier, 2007). Online and distance education classes may not meet at all, and, in the distance learning class, there may be no student interaction at all but merely student and teacher. If these classes do meet, the time

is quite short compared to the overall class time. A good way to define the blended class may be through example, particularly when the newness of this approach results in a variety of too open or too specific definitions. This definition and its difficulties will be further developed later in this paper.

Pieces of the Blended Learning Puzzle

Scholars agree that it is not simply the blended class model that is effective in student gains. It is the careful application of appropriate pedagogies and curricular design (Graham, et al., 2003; Osguthorpe & Graham, 2003). Too often have blended learning classes been attempted resulting in little help or definitive harm. Blended learning requires effort. “Four or five years ago, it was commonplace to hear, “We’ve tried e-learning. People didn’t like it. It didn’t work very well.” This is akin to saying, “I once read a book. It was difficult to understand. I’m not going to do that again.”” (Cross, 2006, p. xviii). It is the purpose of this study to determine what some of the beneficial and detrimental aspects of the communities formed in the blended class are in order that better blended classes can be designed and implemented.

Elliott Masie (2006), a leader in blended learning and editor of *TRENDS*, an internet newsletter on trends in learning, says that all great learning is blended and that the “magic is in the mix.” (p. 25). By this he means not that there is a magic formula to be followed to create a successful blended learning class, but rather the magic comes in what elements are appropriately combined and balanced to create the class. Assuredly, different classes will have different ingredients, but what will those ingredients be? Paying close attention to what lessons, methods, and tools are to be combined from the traditional and online only classes will determine a successful blended class not just making a class a blended class. Several of these ingredients, as

well as how they differ in some respects from their past counterparts, will now be presented. The blended class instructor is a good place to start.

Jonassen, Davidson, Collins, Campbell, & Haag (1995) stated:

In comparison with a traditional classroom, where the teacher contributes up to 80% of the verbal exchange (Dunkin & Biddle, 1974; McDonald & Ellis, 1976), on-line computer conferencing shows instructor contributions of only 10-15% of the message volume (Harasim, 1987; Winkelmann, 1988). (p. xxx)

The U.S. Department of Education (2001) reports that 83 percent of higher education instructors use lecture as the primary teaching strategy. In the blended class the teacher is no longer expected or needed to be the primary leader in the class. Research indicates that a teacher moderator is not necessary for productive online discussions, which frees students to become moderators and self-regulators (Galanouli & Collins, 2000; McConnell, 1994; Rodrigues, 1999). Others point out that the presence of an instructor in the online environment can intimidate students and keep them from freely expressing their ideas (Pearson, 1999). In fact, Seo (2007) points out that Hara, Bonk, and Angeli (2000), Tagg (1994), and Veen, Lam, and Taconis (1998) found that

Student moderators can lead discussions more effectively and foster greater student comprehension than the instructor because student moderators better understand their peers' ways of thinking. Leh (2002) noted that when peer moderators facilitated online discussions, students felt that their conversations became more active. Poole (2000) reported that the use of student moderators contributed to promoting a sense of community among students. (p. 22)

These student moderators need not be placed in this leadership role. They will naturally take on this responsibility. Therefore, given the increased role of the students in creating and governing their interaction, what is the preference for their interaction within the blended class?

Many researchers have found that learners prefer the face-to-face (F2F) interaction in the blended class (Hanson & Clem, 2006; Hoffman, 2006; Swenson & Evans, 2003) or that they place greater value on the F2F (Owston, Garrison, & Cook, 2006) events. However, some researchers point out that the F2F components provide nothing more than socialization and are therefore unnecessary (Offerman & Tassava, 2006). Many advocates of online only education (Dede, 1997; Dunn, 2000) agree with this conclusion and see a future when “students will come to universities only for the social aspects of higher education.” (Bianco & Carr-Chellman, 2007, p. 302). Lindquist (2006) promotes the idea that the role of learner choice and self-regulation are what actually determine the best interaction mode, whether it be live, online, or blended. The blended class accommodates this ability of a student to choose one’s communication environment—either in class, online, or both. This accommodating aspect has been noted by others in blended learning, such as Graham (2006):

Learner flexibility and convenience are also of growing importance as more mature learners with outside commitments such as work and family seek additional education. Many learners want the convenience offered by a distributed environment yet do not want to sacrifice the social interaction and human touch they are used to in a face-to-face classroom. (p. 9)

Some wonder if this feeling of “sacrifice” may only be present due to the limitations of the technology used, so there are experiments into whether novel technology-mediated approaches to the blended class can bring a more F2F experience to the online class. New

methods and tools for communication, feedback, visualization, and simulation are transforming the ways in which students learn (West & Graham, 2005). This transformation may also be a good reason to try to start students in blended classes at an earlier age. Oblinger (2003) and Wendover (2002) point out that these new-generation learners (those born after 1980) have always had in their lives what older people see as new technologies. Oblinger and Wendover term these students “millenials” and describe them as being connected (mostly to each other) and skilled in the use of communicative technology. These millenials commonly view what takes place in college classrooms as slow-moving and uninteresting. It is time for the traditional classroom to adapt to the learner’s style of learning. Today’s students are already different from the generation-X students (born approximately 1961 and 1980), just as the generation-X students are different from their baby boomer predecessors (Oblinger, 2003; Wendover, 2002).

Some Areas of Dispute

Oddly enough, there is a great deal of research on the placement and use of computers in the K-12 environment although the research is not focused on a blended model. This, in fact, creates precisely the problem that researchers have found — placing computers into the K-12 classes is ineffective if there is no appropriate plan, training, pedagogy, and goal. Research, like the technology itself, must be placed within some coherent instructional framework such as the blended classroom model. Papanastasiou, Zembylas, and Vrasidas (2003) demonstrate from data in the Program for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) studies that students’ use of computers in the classroom can actually be an indicator of reduced student achievement, though they are quick to point out that this is not necessarily a cause and effect scenario. They cite evidence that lower-achieving students are given more computer time, and that the increased computer time is not

effective in raising the achievement of the lower-performing students. Several researchers agree that simply placing computers in schools is *not* a solution (Clark, 1983, 1994; Jonassen, Campbell, & Davidson, 1994). Access is not enough. Teacher training is crucial (Vrasidas & McIsaac, 2001). Computers must be integrated into the class with new and appropriate pedagogies. “Clark (1983, 1994), a known critic of the impact of media on learning, has argued for decades that the media does not influence learning in any way.”(E. C. Papanastasiou, M. Zembylas, & C. Vrasidas, 2003, p. 800). As Hoffman (2006) said, “Blended learning is more than the delivery of technologies; it is certainly not a plug-and-play proposition.”(p. 40). Essentially, “computer use, and educational technology more generally, cannot be treated as a single independent variable to explain its effects on student achievement. Evaluating the impact of educational technology requires an understanding of how it is used in the classroom...” (E. C. Papanastasiou, et al., 2003, p. 801). This is precisely what the researchers of blended classes in the corporate and higher education environments have found (Brown & Davis, 2000; Graham, 2006; Palloff & Pratt, 1999; Swenson & Evans, 2003).

However, Papanastasiou, Zembalys, and Vrasidas (2003) report that

Most research carried out to examine computer use and student achievement seems to emphasize that there is a positive correlation between these variables. There is plenty of evidence to indicate a positive relationship between technology and student achievement (e.g., James & Lamb, 2000; Sivin-Kachala, 1998; Weaver, 2000; Weller, 1996; Wenglinsky, 1998), although most of these studies emphasize that for technology to have an effect on student achievement it must be challenging, focused on higher order thinking skills. (p. 801)

They further state there must be capable teachers proficient with the technology. This also adheres closely to the calls for thoughtful implementation from the proponents of blended learning (Backer, 2005; Graham, 2006; Swenson & Evans, 2003). Just because computers are present does not mean gains in student achievement will be seen. For example:

The students from all three countries [Cyprus, China (Hong Kong), and the USA] indicating that they use computers in the classroom most frequently, were those with the lowest achievement on the Third International Mathematics and Science Study (TIMMS) in 1995 (Papanastasiou, 2002). (E. C. Papanastasiou, et al., 2003).

Papanastasiou (Papanastasiou, Zembylas, & Vrasidas, 2004) found similar results in the PISA data. Wenglinsky (1998) reported that students who spent more in-school time on computers actually performed slightly worse than those who spent less time on them.

Merely placing computers with students or expecting students to use computers from a location distant from the classroom is a poor choice. The media itself is not a solution. Training students and teachers in the use of these new technologies in order to enhance, enliven, and enrich their traditional classroom is what must happen first. Only then can the traditional class transform into the effective blended class.

Blended Learning

Masie (2006) states that, “In 1998, the training field popularized the term *blended learning* to refer to the mixture of e-learning and classroom learning.” (p. 22). He especially likes the parallel drawn between the more complex and interactive blended learning classroom and the participants in the blended environment because “as complex beings, we don’t learn in a simple or uniform fashion.” (p. 23).

Bonk, Olson, Wisner, and Orvis (2002) believe that a more complex interaction, including access to learning, is a key factor that influences the growth of a blended learning environment. Moore (2006) feels this lack of a complex interaction that is typically found in distance education is precisely the reason that distance education has not provided a superior learning experience, particularly for American students. He says, “We have to rise above the limitations of American experience since, in the United States, distance education has rarely included face-to-face tutorials” (p. xxv) Therefore, what do we need to do to direct the current trends in blended learning to create a more effective model? Both Detweiler (2004) and Zemsky and Massy (2004) maintain there is still a great deal of debate over the condition of online education in both higher education and the corporate world, and over what these debates mean to its future. As Bonk and Graham (2006) assert, “Clearly, a better understanding of the current state and the future direction of blended learning is warranted.” (p. xxxii). So what are the current views on the future of blended learning?

Future

Cross (2006) brusquely states, “Blended is a steppingstone on the way to the future. It makes computer-only training look ridiculous.” (p. xxiii). He believes that “*Blended* is a transitory term” (p. xxiii, emphasis in original), and that it is merely a stop on the road to a new form of classroom grown from the blended class’ seeds. Maise (2006) declares that blended learning is already here to stay, saying, “learning in the 2000’s will always have an element of *e* (blended)” (p. 25). Ross and Gage (2006) “feel that the trend toward blending is so prevalent that eventually we will not be asking whether institutions are blending but how they are blending.” (p. 152). Several researchers feel that blended learning will become so prevalent in the future that no one will call it blended anymore, just learning (Graham, 2006; Masie, 2006; Massy,

2006). In the meantime blended learning still has to contend with external forces, such as political issues, that will shape or negate its use, whether these forces come from the schools, universities, or the government (M. G. Moore, 2006).

Wagner (2006) tries to give us an idea of the magnitude of what is coming when he states that there is “Anecdotal evidence that only 10 percent of the world’s population is currently “online” (W. Hodgins, personal communication, August 30, 2004) [and this] suggests that we are standing at the front edge of a significant adoption curve.” (p. 42). More recent studies still only place the worldwide percentage at 22% (www.internetworldstats.com, 2008) with North America leading other continents with 73.1% of its population using the internet.

Smith and Seaman (2003) report that blended classes in particular are becoming increasingly popular in higher education institutions as well as corporate and nonprofit training settings. Thompson, Sandglass, and Simon (2000) found that many states, countries, organizations, and higher education institutions are working on deliberate plans for creating or expanding online education. Bonk, Kim, and Zeng (2006) performed two surveys on the future of blended learning. One surveyed higher education professionals and the other corporate training professionals. Already, 93 percent of the respondents were using blended learning. In both arenas the higher education “respondents expected a dramatic rise in their use of blended learning approaches in the coming years...And by 2013, more than seven in ten respondents anticipated that they would offer more than 40 percent of their courses in a blended format.” (p. 553). In the corporate realm 60 percent of respondents felt that

They would offer 40 percent or more of their courses in a blended format. Such findings indicate that blended learning is a permanent trend rather than a passing fad in both higher education and workplace learning settings. Given this significant adoption of

blended learning in both higher education and corporate training settings, it is vital to create strategic plans and directions for it. When asked, 60 percent of the corporate survey respondents indicated that they had a strategic plan for e-learning; however, only slightly more than half of those indicated that their plan was working effectively. (p. 554)

Bonk, Kim, and Zeng (2006) also found in their survey on the future of blended learning that higher education respondents ranked peer-to-peer collaborative tools (asynchronous environments) third, behind wireless networking and reusable content, in the rank of emerging technologies that will have the greatest impact on blended education in the next few years. With the primary focus in research being on higher education and corporate education, the natural question is, “What has been discovered about blended learning in these environments, and how will this information compare to, lead, and impact a K-12 environment?” These findings will be looked at but first a few of the reasons institutions and corporations are turning to blended learning will be presented.

Adaptability for both student and instructor is one of the primary reasons. M. G. Moore (2006) states that blended learning, by its very nature, provides “more than one opportunity of satisfying each student’s style of learning.” (p. xxv). Graham, et al., (2003; 2005) found three reasons were by far the most prevalent in choosing the blended learning style: (1) improved pedagogy, (2) increased access and flexibility, and (3) increased cost-effectiveness. These reasons are appealing not only to the students and instructors but also to the policymakers and administrators since it increases their return on investment. Collis, Bruijstens, and van der Veen (2003), Hartman, Dziuban, and Moskal (1999), Morgan (2002), and Smelser (2002) showed that the blended learning classes increase the level of active learning strategies, peer-to-peer learning

strategies, and learner-centered strategies used. Osguthorpe and Graham (2003, as cited in Graham, 2006)

Identified six reasons that one might choose to design or use a blended learning system: (1) pedagogical richness, (2) access to knowledge, (3) social interaction, (4) personal agency, (5) cost-effectiveness, and (6) ease of revision. In the BL literature, the most common reason provided is that BL combines the best of both worlds. (p. 8)

Given such promising reasons, there is little wonder why higher education institutions and the corporate world are moving towards and expanding their blended learning models.

Higher Education

Higher education is one of the arenas currently seeing a great deal of research into blended learning. Their findings report that universities are developing a preference for blended classes for both financial and educational reasons. Higher education students in both online only and traditional classes have requested a more blended class model. Jones (2006) reviewed the research literature for higher education and presented a case study in which distance learners asked for more blended experience. Blended courses at the University of Central Florida saw a tremendous increase in popularity from the moment of their introduction. The number of students signing up for blended courses increased from 125 in 1997 (eight blended courses) to over 13,600 (508 blended courses) in school year 2003-2004 (Dziuban, Hartman, Juge, Moskal, & Sorg, 2006). DeLacey and Leonard (2002) looked into the benefits of blended learning at Harvard Business School. They discovered that students learned more when online classes accompanied traditional F2F classes. Gains were also seen in student interaction and satisfaction.

In designing blended classes universities have taken uncommon views. In the discussion over how much online learning should be used to support F2F learning, one university has taken

a different tack. Says Cross (2006), “Capella University turns this view on its head, asking what face-to-face support is required to supplement online learning...Capella uses face-to-face only to further social goals such as building a support network or creating informal affinity groups.” (p. xix). Others have asked how much time should be devoted to the online and F2F components, and the University of Phoenix has responded by saying there is no set amount of time spent in both face-to-face and online interaction (Lindquist, 2006). Though there are several examples of successful blended courses in higher education, these initiatives are not always successful.

Laurillard (2002) cautions those thinking of incorporating blended classes into their curriculum that the first attempt typically does not work well. Jones (2006) reports that in the United Kingdom

A large number of early adopters of e-learning failed to attract and retain sufficient students to sustain their operations...The UKeU (UK eUniversities Worldwide) had attracted only 900 students against a target of five thousand, and in 2004 it was disbanded. Simply stated, the UKeU failed because of its emphasis on the technology at the cost of meeting learner expectations and needs. (p. 183)

According to chief executive of the Higher Education Funding Council for England, Sir Howard Newby (2004),

In hindsight it was clear that online learning on its own was not as popular as predicted and there had been a number of e-learning failures by universities in the US. What students wanted was ‘blended’ learning where online materials were backed up by conventional teaching. (p. 2)

Higher education agendas for attracting and educating students in an efficient and effective fashion bear a strong resemblance to the agendas for the corporate educational

establishment. However, in the corporate venue, the stockholder and productivity of the company are the primary concern and the growth and strength of the company the primary goal, not the satisfactory education of the employee.

The Corporate World

Blended learning in the corporate world takes on a very different perspective and objective. In the corporate world, the learner is not of utmost importance—the job is (Cross, 2006). Because getting the job done takes front stage here, Harvey Singh (2006) bluntly places the two together. For him, the greatest and most useful blend possible is the unification of learning and work. He feels that if this can be accomplished, then all learning at the workplace will be done in real-time. Truly a bold statement! Several companies have working blended classes up and running, and their proponents have views similar to Singh's because they are concerned with their return on investment (Bersin, 2003; Lewis & Orton, 2006; Ziob & Mosher, 2006) and the need to remain up-to-date while controlling costs. For them blended learning offers the most cost effective solution of fusing learning with the job. Several other benefits have been reported in studies on blended learning courses in the corporate world.

Graham, Smith and Ure (2003) found increased cost-effectiveness and productivity when companies used a blended approach instead of e-learning alone. Bersin (2004), Nelson (2005), and Thomson and NETg (2003) recount enhanced employee retention, and Zenger and Uehlein (2001) claim that blended learning reduces the time needed to train employees. Online resources can be easier and cheaper to update and distribute (Osguthorpe & Graham, 2003), and the costs are reduced as the online nature of the blended class takes materials, information, and messages to workers, wherever they are (Conlin, 2006). Thomson and NETg (2003) released a report

claiming real world tasks by people who learned through a blended strategy were performed faster than by those trained using e-learning.

These findings raise the question of what findings might parallel the effects of secondary school blended learning classes. It could well provide a window for students into their future careers, a career that will likely contain blended learning. The sooner and more frequently students are exposed to this type of classroom, the better prepared they will be to hit the ground running and succeed in the corporate environment. Several companies utilize blended learning and have shaped their instructional models to incorporate this, for example IBM, Sun Microsystems, Microsoft, Avaya, Cisco, and Oracle (Bonk & Graham, 2006). Several have found commonalities within their models, particularly the sense of community. These corporations have seen “the development of communities of interest or communities of learning” and continue to see the “growth possibilities” (Bonk & Graham, 2006, p. 57) of blended learning. Oracle’s Hanson and Clem (2006) “found similar degrees of content retention between the instructor-led training and blended learning groups but uncovered higher degrees of perceived benefits and an enhanced sense of community among the blended learning participants” (p. 140). In their study they found that there was more use of the community for work on community-based tasks than for community social interaction. This led them “to suspect that job-oriented training environments may stimulate different motivational factors than academic learning environments would, an issue that instructional designers should consider” (p. 145).

Corporations seem to be presenting more research and data on the effects and benefits of blended learning than higher education. Driven by costs and the bottom line, a more Darwinian elimination of poor theories and practices could well be present and, if this is the case, blended

learning may well be not only surviving but thriving and reproducing because it is the fittest. Therefore, more blended learning courses in K-12 and colleges could better prepare students for their contribution to the work force. This means building the collaboration skills of the students; instructing them on how to build and work in a community of learners.

Classroom Community

One of the characteristics of effective science teaching as outlined by the National Science Education Standards (Council, 1996) is “Supporting a classroom community with cooperation, shared responsibility and respect” (Council, 1996, p. 52). Hoffman (2006) states, “One of the most exciting opportunities afforded by blended learning experiences is the opportunity to create learning communities” (p. 34). These communities are an important part of the blended class (Harvey, Moller, Huett, Godshalk, & Downs, 2007; Swenson & Evans, 2003).

Definition of Community

Some definitions of community are presented here to demonstrate commonalities of group work, interaction, practices, and participation. According to Wilson and Ryder (1996), “groups become communities when they interact with each other and stay together long enough to form a set of habits and conventions and when they come to depend upon each other for the accomplishment of certain ends” (p. 801). Bellah, Sullivan, Swidler, Tipton, and Madsen (1985) defined a community as “a group of people who are socially interdependent, who participate together in discussion and decision making, and who share certain practices that both define the community and are nurtured by it.” (p. 333). Also, Lave and Wenger (1991) define a community by stating first that it does not

Imply necessarily co-presence, a well-defined identifiable group, or socially visible boundaries. It does imply participation in an activity system about which participants

share understandings concerning what they are doing and what that means in their lives and for their communities. (p. 98)

However, there are cautions about the lack of a consistent use of the word “community.” Barab, Kling, and Gray (2004) state, “At present the word ‘community’ is at risk of losing its meaning. We have little appreciation and few criteria for distinguishing between a *community* of learners and a *group* of students learning collaboratively” (p. 3, italics in original). They continue, saying, “*Building online communities in the service of learning is a major accomplishment about which we have much to learn...someone external cannot simply impose a predesigned community onto a group*” (pp. 4-5, italics in original). The community must be developed by the participants “around their particular needs and for purposes that they value as meaningful” (p. 5). Hanson and Clem (2006), however, point out that there is little research into the communities of the blended class

Although there is descriptive and prescriptive literature regarding fully online learning communities (for example, Bonk & Dennen, 2000; Palloff & Pratt, 1999), it is difficult to find applicable research about the dynamics of learning communities in blended learning (mixed media) environments. (p. 138)

Because there is little applicable research, several of the sources presented here reference online only communities though there are some blended examples primarily from the corporate world that will be addressed first.

Benefits of Blended Communities

Community formation in the blended class is one of the most important potential rewards from the blended class model. Hanson and Clem (2006) noted, “We saw considerable evidence that our learners strongly valued the community in the blended environment” (p. 144). In turn,

this community contributed greatly to Oracle's training program. Hanson and Clem (2006) observed that, "Blended approaches seem to generate intangible benefits, such as community formation, that are nearly impossible to measure, although they are ultimately essential to an organization's success" (p. 147). Others noted that the blended class created much more interaction among students than was typically found in the traditional classroom (Waddoups & Howell, 2002; Wingard, 2004). One of the results of this was an increase in the level of student satisfaction in the blended classroom environment that was sufficient to give students a preference for the blended classroom over their traditional classroom experiences (Leh, 2002; Willett, 2002). These community experiences result in effective discussions among students that, in turn, result in students developing an understanding of difficult concepts and refined social skills (Allen & Seaman, 2004). Osguthorpe and Graham (2003) provide more depth claiming

Students share questions, insights, and perplexities. They not only experience higher levels of mastery, but they open themselves to redefining and repositioning themselves in the world....This is the ultimate purpose of a liberal education—to help individuals see themselves in a new light, to help them relate to others in new and more productive ways....Purely distance delivery systems limit this kind of social contract, while blended environments enhance the possibilities. (p. 231)

Osguthorpe and Graham continue by stating, in contrast, the F2F environments "bring learners together in an environment where they can question, experiment, and enjoy the energy and enthusiasm of group learning. This interaction occurs between learners as well as between learner and teacher" (p. 288).

Rovai and Jordan (2004) found that blended courses produced a stronger sense of community among students than either traditional or fully online courses. Hanson and Clem

(2006) found the same thing: “blended learners appeared to benefit more and comment more frequently on the sense of community” (p. 143). Johnson, Aragon, Shaik, and Palma-Rivas (1999) compared online only and F2F classes and found no difference in the learning results, but did discover that students in the online class felt less confident and more socially disconnected than did students in the traditional classroom. It seems that online only students feel deprived of a sense of community. Cross (2006) humorously notes the importance humans place on interaction when he says, “Interaction can create an experience so compelling that it makes workers hungry to learn and drives otherwise sane people to pay four dollars for a cup of coffee at Starbucks” (p. xix). Community interaction helps to develop “Higher-order skills [that] require coaching, role play, and perhaps face-to-face sessions” (Cross, 2006, p. xx) through experience.

One of the primary promises of the blended classroom is to further, if not fulfill, the long-sought after goal of a more student-centered class, relinquishing the hold of the teacher-centered classroom. The blended class’ online component *forces* the instructor out of center stage and beckons the students to take the lead (Swenson & Evans, 2003). The students take charge of their classroom experiences though they may not be within a traditional class. Hanson and Clem (2006) remind us

Dewey (1938) argued that all genuine education comes through experience. Yet he further explained that it “does not mean that all experiences are genuinely or equally educative” (p. 25). Dewey held that poor experiences, not the absence of experiences, are the problem, and what makes them defective is their lack of connection to further experiences. (p. 138)

Sticht (1994) and Saba (2000) agree with this and with Clark (1983, 1994) that the technology is not truly the source of benefit. Technology in and of itself cannot be. The benefit is through the

combination of technology with a meaningful connection of experiences, both community and curriculum material based. This material-based aspect, not the community aspect, has normally been the focus of research, and this is precisely where current research should focus (Hanson & Clem, 2006). However, we must not forget that traditional classes often frown on the concept of community. Cross (2006) reminds us that

Many of us equate learning with schooling. That is why we think of learning as something a person does in isolation and that its ideal delivery takes place in the classroom or the library, cloistered from the outside. Group work is by and large discouraged (it's called "cheating"). (p. xxi)

The negative community trait of cheating cannot be ignored. This results in a serious betrayal of the blended community and creates concern among the students who worry that others are taking advantage of them and the blended class.

The Online Community

Within the confines of the online only class community is also important but it occurs exclusively, or almost exclusively, online. Because of this, "Virtual learning communities are learning communities based on shared purpose rather than geography. Through technology, learners can be drawn together from almost anywhere, and they can construct their own formal or informal groups." (Schwier, 2007, p. 28). F2F communication is limited if it happens at all. This places added importance on student communities. Schwier (2007) states that "Communication is at the heart of any community, but especially virtual communities. Communication acts as the most important catalyst in virtual learning communities" (p. 24).

Palloff and Pratt (2007) listed these as indicators that a learning community has formed in an online class:

- Active interactions involving both course content and personal communication
- Collaborative learning evidenced by comments directed primarily student to student rather than student to instructor
- Socially constructed meaning evidenced by agreement or questioning, with the intent to achieve agreement on issues of meaning
- Sharing of resources among students
- Expressions of support and encouragement exchanged between students, as well as willingness to critically evaluate the work of others (p. 32)

Whittaker, Isaacs, and O'Day (1997) report that

online communities have a number of core attributes:

- Shared goals, interests, needs or activities;
- Repeated, active participation, with intense interactions and strong emotional ties between participants;
- Access to shared resources with policies to determine access;
- Reciprocity of information, support and services between members; and,
- Shared context (social conventions, language, protocols) (p. 28)

These online communities commonly utilize asynchronous communication. Harvey (2007) found that “Asynchronous distance education provides an opportunity for meaningful learning beyond the capacity of the traditional classroom if learning communities are created that encourage knowledge-building through information exchange and social reinforcement” (p. 169). He continues by stating, “When the goal of asynchronous distance education is to attain knowledge-building levels, learners must have membership in a community dedicated to learning topic-

specific information” (p. 170). This aspect of community is a primary pillar of any asynchronous learning environment, which will be discussed here.

Asynchronous Communication

Asynchronous Learning Introduction/Definition

Blended learning and an effective online community depend on developing interactions and communications among the participants. “Discussion forums are increasingly seen as one of the most powerful tools for creating online learning communities (Sergiovanni, 1999; Swan & Shea, 2005)” (Corich, Kinshuk, & Jeffrey, 2007, p. 89), and “Discussion forums are being increasingly used to promote collaboration among a diverse variety of people from a wide range of settings and locations (Mayadas, 2001).” (Corich, et al., 2007, p. 89). “Hawisher and Pemberton (1997) report a correlation between the success of an online course and the value instructors placed on communication with and among students.” (Mabrito, 2006, p. 94)

Wagner (2006) declares “interaction continues to be perceived as the defining attribute for quality and value in online learning experience.” (p. 44). He continues, saying

As more and more distributed models of learning and collaboration emerge, interaction increasingly serves as the so-called glue that holds together all of those variables being blended”. As noted by Moore and Kearsley (1996), the more distributed the teaching and learning paradigm, the more critical the need for interaction. (pp. 44-45)

Furthermore, Wagner (1994, as cited in Wagner, 2006) states

That the perceived quality of a learning experience is directly proportional to and positively correlated with the degree to which that experience is seen as interactive. If technology-mediated learning designs are to have any significant impact on current and

future pedagogical practices, then learning design and development decisions need to maximize the benefit of interaction. (p. 45)

This is a step beyond Moore's definition of interaction, which is that between "teacher and learner, learner and learner, and learner and content." (Moore, 1989, as cited in Wagner, 2006, p. 45). It moves into the realm that Hillman, Willis, and Gunawardena (1994) predicted: that of learner-interface interactions. Therefore the blended class must have a strong interactive online component that allows students to meet, discuss the class topics, and socialize. This characteristic feature will be elaborated upon here in one of its recognized forms—asynchronous communication.

Asynchronous communication refers to "communication that can occur at any time and at irregular intervals, meaning that people can communicate online without a pattern of interaction." (Palloff & Pratt, 2007, p. 271). This definition is commonly agreed upon in online learning (Derry, Seymour, Steinkuehler, Lee, & Siegel, 2004; Harvey, et al., 2007). Email, texting, and forum posts (sometimes called discussion boards) are indicative of this form of communication. Forum posts, which are used in the blended class studied here, are "easy to use, inexpensive to implement, and extremely effective when designed and facilitated well." (Hoffman, 2006, p. 33).

However, this asynchronous environment is by no means perfect and therefore cannot be a sole substitute for all class communication without consequences. There are several strengths and weaknesses determined by researchers concerning the asynchronous (computer-mediated) environment versus face-to-face (in-class) discussion, and these will be reviewed here.

Asynchronous Learning Strengths/Benefits

Asynchronous learning is recognized as an important aspect of computer-mediated instruction. According to (Harvey, et al., 2007), in the distance education arena it

Has evolved to a point where it is technologically feasible and socially acceptable. With concerns over its effectiveness largely resolved, asynchronous distance education (ADE) offers two potentially distinct advantages over face-to-face instruction: the ability to deliver instruction anytime and any place, thus increasing access for learners who could otherwise not be served and, second, for creating an environment that allows for knowledge-building based on collaborative and reflective learning. (Barry & Runyan, 1995; Moller, 1998; Moore & Kearsley, 1996) (p. 170)

To draw the asynchronous environment back into the blended learning realm, Hoffman (2006) claims

We need to be careful not to overemphasize the live (synchronous) and undervalue the asynchronous components of the blend. All aspects, including assessment, required communication, participation and exercise completion, need to be considered as important as attending any live (live meaning face-to-face or synchronous online) events. (p. 35)

But Hoffman (2006) cautions that care needs to be taken during implementation, saying “we need to remember to reinforce the blend, so that participants understand the importance as well. Otherwise participants will wait for the live events to obtain the “important stuff,” and the blend will not be successful.” (p. 35). To determine the ways in which to make the asynchronous environment an important event to the students, careful attention needs to be paid to the strengths

and weaknesses of the asynchronous and F2F environments. In this way the benefits can be directed towards successful gains while the deficits can be reduced.

Strengths and Weaknesses of Asynchronous and F2F Communication

Graham (2006) presented and summarized some of the current findings on the strengths and weaknesses of F2F and asynchronous discussions. This table is reproduced here:

Table 1

<i>Strengths and Weaknesses of Conducting Discussions in Face-to-Face and Computer-Mediated Learning Environments</i>		
	Computer-Mediated Environment (Asynchronous Text-Based Discussion)	Face-to-Face Environment (In-Class Discussion)
Strengths	<p><i>Flexibility:</i> Students can contribute to the discussion at the time and place that is most convenient to them.</p> <p><i>Participation:</i> All students can participate because time and place constraints are removed.</p> <p><i>Depth of reflection:</i> Learners have time to more carefully consider and provide evidence for their claims and provide deeper, more thoughtful reflections (Mikulecky, 1998; Benbunan-Fich & Hiltz, 1999).</p>	<p><i>Human Connection:</i> It is easier to bond and develop a social presence in a face-to-face environment. This makes it easier to develop trust.</p> <p><i>Spontaneity:</i> Allows the generation of rapid chains of associated ideas and serendipitous discoveries (Mikulecky, 1998).</p>
Weaknesses	<p><i>Spontaneity:</i> Does not encourage the generation of rapid chains of associated ideas and serendipitous discoveries (Mikulecky, 1998).</p> <p><i>Procrastination:</i> There may be a tendency toward procrastination (Benbunan-Fich & Hiltz, 1999).</p> <p><i>Human Connection:</i> The medium is considered to be impersonal by many (Benbunan-Fich & Hiltz, 1999), which may cause a lower satisfaction level with the process (Haytko, 2001).</p>	<p><i>Participation:</i> Cannot always have everyone participate, especially if there are dominating personalities.</p> <p><i>Flexibility:</i> Limited time, which means that you may not be able to reach the discussion depth that you would like.</p>

Note. (p. 18)

Determining what the important aspects are that an instructor wishes to emphasize in a discussion is the first step. For example, a lecture in which the instructor wishes to give each student the opportunity to participate would best be served by asynchronous communication. On the other hand a lecture in which the instructor wishes to develop trust among discussion participants would work best in a F2F environment. Schank and Cleary (1995, as cited in Hanson & Clem, 2006) concurs with the depth of reflection afforded by asynchronous communication saying, “Cognitive scientists agree that learning by reflection is essential for mental processing and understanding” (p. 137) while Bean (2002, September) states, “Reinforcement is where the knowledge transfer takes place” (p. 25). Reinforcement via reflection becomes a common theme. Lindquist (2006) points out that at the University of Phoenix the belief is that the online parts of the blended class model encourage student reflective thinking, while the synchronous face-to-face portions give students the opportunity to socialize which the students find especially important. The asynchronous environment insures that this reinforcement does not occur in a vacuum.

Even though the asynchronous environment is online, the students are surrounded by classmates and their social presence (Gunawardena, 1995) becomes an important aspect of this environment. Social presence measures to what extent the learners feel they are real and are perceived as real in the online world (Moller, 1998). Garrison, Anderson, and Archer (2003) carry the concept further by adding how well the learners create and project their online presence to the community. They are constructing their online persona and that is what they are presenting for their place and activities within the online community.

Dennis, et al. (2006) also speak of the flexibility afforded by the asynchronous environment compared to F2F and

In online learning environments, course materials and messages between students and instructors are available anywhere and anytime that the student has Internet access, which allows the student to study independently of time and space and to read messages and send messages to the instructor and peers at the student's own convenience... Fidelity is also an aspect of asynchronicity and synchronicity that has impact on engagement and social presence in learning environments. Fidelity is a measurement of richness of communication; generally, synchronous environments such as face-to-face formats have very high fidelity, while asynchronous environments that are primarily audio and text based have very low fidelity. (p. 122)

Dziuban, Hartman, and Moskul, (2004) found that the asynchronous structure of blended classes can fashion an exceptionally effective computer-mediated communication environment. This provides a learning environment in which students are always able to be actively engaged with the learning community, and this gives them the potential to learn more than in a traditional classroom. The classroom is not the only place where students gain benefits. They are setting themselves up for future learning in their careers. Already, Lindquist (2006) purports that "Blended delivery better emulates how professionals in the early twenty-first century conduct business. The norm today is to be proficient in face-to-face meetings but also to work asynchronously and electronically with other stakeholders to achieve the desired learning outcomes." (p. 234).

Other researchers echo these researched differences of the online and traditional elements of the blended class. Mabrito (2006) offers several comments

Asynchronous conferences tend to focus more on substantive issues and less on general conversation, unlike synchronous conferences that may give more prominence to the

social aspects of interaction (Lapadat, 2002). Additionally, no time constraints are placed upon participants in asynchronous conferences; they have more time to formulate responses to messages and may choose to navigate messages in a nonlinear order. Because of these characteristics, asynchronous discussions can become a type of prewriting activity (Mabrito, 2000). (p. 95)

Using such “interactive technology makes it easier for students to acquire...workplace skills. Garrison and Onken (2002) note that businesses expect these skills, and the student is often at competitive disadvantage without them....Studies in synchronous and asynchronous online communication in the context of the online classroom have revealed, however, that these two different forms of communication may indeed affect patterns of communication and interaction among students differently.” (Mabrito, 2006, p. 94)

Asynchronous communication is an important component of the blended class and very different from traditional classroom communication. It offers the ability for all students to interact at their own pace, provide meaningful reflection, and prepare them for future learning in blended classes as well as the workplace. Several of these benefits dovetail nicely with the traditional class, filling in educational and community gaps, and offering support for students outside of class and at whatever time is convenient for them.

Summary

Blended learning surrounds us. It is more than fashionable; it is the training and educational delivery method of choice. Blended learning is now dominating news in higher education, corporate America, and governmental training settings, and the time has come for it to stop standing on the shores of the K-12 ocean and push off into these untested waters.

CHAPTER 3

Methodology

The purpose of this study was to look at the construction of and interaction in communities of students participating in an Advanced Placement Physics class that was modified to be a blended class. This was therefore an investigational research methodology in that the participants were placed in a purposely created and structured environment and then observed and interviewed from a grounded theory perspective. The central questions guiding the research were: 1) What are the characteristics of the student community formed in the blended secondary science physics class? 2) To what extent is the blended class allowing students to create and manage this community? 3) How does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class?

These questions were most appropriately addressed through a qualitative research process. This approach revealed unexpected areas pertinent to answering the central questions. The research flexibility allowed in the methodology and the changes made are detailed in the final analysis.

Subjects and Setting

The students involved in this study were all 11th grade students enrolled in one of my four, first year Advanced Placement (AP) Physics. All students in these classes were offered the opportunity to participate in the study. This provided a pool of 72 participants of whom 52 agreed to participate in the study. There were 40 who actually participated actively through interviews or forum posts. Active participation constituted being interviewed or answering a research question posted online. Passive participation occurred by students allowing their work in the online discussion forums to be analyzed and reported on for the study. Students taking

these AP Physics classes were obviously advanced students but only about two-thirds of them were labeled as ‘gifted.’ Both gifted and non-gifted students provided their views and insights into the online and in-class communities that developed in the blended class. The classes were split evenly overall with 36 boys and 36 girls. Class sizes included one small class of only 13 students, one of 15 students, and the remaining two classes with 22 students in each.

These students were all highly motivated, commonly representing the smart, articulate, and gifted student. Top students in the school were found in these classes. Most of these students are expected to go on to a four year college after graduation and many of them by scholarship. As such, there was a great deal about the maturity and motivation of the students involved in this study that makes them an atypical representation of the “average” high school student. This was not considered a problem since this is a groundbreaking study of an area predominantly either ignored by or inaccessible to the research community at large. Simply put, we had to start somewhere and this was as good a place as any.

Dacula High School is a public high school situated in Gwinnett County and belongs to the Gwinnett Public Schools system. It is a generally upper middle class suburban high school of approximately 2500 students with 141 teachers. 24% of these students receive free or reduced lunch and 5% are of limited English proficiency. Approximately half of the teachers have a graduate degree and the teachers average 13 years of experience. The school has recently been expanded and my room is in the new building. Class size is limited to no more than 22 students and follows a schedule of 56 minute class periods, meeting Monday through Friday.

Data Collection Methods

The methods of data collection included unstructured interviews, forum posts, and open questions posted online. An unstructured interview is defined by Lofland and Lofland (1994) as

a “guided conversation whose goal is to elicit from the interviewee rich, detailed materials that can be used in a qualitative analysis.” (p. 18).

This study began with assessing the previous experiences students had with blended classes. Initial interviews were conducted at the start of the blended class with six participants: six students (two male and four female). The initial interviews were used to learn what knowledge and experience, if any, the participants had of blended classes, its community, what their opinions were, and what the current blended classroom’s community was like. The questions for the first interview can be found in Appendix A. Six weeks later, a final set of interviews was conducted to collect data on the participants’ overall view of the blended class experience. The questions for the second interview can be found in Appendix B. One girl participant, Celeste, was not available for her second interview. The rest of the interviewees completed both interviews. Analysis of the interview data occurred after each set of interviews comparing both concurrent and accumulated data. The analysis of the first set of interviews helped to prepare for and guide the second set of interviews.

The online forums were set up at the beginning of the school year, in August 2008, and were used by the students to interact with each other, discussing anything appropriate they wished, from discussing how to solve the online homework problems to plain socializing. The forum posts used in this study were completed by the students well before the students knew they would be asked to participate in the study, and only posts that were created before students were aware that they would be asked to participate in the study were collected. This eliminated any reactive effects to testing in the forum posts sometimes called the “guinea pig effect” (Buddenbaum & Novak, 2001, p. 33). Granted, a smaller effect may have been present due to the

knowledge that their teacher moderates the forums, but this is true in any class setting and, therefore, inherently a part of the research data.

The third data set was obtained in what may well be a novel method. Four questions were posted consecutively on the forums. Also, each question was posted and left up only while there was no online homework posted for the class. This allowed for students to not be burdened and distracted from their physics work. Two weeks passed between each question post and each question was left open for responses for three days. These times were used to minimize the study's impact on their normal class routine. These four questions can be found in Appendix C.

Student-student interaction allowed for free communication with each other about homework and class work and the teacher had little worry about the integrity of the grades because the computer-generated work was individualized. In fact, the teacher encouraged students to work together on these assignments so that not only was the material being addressed, but social skills, such as communication and cooperation, were hopefully improving. Some students may have found this odd since, suddenly, the teacher was expecting them to generate a group effort in an area where, classically, individual effort was the expectation and group effort was considered cheating.

Constructionism also matched the course content as well: physics. The basic theoretical context of physics is to build knowledge through interaction with the universe in the form of experimentation and then to share that knowledge with others. This satisfies the environmental and social qualifications of constructionism. From the data obtained by these interactions, students with students, students with technology, and students with physics, this study proceeded to analyze from the perspective of grounded theory.

A review of the research indicated that the blended class delivery method had not been tried before in the context of the secondary science AP physics classroom. Therefore, there was no preceding theoretical framework to either work from or to contrast against, requiring the use of grounded theory and phenomenology in addition to constructionism. Grounded theory was used to help construct a model that described the interactions (student with student, student with technology, student with teacher, and student with science) observed from the constructionist view used during data collection. From there, grounded theory was used to discriminate between behaviors and experiences that hindered or helped the students' understanding of science and to achieve a better understanding of how best to increase students' science learning and knowledge through the blended class model. This allowed for the development of improved blended classes, resulting in improved student learning from new and more effective classroom methods.

Interviewees were not chosen at random but selected based on my perception of their ability to express their experience and their participation in not just the traditional class setting but the blended class as well. This called into question the external validity of the conclusions and limited the study (Hycner, 1985).

Some argue that due to the depth and time-cost of analysis, there are relatively few participants in a qualitative study, limiting the study's ability to generalize. Furthermore, the participants are being asked to reconstruct past experiences. Critics argue that the lived experience of the participants cannot be faithfully revisited since memory is flawed. Qualitative researchers understand this and state that this *is* part of the essence that the person comes away with. To try and separate fact from idea would deny that fiction is a part of the lived experience.

Replicability, a founding principle of scientific research, is also difficult to maintain in qualitative studies (Hycner, 1985). In addition, several mainstays of natural science theory such

as control groups, hypotheses, prediction, and the completed theory are not applicable. Qualitative theory's core assumption of the uniqueness of human lives and the individual's experiences refutes the relevance of many of these schemes.

My classes use a transforming course-level blend. This means that there is a “combination of distinct face-to-face and CM (computer-mediated) activities used as part of the course” (Graham, 2006, p. 11) that constitutes the course-level aspect and follows a radical transformation of the pedagogy—for example, a change from a model where learners are just receivers of information to a model where learners actively construct knowledge through dynamic interactions. These types of blends enable intellectual activity that was not practically possible without the technology. (Graham, 2006, p. 13)

In my blended physics class, students meet F2F for a regular class period, five days a week and cover lecture, labs, demonstrations, videos, and discussions. The CM component takes place over the internet using WebAssign which generates the homework assignments, keeps track of student work, and provides the forums where students can meet anytime, day or night, to socialize and/or work together on the assignment.

Grounded Theory

Grounded theory was formally introduced to qualitative research in 1967 when Barney Glaser and Anselm Strauss published *The Discovery of Grounded Theory: Strategies for Qualitative Research*. The book was developed in part as a response to the growing prominence of quantitative research being done in the social sciences. Over the years, qualitative research in the social sciences had been in decline, pushed out by the growing use of more quantitative methods adopted as the preferable analytical method in journals, colleges, and grant suppliers (Charmaz, 2006). Others disagree pointing out that this primarily only applies to studies funded

by federal agency grants (Jackson, personal communication, March, 31, 2009; Reeves, personal communication, September 12, 2008).

However, quantitative analysis typically did not result in new theories since it purposefully tested hypotheses that developed from current theories. This circular approach resulted more in perpetuation of theory than progress toward new theory. Qualitative researchers recognized this dilemma in quantitative methods and Glaser and Strauss constructed a qualitative approach that intentionally developed theory as the research proceeded.

Glaser and Strauss (1967), while investigating the experience of people dying in hospitals, realized that their data could be used to shape their analyses and theories of the very same data. By being highly structured in their methods, they were able to generate a formal and careful investigation resulting in a more rigorous qualitative method. In this method, a system of data-feedback provided deeper insight into their study and allowed them to effectively defend the validity of their conclusions—a common weakness in previous qualitative methods, according to critics (Charmaz, 2006). Ezzy (2002) states that grounded “theory is built up from observation. Observations are not selected to test a theory. Theory is ‘grounded’ in data.” (p. 12). From this framework, Glaser and Strauss developed a process of data collection, analysis, and theorizing.

Furthermore, Glaser and Strauss realized this method offered the social sciences a structured form of analysis that could claim a much more solid foundation. This, in turn, would offer the ability to once again study data from a qualitative perspective and have the strength to stand side-by-side with quantitative analysis. Qualitative researchers took note of this and began a concerted shift toward the use of grounded theory. This has resulted in the growth of grounded theory into a multifaceted theory and methodology that has continued unabated for 40 years.

Today, there are two common divisions of grounded theory, both applying the basic elements outlined by Charmaz (2006). The difference between the objectivist and the constructivist views is determined by the role the researcher takes. In the objectivist view, “the researcher takes the role of a dispassionate, neutral observer who remains separate from the research participants, analyzes their world as an outside expert, and treats research relationships and representation of participants as unproblematic” (Charmaz, 2006, p. 188). This results in the objectivist researcher assuming a positivist stance where the world is external to the researcher and experiments are performed in the classic sense of the scientific method. Theory is generated through the expert observation of objective facts. Part of the duty of the researcher is to eliminate their own effect on the gathered data. The constructivist stance places the researcher as an integral component of the research. Here, the researcher is a co-participant in the research and in their interaction with study participants. Charmaz (2006) states this “approach places priority on the phenomena of study and sees both data and analysis as created from shared experiences and relationships with participants” (p. 130). Though the researcher assumes different roles in the research, basic elements of grounded theory occur in both the objectivist and constructivist styles.

According to Charmaz (2006), Glaser and Strauss contended that correct grounded theory included seven elements:

Simultaneous involvement in data collection and analysis

Constructing analytic codes and categories from data, not from preconceived logically deduced hypotheses

Using the constant comparative method, which involves making comparisons during each stage of the analysis

Advancing theory development during each step of data collection and analysis

Memo-writing to elaborate categories, specify their properties, define relationships between categories, and identify groups

Sampling aimed toward theory construction, not for population representativeness

Conducting the literature review *after* developing an independent analysis (pp. 5-6)

Of these seven elements, the constant comparative method of data collection, coding and memo-writing are essential techniques that will be discussed further. Glaser and Strauss' final element of conducting the literature review after the analysis was not followed, nor could it truly be since I was already fairly familiar with the blended class model, having been a practitioner of it for several years and having studied it extensively throughout the course of my master's and doctoral studies.

Coding and Constant Comparative

Coding in grounded theory demonstrates one of the most important aspects of grounded theory because it is here that the produced theories are "born and take shape." Grounded theory researchers take the view that through successive and continual comparison of "data with data to find similarities and differences" (Charmaz, 2006, p. 54) new theory is developed. Of great importance is the fact that the researcher does not wait for all of the data to be collected before beginning analysis. Analysis begins as soon as data starts being collected and continues during further collection. For example, using two interviews, each will be analyzed separately for recurring themes (and even contradictory themes) within themselves and then compared against each other. Furthermore, interviews between different participants and earlier and later interviews with the same participant will all be constantly compared within and against each other. Each element of data will be compared to each other across multiple levels commonly

labeled as data, cases, categories, and concepts. During this ongoing process, this analysis will generate “successively more abstract concepts and theories through inductive processes” (Charmaz, 2006, p. 187) and the comparisons will “constitute each stage of analytic development” (Charmaz, 2006, p. 187). By continually analyzing and reanalyzing the data, nuances take on a perceptible form and similarities become apparent to the researcher who then revises their theory to account for the newly detected connections. To facilitate this method, Glaser and Strauss (1967) developed several procedures for studying the data, two of which are integral to grounded theory: coding and memo writing.

Coding and Memo Writing

Coding involves generating words and phrases that define the data the researcher is gleaning. According to Charmaz (2006) these codes are much more effective and useful if they show action. Different from other methods, the researcher creates the codes *after* data collection has started, not before. The coding is open which means it can and should lead the researcher into new areas, thoughts, and theories, helping the researcher study their emerging data (Glaser, 1978). Charmaz (2006) lists several types of coding such as word-by-word, focused, initial, axial, and *in-vivo*. From these codes, the researcher discovers trends and tendencies, similarities and discrepancies, and categories and subcategories from which themes and theories are developed and constructed from memos.

Memos are “the pivotal intermediate step between data collection and writing drafts of papers” (Charmaz, 2006, p. 72). In this stage, the researcher writes down their myriad thoughts while going over their codes and generating categories. There is a great deal of emphasis on working quickly so that they can get down as many of their ideas and thoughts during this free-form, almost brainstorming, method of drawing connections and comparisons within the data. At

this stage, the research begins to take a direction that leads the researcher back into their data to look for support to their intuitions, guesses, and feelings about what their coding is trying to tell them. It is common for the researcher to develop a new understanding of their data at this stage and for the memo to develop into new perspectives and theories. The process is highly cyclical and works to improve the quality of abstraction in the researcher's design.

Methodological Choice

The guiding theoretical framework of this study was grounded theory (Glaser & Strauss, 1967) from a constructionist view for the data collection techniques and analysis strategies. Crotty (1998) defined constructionism as “the view that all knowledge...is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (p. 42). This theory corresponded closely to the blended class model since the model emphasized interrelation between students through the online forums, the individualized homework, and the computers. The social context was the interaction between students and between students and their world, in this case, the technology utilized in the blended class.

Grounded theory from a constructionist viewpoint worked well as a pilot study for several reasons. The analysis method is very clear, fairly standardized, and widely accepted in qualitative research with a secure history. Since the focus is on the creation of communities within a generated blended class a constructionist view matches the purpose of the study. Having a background in physics, this researcher is also concerned with the inherent problems of qualitative methodologies in that their results can be difficult to defend. Since the data and conclusions are derived from biased observation and subjective interpretation there is hesitation as to the validity of any qualitative methodology. Yet, after working with grounded theory during

the pilot study, this researcher became impressed with and convinced by grounded theory's insistence on repeatedly returning to the data to verify the accuracy of the codes and conclusions uncovered. It is also reassuring that the belief in grounded theory is that the data lead the researcher, not that the researcher is looking for data. The intent is for the data to remain what they are and allow for theory to be shaped from the data.

Methods

Each of the live interviews was manually transcribed from the mp3 format recorder into a text file. The first set of interviews were transcribed within a week of the interviews and analysis and coding was started. From these initial analyses, the second set of interview questions was developed. The online interview questions and the forum posts, being typed into the forums by the students, were already effectively transcribed and merely needed to be copied and pasted into a text file. This allowed for each data source to be gradually added in to the data mix and comparative analysis and initial coding began. After the initial data had been collected and some coding had been done, it was transferred into the qualitative analysis software called NVivo 8 (QSR International, 2008). NVivo enables the researcher to have numerous data files open at once and code them by simply selecting a section of the data (such as an interview quote) and associating that section with an existing code (called a node) or create a new node.

Three categories for the emerging nodes, called super nodes, were created—one for each of the three research questions. Numerous nodes were created which, after careful analysis, were condensed from overlapping nodes. For example, one node labeled “Potential Problems” was used under the super node for the first research question and another node labeled “Possible Problems” was used under the super node for the third research question. These nodes overlapped and used many of the same data so it was determined that the node under the third

research question made more sense and the “Potential Problems” node was eliminated. Another node for the first research question called “Aspects of Community” was simply not used because it was almost identical to another node that was used—“Blended Community Characteristics.” Nodes with insufficient supporting data were removed as well as nodes that it was decided did not address the research questions. Once the coding of nodes was completed, meaning all of the data had been entered and analyzed, each of the nodes was printed out as a hardcopy. These hardcopies had each section of data that had been coded with the same node organized by interviewee, forum posts, and finally online questions. From there, the most pertinent quotes and data were used to construct the summary of findings presented in chapter 4 as well as the discussions and conclusions for chapter 5.

Feasibility

The grounded theory method was feasible because its application to interviews and observations has already been successful in the pilot study. Data collection through interviews alone and analysis of prospective individuals had already resulted in the discovery of new and unexpected themes and structures within the blended classroom. One of the unforeseen structures that emerged in the pilot study was the creation and promotion of new communities by students due to the blended class model, which had become the principal focus of this study. With the addition of data collection via forum posts and online questions open to the class community, the study resulted in a greater understanding of student communities and how they affected student learning within the student learning environment.

Ethical Considerations

This study was approved by the Institutional Review Board of the Human Subjects Office at the University of Georgia. Signed consent was also obtained by each participating student’s

parent or guardian. Pseudonyms were used to protect the identity of the participants as well as maintaining data secured in password-protected computers that remained in the researcher's possession.

Limitations of the Study

A primary limitation to generalizing the findings of this study was that the participating students are not average students. They were highly motivated students with approximately two-thirds of them belonging to the state of Georgia's gifted program. These students typically have strong parental support, stable home lives, high-speed internet access, and believe school is important.

Subjectivity Statement

I was born and raised in Georgia. Educated in public schools, I attended Georgia State University, earning a bachelor's degree in physics with a minor in mathematics. After graduation, I obtained a teaching certificate and taught physics and computer programming for eighteen years in public schools during which I also earned a master's degree in science education. I was named a Master Teacher by my school system, was also given the STAR Teacher award for Dacula High School in 2006, and was nominated and had my application accepted to NASA's Educator Astronaut program though I did not get hired as an astronaut. Presently I am finishing my doctorate in science education at the University of Georgia. I have previously been a researcher in astrophysics at Georgia State University as an undergraduate student. I have also done research in science education through Piedmont College as a graduate student.

I have a strong interest in the use of technology in the physics classroom since I believe technology is one of the most effective means to improve society. One of the reasons I believe

that technology can be used to increase science achievement in American students is that it promotes student accountability. Whereas in a traditional class, only the teacher oversees the work of the students, a blended class utilizes the technology to keep track of student progress and makes that information immediately available not only to the teacher, but to students and parents as well. This belief, among others, has led me to slowly implement changes to my classes over the course of my career that belong to the blended class model. This creates both strengths and weaknesses for my position as the researcher in this study.

Since I am already a designer and practitioner of the blended class model in the secondary physics class, I have experience in the tools, structure, capabilities, and limitations of the blended class model. As a teacher, I am familiar with the combinations of social interactions between students, parents, and teachers. As a physics teacher, the problems students encounter when first learning physics and using technology to improve learning are well-known to me. These strengths will allow me to better focus on relevant data and ascertain its importance and novelty. However, this experience also indicates a strong bias for the success of the blended class model that must be minimized as much as possible to insure the integrity of the study. It is intended that this will be greatly alleviated through the use of grounded theory methodology and its reliance on recurring themes in data for supporting conclusions.

I have literally spent years developing what I believe to be an effective blended secondary physics class. But my training as a physicist has taught me that only facts count. A favorite theory that is not supported by the collected data must be discarded. The feelings of the theorist are irrelevant to the universe that is being studied and therefore they must be ignored to the best of the ability of the researcher if genuine progress is to be made. This training will remain the basis of my detachment during the course of this study.

Summary

This chapter presented the outline of the study including its research questions, participants, setting, methodology, and limitations. The grounded theory methodology is a well-established methodology, intended to allow the data present itself rather than the researcher looking for specific concepts and ideas from preconceived notions. Finally, the study's feasibility, ethical considerations, and the researcher's issue of personal bias are addressed.

In chapter four I will present the study's data, organized by the research questions and the overarching themes that the grounded theory methodology uncovered. It will briefly describe emerging trends in the data.

CHAPTER 4

Summary of Findings

This data presentation will be broken into various subsections according to the three research questions:

- What are the characteristics of the student community formed in the blended secondary science physics class?
- To what extent is the blended class allowing students to create and manage this community?
- How does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class?

As the data were simultaneously analyzed and coded in accordance with a grounded theory methodology, the findings in this chapter are grouped by the codes that emerged. Quotations from students often represented more than one code, and therefore some quotations will be reused in different sections here. Bear in mind that forum posts made by students are presented in their original format, including spelling and grammatical errors. In many instances this would require a distracting number of [sic] comments; therefore they will be left out. Further analysis of these findings and conclusions will occur in chapter five. I will start with a brief summary of the individual interviewees and a description of the students in general since they comprised the responders to the research questions which were posted online for open response and discussion. These students were also the ones who created the actual forum posts used in this study. Bear in mind that when students are talking about “WebAssign”, they are referring to the online portion of this blended class, which includes homework problems that are delivered via the Internet and graded immediately by computer, in addition to the online forums which reside within the

WebAssign homework site. Students are given 15 attempts to get a problem correct which creates the opportunity for a great deal of discussion in how to correctly work the homework problems. They are given 15 attempts so that they do not feel pressure in trying to get the problem correct in the first several attempts.

The Six Interviews

All six of the students who gave personal interviews were juniors currently taking the AP Physics B class with the researcher as their teacher. They volunteered to give these interviews because they were interested in helping.

Celeste

Celeste is an eighteen year old Caucasian student in the gifted program. She has been in the gifted program for several years after being labeled as gifted at an early age. Sitting sandwiched between five very good friends in class, she always demonstrates a bubbly personality, is extremely social in class, but says little in the forums. She labels herself as a lurker—someone who observes the forum posts but does not participate. She sits in a ‘sideline’ position in the class, facing the body of the students with the front of the room and the teacher to her left.

Mikalah

Mikalah is a seventeen year old African-American student who, while not in the gifted program, is still an intelligent, outgoing, outspoken, vibrant young lady with strong opinions and a winning smile. I have frequently witnessed her stand up for herself in class. She is in a perpetually good mood and seems a genuinely happy child. I have never seen her do anything remotely immature, and she carries that attitude into her work ethic. A strong leader in the classroom, whom other students respect and enjoy, Mikalah sits in the center of the class facing

the teacher so that she can just as easily address the teacher's class discussions, as well as she can address the class discussions of other students. Never shy or intimidated, her views on the blended class are remarkably observant and deep. She is strongly analytical and intuitive.

Isabel

Isabel is an eighteen year old Caucasian student in the gifted program. She has also been in the gifted program for several years, being classified as gifted at an early age. She is highly intelligent with a serious demeanor and is the only gifted student in her physics class. Quiet, focused, and very solemn about class and learning, she only socializes during class-time when the class has been given a group work task. She sits in the very back right corner of the class and only speaks when called upon or when she has a point of confusion she needs cleared up, which is rare. Once she starts discussing the blended class, she becomes quite animated and enjoys talking about the differences it has made in her views on classroom education as evidenced by the speed at which she talks.

Kevin

Kevin is a seventeen year old Caucasian student and is no longer in the gifted program. This is odd given his immense intellect, which is now universally recognized by the students in the AP Physics classes. This may either simply be a mistake in his educational placement, or it may be that he did not display the requisite creativeness commonly found in gifted testing used for placement in gifted classes. In class Kevin is quiet and shy, and several students remarked that even though they had known him for years, they would have never known how smart he was if it weren't for his powerful teaching skills in the forums. Once he is comfortable with the people he is around, you discover he has a wicked and very dry sense of humor. In any case, his initiative, drive, and understanding of physics have made him a respected authority not only

across all of the AP Physics classes, but also in the forums, and his teaching is greatly appreciated by his classmates. Kevin sits on the left side of the class in the back corner near Richard.

Richard

Richard is a seventeen year old African-American student who is not in the gifted program. He has the most outspoken and outgoing personality in all of the physics classes, and, because of the forums, he is well-known for his playfulness and leadership, though most agree that he can be annoying. He doesn't mind this opinion of him since it is intentional on his part to be annoying, and he feels it brings a life into the forums that they wouldn't otherwise have. If there is a court jester for the forums, it is Richard. As for his leadership, the other students know that his help in the forums for solving problems is not always correct, but they know he is undaunted by mistakes. He fixes the mistakes and doesn't let these public faux pas embarrass or slow him down in any way. To him, that's learning in a very real sense. In person he is a fun, warm, and caring person to be around. He admits that his maturity and attitude are different at home, in class, and in the forums. At home he says he feels alone and isolated while doing homework. In class he says he is usually quiet and reserved and prefers to just listen. In the forums he is an outspoken, social leader.

Jen

Jen is a seventeen year old Caucasian student and is not in the gifted program. She has a strong personality and is unafraid to stand her ground or give her opinion. Her socializing is done in class but not to a great extent. Normally she is quiet and especially responsible, particularly in regards to her schoolwork. Intelligent and a hard worker, she comes across as a somber student who requires some work on the part of others to get to know her. Although she is not really a

leader, her presence gives one the sense that she belongs to the backbone of the class, meaning a student who is always present, is steadfast in her work ethic, and on whom others rely for consistency in a dynamic environment. Jen also sits in the last row of the class facing the teacher.

The Online Discussion Questions

The four online discussion questions were posted in the forums for any and all students to respond to if they had agreed to be in the study and wished to respond. They were given approximately a three day window during which they could respond, at which point the question was “locked”, meaning that no new posts could be added although the previous posts could still be viewed. All of the posts were visible to all students so it was an open forum where students could read what others posted and therefore comment and asynchronously dialogue with other students about the question and each other’s responses.

The Online Forums

The online forums were set up in August of 2008 at the beginning of the classes. What follows here is a sample of the over 140 pages of forum posts collected during the first 12 weeks of the class. These forums acted as an online public meeting place for discussion among the students about anything they wished. The majority of the posts involved were related to physics, but a great deal were what many students termed as goofing off, blowing off steam, or socializing. These discussions, which frequently were interwoven with physics problems, learning, and teaching, served as a larger venue for expanding class time and interaction among the students. They could talk about their lives, frustrations, tell jokes, or be passive and simply read what others had posted for education and entertainment. As stated previously in chapter three, the students responding to the questions posted online, and those who posted throughout

the first 12 weeks in the forums, are both gifted and non-gifted eleventh grade students taking an AP Physics class, the first AP class that many of them have ever taken.

What are the characteristics of the student community formed in the blended secondary science physics class?

Several characteristics of the blended class' student community, its activities, personas, and problems, were experienced and discussed by the students bringing light to this question.

Collaboration

The ability to collaborate on physics was the primary characteristic mentioned by students in all of the data sources. Working together was extremely important to the students.

Celeste said:

I like the WebAssign just because you can keep posting your answers and getting it wrong and then figuring out how to do it and it tells you if you get it wrong, whereas if you do your homework, like, from a book and you come to school the next day and you worked really long on a problem and it's wrong. And so if you do the WebAssign on the computer, it just does it. It just helps you do it and you just do it right off the bat. (first interview)

When asked her preference on the separation of gifted and non-gifted classes she continued, saying, "All of our classes are separated: gifted, AP, non-gifted AP and I like it when it's mixed" (first interview) and pointed out that there was no cross-class interaction in any of her other classes. Her feelings about the forum were positive, and she said "It was really entertaining too." (first interview) More specific to the collaboration itself her reasoning followed:

You go through your WebAssign (homework) and then you don't know one (problem) and so you just go on there and there's a whole long post on how to do it and somebody's

like, “Oh wait, my numbers didn’t work.” And then they tell you, “Remember to convert this to this.” And stuff like that. They’re like reminders, I guess... Like, lately, in the very beginning, like right after you post it, some people post all their solution or formulas or whatever and then slowly after that people will ask more and more questions as it gets closer to when it’s actually due. Like two or three days before it’s due is when people really start to do it. And it kind of drops off until when I get on there and there’s like one person going, “Wait! Somebody come back on! I don’t know what to do!” (first interview)

So strong were her feelings on the benefits of this collaboration that when she was asked what her reaction would be if the forums were no longer available she exclaimed, “Oh my God, no! Oh my God, no! No, no, no!” (first interview). She felt strongly that the blended class greatly increased her ability to work with other students and to learn physics. Celeste’s views of the strength of vastly improved collaboration within the blended class was echoed by almost all of the other students in the study.

Mikalah spoke extensively and eloquently about her attitudes on and experiences with the online collaboration. To a student at another school, she would describe this benefit of the blended class in this way:

I would say we learn the basic stuff. You put a lot of our stuff on power point and then we go home and our homework assignments aren’t like most other classes. They aren’t on paper; you don’t have to keep up with all that stuff. We just go online and we get a reinforced lesson because we can go and do our homework assignments online and then we log on to this WebAssign thing. We just login and you create your own account, that’s setup for you.... isn’t it? And then we can ask each other. So it’s like doing homework but

by yourself but having a whole group of people; and it's not even just for your classroom. You can get questions that other people ask, so you don't feel really stupid thinking you're the only person that didn't understand this and you can ask people from the class how to do this and that and so it just works. (first interview)

Mikalah had this to say about the online homework and the ability to collaborate:

On WebAssign, it's a whole community that's basically the biggest thing and you can't help but work with other people because if someone gets on it before you, you have this whole safety feeling, you go on and before you start, you're like, "Oh, I know I started this assignment pretty late but there's 10 people who've done it before you". And so they go and they have questions on how to do this problem; don't miss that on here. It's like reducing the chance of human error because you pick up your dumb little mistakes before you even make them. You just know this is how you do this problem. And everyone just works together. People might play with each other sometimes but, like, for WebAssign I don't think we all get it done ourselves. (first interview)

She described a very different collaboration dynamic in the blended class compared to her other classes:

I have study groups for some classes, and other AP classes or other assignments are just homework and most students, well let's not lie, like when some students don't do their homework they end up copying, to state the facts. But in WebAssign there's no need to do any of that because the answers are randomly generated and then we know what we're doing, we can go ask someone else who's done it. (first interview)

There were further benefits over the traditional class she spoke about:

If you think that you are totally lost on this, know that 10 other people are totally lost on it and so you're going to go and, no matter what happens, you get help on WebAssign in the forums. You don't have to wait until the next day to come to class and be like, "Oh I can't do my homework assignment because I totally didn't get this question." Which is what happens in other classes, because it's right there and that just makes it ten times easier. (first interview)

The forums helped her to learn more about her classmates and not just in her own class:

But coming into this classroom and having WebAssign there made it easier to talk to everyone else because if you have nothing to say to your classmates, you know that you can talk about WebAssign. And I also connect to everybody else in a bunch of different classrooms. I know I've made a bunch of different friends in the other physics classes. I get help from people I didn't even know before, just talking about this question. "Oh, I helped them" and "oh, I helped them." (first interview)

A specific example of collaboration stuck out in her mind:

Caroline, she...gets help from Kevin, she gets help from Billy...just went around and was like, "Hey, these are your numbers, this is how you do that" and everybody's like, "Ok, yeah." And on WebAssign we always have that whole post equation and remember to change this grams to kilograms all that stuff. And Richard puts his specific examples in there and works that stuff out there too...it [the forums] make it easier to work together. (first interview)

Isabel had several things to say on the collaborative characteristic of the blended classroom community. She started by comparing it to the more restrictive traditional classroom claiming, "more times in class teachers encourage you to be quiet and not help each other and in physics

we're on WebAssign and you encourage us [to work together]." (first interview) This encouragement leads to situations in which:

They've figured out a problem that everyone else has been having trouble with. In other classes you just sort of don't do anything about it but in this class people will be like, "Oh! I finally got this one!" and they'll post an explanation about it on the forums. And so, it's sort of different for other classes. (first interview)

The collaboration came with added benefits according to Isabel because it extended beyond the classroom:

It's helpful for when you're at home and you can't ask a student cause they're not next to you but you have to figure out another way, and that makes it really easy to ask other people's explanations when you're doing your homework at home. (first interview)

She went on to say:

People are a lot more open to ask questions online. I noticed cause not that many people will just come up to you and ask, "How do you do this?" in class. I mean every once in awhile but not very much. but on the WebAssign, people will post all the time, "I'm really confused", "Help me out with this". They don't hold back as much because [of] it being online; it's just they don't hold back as much in asking questions. (first interview)

and added:

whenever you don't understand something, you [can get someone to] explain it and that way, a lot of times, if you don't understand some of the homework and you never get the chance to ask a teacher you'll just never understand that. And so WebAssign, it's pretty foolproof. If you want to figure it out, you can somehow...its definitely expanded working together a lot more than other classes. (first interview)

Collaboration took on an important role for Isabel's work in the blended class.

Kevin, one of the recognized leaders of the forums, found that the online forums provided similar benefits. He said:

well, it seems that we all are working together to just get our homework done; which is good and it helps us learn more about each other and see who can do what...we help each other out regardless of if we know each other or not, just because it feels good to help out others... there's a lot more help in this class. Because it's like you're in physics even when you're on the internet on the forums because everyone's talking all the time and asking questions, whereas other classes you're just in there for an hour a day and you can't ask questions about it and get a straight answer from somebody. The physics just keeps on going after school. (first interview)

This online extension and continuation of the physics class made it possible for students to "have an unlimited resource to go to ask questions" (first interview) according to Kevin.

This "unlimited resource" was echoed by Richard, also a recognized leader in the online forums. He referred to the ability to use the forums for a refresher on class lecture and concepts because when the teacher says it "you forget about it" but "when you're on the forums...they [other students] actually write it down...and if you don't understand it, you can always go back to it." (first interview) For Richard the forums gave him the chance to "ask them again and they can explain it all. I can visualize it" (first interview) and kept him from the unlikable situation of "having to look in a book and understand all that." The collaboration gave "more examples of [how to do] the problem...and it's just a whole lot better than...call[ing] somebody." (first interview) He continued talking about the online forums expressing:

It's just that you can talk to the whole class at once with that one post. So like if, instead of like a regular class where if you don't understand it, you call one person and they don't know how to do it; with WebAssign you're not gonna understand it and you ask about it and everybody in all of the classes can answer your question. (first interview)

Claiming that the online forums combined with WebAssign's feature of unique physics problems for each student was better than the traditional class; he offered that in the forums there was:

A whole lot more confusion and [students] say[ing], "How do you do this and how do you do this?" But then if everybody had the same problems, I think there'd be a whole lot more copying and the idea, "Oh, you solved it; let me see how you did it." (first interview)

Collaboration was fostered by the individualized problem sets; something that did not happen in the traditional classes.

Jen's experiences in the online community's collaborative efforts generated similar comments. This added benefit over traditional classes was:

usually better than in other classes cause you know each other. You did the problems together in class, so when you're doing the problems out of class you understand what's going on. You can be like, "Mr. Crymes said this, Mr. Crymes said that" but it's different when you're with other classes. (first interview)

She even has friends at other schools that use WebAssign but who don't have the forums for working together. These students seem jealous as Jen relates, "I have friends at other schools that use WebAssign, but they don't actually have forums. So they're like, "you get to talk about it?" and I'm like, "yeah, it makes it a lot easier, it's like, more interesting"" (first interview) and continues, "It definitely makes us work more together." (first interview)

Students in the online research questions posted several comments expressing their opinions of collaborative efforts and how they have come to view this aspect of the blended class. One student, finishing with a wide-smile emoticon, said:

It allows us to communicate about our work without having to disrupt class to ask each other. The ability to communicate about it helps give us a better understanding of it when we see it explained in different ways. Many students are willing to put in extra work to help each other and that helps a great deal. :D (online response)

Meanwhile another chimed in to agree with their classmate saying:

The WebAssign forums can help a student work with other students to learn physics and get the homework done. It helps further the understanding of the problem to those who explain them and to the student reading it. (online response)

Many of the positive points of the blended class were summed up in this post:

it is easy for students to stay on task (because it hard to get off task because all of the topics are related to physics and you can easily ignore the ones that aren't), it easy to stay focused because if you get stuck you can find help quickly and easily on the forums, it tests your knowledge effectively because you can learn from your mistakes (which is a great opportunity since you don't get that opportunity much in life) and you get the help that you need w/o searching through a lot of unrelated stuff on Google. (online response)

One student found the forums a necessary component of the online homework because several annoying problems with the electronic format of the homework were mitigated or even eliminated by the forums. One example was WebAssign's inability to provide hints such as, "is your calculator in degrees", or "did you use 9.8 m/s^2 instead of 10 m/s^2 for gravity?", or a heads-up for rounding errors or non-standard units for the answer. One student said:

Anyway, the above issues, while caused by an electronic system, are mostly fixed by the inclusion of the forums. The shortcomings of the system can be identified and circumvented by working the problems out and pointing out minor mistakes in groups. By allowing communication on the site with little to no limitations, we essentially create a human “common mistakes” recognition program. (online response)

Similar sentiments abounded, such as:

I think the biggest change WebAssign has made in the way I collaborate with classmates on homework assignments is that I can easily work with everyone who has the assignment. Previously, I would generally only talk to my friends when working on homework, whereas with WebAssign, I don't need to know someone's phone number or email address or whatever to work with them. The forums are right there for everyone to use. There have been several questions that I was completely stuck on, but I was able to do them with the help of people on the forums. Perhaps more importantly, I didn't just figure out how to do the problem, I was able to better understand the underlying concept. (online response)

Other common praises were exemplified by this student's post:

WebAssign has definitely changed the way we all interact with each other. Coming into the class I'm sure no one had a clear idea of physics and could just do everything right away. It [WebAssign] made it easier to ask for help because you know and understand that if you have a question likely one of the other hundred students might have thought the same exact thing and so we're all able to help each other. I for one know that I feel less dumb because I don't get something. Also, the fact that our assignments and

discussions remain intact we can go back to them later and see where we went wrong and know them the next time. Its genius! Haha :) (online response)

One student saw a future benefit of their current collaboration saying, “This can help us later on in life to already have developed the skills to communicate with others in a way to accomplish something.” (online response) Another said, “An online class seems more like college prep too.” (online response) One student believed it helped in several areas compared to traditional classes:

The online part of this class is extremely useful, being able to go online and ask for help for any class would be awesome. like ive forgotten notes for class before and had to try and go on facebook or myspace or call someone to try and get help. it makes study parties a little easier. if we could have more blended classes when we're younger before we can drive, it would be extremely helpful. its a great way to interact and it helps us a lot (online response)

These views of the online class were numerous, and while many more pages of supporting data could be included, they would be repetitive at this point. Supporting examples from actual online collaborative communication were easily found within the forums. Practically each problem and solution posted demonstrated this. For example:

Billy

wait, I messed that up.. your dimensions should be 24.32447327 and 12.16223664. you can figure the rest out from there ;]

Thu, Aug 14, 2008 08:24 PM

T.J.

If that way is too hard for sum of yall, treat the board as a grid where point A is at (0,0) and point B is a (2,6). Once u find the distance just multiply that number by the length of the side of the squares on the board and u have your answer.

Fri, Aug 15, 2008 04:07 PM

T.J.

Oh, forgot to put in the middle to use the distance formula to find from point A to B.

Fri, Aug 15, 2008 04:09 PM

Catherine

Make sure you use the Pythagorean Thoerem to find the hypotenuse of each INDIVIDUAL square...you should find the length of each jump (the hypotenuse of one square) to be around 5.374 and then you can find the lengths of each side. After you've done that, use the Pythagorean Theorem again to find the hypotenuse of the entire triangle.

Fri, Aug 15, 2008 11:22 PM

Catherine

Oh wait, we all have different numbers included in the question don't we? Whoops...if that's the case then disregard the figure I posted in the previous comment...

Sat, Aug 16, 2008 03:40 PM

Cary

Did you find the diagonal of the checkers? You have to use that, not 4.3cm. the side of the square is not the same as the diagonal.

Sun, Aug 17, 2008 12:33 PM

Mike

hmmm.. i cant get the right answer and im pretty sure im doing the stuff right...anyone help me out? my measurement is 4.2 and my answer keeps coming out to be 18.783. Im multiplying 4.2 times length of each leg so it looks like this $16.8^2+8.4^2=c^2$.

Sun, Aug 17, 2008 02:43 PM

Stephanie

Can somebody else explain this? I'm still not getting it.

Mon, Aug 18, 2008 05:01 PM

T.J.

Just look at my post on how to do it... all it is is distance formula and setting up the checkerboard as a graph using points. Read what I put up there and it's a lot simpler than all the other kind of math.

Mon, Aug 18, 2008 07:15 PM

Cary

hahahahah. you crammers. all you do is find the diagonal of the square and multiply that by the amount diagonals there are from the center of each square. do that for each leg of the triangle. then you do that $a^2+b^2=c^2$. pretty easy.

Tue, Aug 19, 2008 09:33 AM (forum posts)

In another example:

Topic: number 14 anybody

Arthur

i need help with 14

Thu, Aug 14, 2008 09:10 PM

Billy

I already explain #14 in one of the other topics.

Thu, Aug 14, 2008 10:21 PM

T.J.

I've already got the answer to 14 but dont know why Billy's way worked? I mean the tangent of theta is suppose to equal the opposite over adjacent and u put the adjacent in as theta when x should have gone under .192km. I am so confused right now...

Fri, Aug 15, 2008 03:57 PM

Cary

ARGH!!! 14 is just the most retarded question in existance... I put in 1.5 and it says wrong... I put in 1.48 and it goes DING DING DING!!! Took me 30 minutes to figure that out... lol.

Sun, Aug 17, 2008 01:23 PM (forum posts)

Collaboration between the students took on a completely different form in the blended class. This was one of the most important characteristics of their blended class community. More collaborative work could now occur due to the online environment where students could post questions, ask for solutions, and ask for explanations. No longer was the homework an area of extreme frustration and anxiety. Students could more efficiently use their time for learning.

Authority

During collaboration, several online student traits appeared. Often these traits differed greatly from the student's face-to-face personality, and the students of the blended class noticed this. One of these online student traits noted was "the authority"—a student recognized as having mastered the material and capable of explaining it online to others. Students commonly

recognized in the community as authorities were Richard, Kevin, Isabel, and Mikalah, among a few others. As Celeste stated:

Some people are like, I guess most of the time, there are a few people in each class who are the physics whizzes or whatever who answer people's questions and then everyone asks them and then they're like, "Oh, this is what you do." Like with a white wig kind of.
(first interview)

Kevin pointed out that "People in class will ask people that posted a bunch of information how to do stuff and it really shows who knows what and how to do stuff." (first interview) When asked about leaders in the online community, Mikalah pointed out one of these people saying:

Richard. Don't tell him I said that...But he does put the formulas on there, especially if Kevin doesn't. And then, he's usually also the one who does it. Because he used to always be the person who got help, now he's the person always paying attention in class and writing down the formulas when someone else needs them. He also has become the person to solve it out and to work out the problem with his numbers and when he hits something, even if it's a dumb mistake, then the next person that makes that stupid mistake can come and see it, because of him. (first interview)

Kevin agreed that Richard was a leader, and when Richard was asked the same question, he replied simply, "Me...everybody else ask me for questions cause I'm awesome like that with WebAssign and everyone else will come and ask me." (first interview) Richard went on to explain why he strove for the authority role, "That's fun! It makes it more fun. Like if I didn't do that and I was just answering questions it'd just be like no fun; there'd be no social life in it" and that it made him feel, "Awesome." (first interview)

Jen believes that Kevin's abilities would have gone unrecognized if it weren't for the forums:

In class, more people will be like, Hey Kevin, but nobody would have known to ask him before, cause he's usually pretty quiet; well, in the sense of doing work you know. He's not quiet, but nobody knows he's actually really smart and understands everything. But when he posted stuff online everybody was like, "Oh, he understands this, we should see if he can help." yeah, I had no idea he was really smart and I would actually talk to him before and was like, "wow." (first interview)

She, like Mikalah, also felt that Richard was changed into an authority by using the forums. "In the beginning he took answers, asked for answers, and then he started realizing that he should actually help too, so he changed the way he used it and became really helpful." (first interview)

Isabel, one of the authorities, said, "I do stuff like explaining so that's sort of leaderish" (first interview) and Kevin felt that he kept "people from going insane...because I do a lot of the posting of information." (first interview)

The actual forum posts demonstrated these sentiments towards the leaders. Here are a few directed at Kevin:

Cary

thanks a billion Kevin. got done 3 hours earlier than planned. woo! go Kevin.

Fri, Oct 24, 2008 09:23 AM

T.J.

Kevin's post makes more sense than all those useless words on ur thingy...

Fri, Oct 24, 2008 03:36 PM

Zach

I LOVE YOU (no homo)

Fri, Oct 24, 2008 04:58 PM (forum posts)

In another topic was found:

Mikalah

marry me Kevin <3 you deserve a cookie this post deserves a cupcake
and HTML is soo much easier to look at than Maple thank you berry much
:]

Fri, Oct 24, 2008 08:38 PM

Steve

Why did I not look at this 5 hours ago?

Fri, Oct 24, 2008 08:39 PM (forum posts)

As well as:

Greg

Kevin, how are you so smart at this

Wed, Oct 29, 2008 11:22 PM

Bobby

Kevin Reese what do you know I need your help cuz you know EVERYTHING!!!!

Mon, Oct 27, 2008 09:55 AM

Zach

Don't kid yourself. You know Kevin has magical physics-omniscience powers.

Mon, Oct 27, 2008 11:07 AM (forum posts)

The "authorities" started as forum leaders and from that position became classroom leaders as well. Interestingly, the authorities started out as unknowns in the blended class as well

as their traditional classes. The forums drew them out into the spotlight, giving them a platform to teach from and demonstrating one of the characteristics of the blended class community.

Is It Cheating?

The students had many different opinions about whether or not the amount of cheating was increased or decreased in the blended class. The common question was what constituted cheating in the blended class. Most all agreed that the old fashioned method of cheating was no longer a viable option, but that cheating had likely merely evolved into another form. Kevin started the topic of potential cheating saying, “it’s a different way of cheating because you have no way of knowing if someone is logged onto another person’s [WebAssign], unless you can track IP addresses...” (first interview) which is actually something that the instructor can do. However this does not help alleviate the potential problem since a student can merely claim they were working at a friend’s house. Kevin even mentioned, “I’ve heard that people get paid to log onto other people’s [WebAssign] and do their work...that’s what I heard” (first interview) though he was the only student that mentioned this rumor. When asked if he thought there was a lot of cheating occurring or just a little bit of help he added, “I think it’s just a little bit of help.” (first interview) By the second interview, Kevin had this to say, “Every community has some bad people in it, some rule breakers. There’s a place for them in every community I guess. Cheating is definitely different and there’s less chance of getting caught.” (second interview)

Richard pointed out that, “People don’t normally ask for answers, they want to ask for equations...and I’ll just start answering. I’ve never said, “Give me your numbers so I can answer your question.” I’ll give them the formula and how to use it.” (first interview) He continued by stating:

It can change the way somebody can cheat but I really don't think somebody will say, "give me all your numbers and I'll solve it for you" cause people are too lazy to do that for their own problems, so, I really don't, I can't see somebody saying, "give me all your numbers and I'll solve all your problems for you". I think it would kind of like lessen cheating. Like if we had like class work and you said do these problems out of the book, people would look up somebody else's paper and just write down what they have, but everybody has different numbers so they have to probably do their own. I think it lessens cheating. (first interview)

During Richard's second interview he reiterated this view and added:

I don't think people can really cheat on here unless you have those people who actually call somebody, give them their numbers, and they put it in for you, but mostly everybody I know, they'll give an explanation and then they can figure out the problems for themselves. It makes the feeling of community better, like I said; it gives the shy people a chance to talk without actually talking in class. If we didn't have the forums, I would say if we had homework on a sheet of paper, everybody would find one person and instead of actually, "How did you do it?" they would just be like, "Ok, you did that one. Let me write down that answer and that answer" and that wouldn't be very good. On WebAssign they ask more how to do it so they can understand it and they can do it when the test and quiz comes around. (second interview)

Mikalah was dubious as to whether people could actually cheat in this blended class:

Mikalah: you've ruled out the whole cheating thing by changing our numbers. So if someone can figure out a way to work on their WebAssign and be dumb enough to get someone else to go and do someone else's WebAssign when they just spent time doing

theirs, then, ok, they're working a little too hard to cheat. Other than that, you've kind of ruled out the cheating.

J: What if you pay other students to go in and do that?

Mikalah: Ok, that's working a little too hard. Way too hard to do that. I'm sorry. When did it cost money to cheat? (first interview)

By the second interview, Mikalah's opinion on the effectiveness of cheating had changed little:

No. Because the numbers are randomly generated. Cheating, if they're not like looking at the computer screen with you, is impossible. Yes. It betters the feeling of community like I said because now you can put us all in one classroom and we'd be able to talk if anything about WebAssign without segregating ourselves between classes. Everyone's just one big hosh-posh of people. If you want to cheat on WebAssign you better have mad skills now! I don't know. I want to say WebAssign can breed some seriously good cheaters but, no. I'll say except for maybe that one person or people who don't really want to do their own work; people will usually work out their own problems before they absolutely, positively give up and find someone else to do it for them. And it's not really considered cheating to be like, "I cannot understand this and tried it five times. Do it for me and tell me where I'm going wrong!" (second interview)

Jen's reasoning was similar to that of Mikalah and Isabel, but she seemed confused on whether using the forum posts for help on solving problems constituted cheating:

J: what effect do you feel this form of blended class has on cheating?

Jen: well, it's not cheating is it? Since you give it to us. It's cheating in other classes because you can't talk about it in other classes or they consider it cheating. But I suppose it's like cheating if you're lurking. So I mean I guess it increases cheating in a sense.

J: overall, do you think it helps, hurts, or just simply changes the way people cheat?

Jen: changes I guess. the cheating policy at our schools are pretty crappy, cause I don't see it cheating by communicating but a lot of people won't actually talk about it, they'll just copy it. So it's like if everybody uses it right and talks about it then it's not cheating, but some people just copy.

J: what effect do you think it has on everybody getting their own set of numbers as far as hindering, helping, hurting the cheating?

Jen: it makes it harder, because you can't exactly cheat since we all have different numbers. You actually have to try and figure it out but you're still giving them the equations so it's like, what's the point? (first interview)

By the second interview, Jen's view of cheating had changed little though she seemed to waver back and forth on whether it was true cheating compare to the traditional class:

No, still pretty easy to cheat. I like the fact that we can work together. It makes it better. So the fact that we can communicate is positive throughout the classes. When it's online and we're forced to explain it as we're doing it, you get it better. Before, if you'd come in and copy somebody's homework really fast before you had to turn it in, you wouldn't get anything from it, but this way you do actually have to figure it out yourself. (second interview)

Isabel answered the question of cheating, saying:

It matters where you draw the line for cheating. if you say cheating has to be someone else physically doing it for you, then I don't think most people really take the time to actually go do it on people's pages, but if you just call it someone telling you, "Put this number here, here", that's not really cheating but it's close to the line. So you're like...it

doesn't help people to cheat but it helps people figure out the answer without really doing the work. It Matters where you draw the line at cheating. (first interview)

In her second interview, she still believed that it depended on what the definition of cheating was. But she also added that even if it is considered cheating you still end up doing and learning more while cheating in the blended class compared to the traditional class:

I guess you have to do a little more... unless you literally get someone to go on there and do it on your account. You have to do a little work while you're inside, you have to at least plug in the numbers and so you do a little more work than just copying down. So it's a little less of cheating but still so. (second interview)

In the conversation with Celeste, I probed a bit to try and draw out her views on whether or not she felt it was cheating to get solutions from the forums:

J: What effect do you feel this form of blended class has on cheating? The online stuff.

Celeste: I mean I guess it's just another place where you could attempt to do that. I mean I guess some people probably do it and they say, "Here, take my password and you can do mine." But I think because there are posts and stuff like that, it's not as much as if you had taken them away. You know people would be trading passwords right and left, but because there's a place that you can just ask questions and get your answers without actually cheating, maybe it actually decreases it.

J: Do you think it changes how people cheat?

Celeste: I think it really decreases it because you don't need a reason to cheat because basically what you're doing is not cheating but it's like right on the line. You're talking about what you don't understand and somebody's telling you what's wrong about it and what you should do. So it's like right on the line.

J: You think it's right on the line, huh?

Celeste: Pretty much.

J: Well, think about it this way: I go over how to do the problems in class.

Celeste: Yeah. It's the same thing.

J: So, looking at it from that perspective, do you still consider it to be right on the line?

Celeste: Not when you're doing it.

J: But when a student picks up the mantle of playing teacher and posting it?

Celeste: Right, I mean, I think that's what other people see in it. Like maybe not me, I don't think it's cheating. I think somebody could say, "Here, give me your numbers, I'm going to show you how I did it." I don't think that's cheating. But I'm sure there are people in the adult world who, or maybe people in our world who think it. Like in math, in other classes I think if you told the teacher, "Hey, we got together and we worked on these together" I think a teacher would. You know you can't take a test like that. You can't, why can't you do that? Why can't you when you take a test, why can't you post questions like that?

J: Well the difference with a test is at that point is determining what the individual has learned. And when you're working together on homework, you're basically trying to figure out how to do it and by passing ideas back and forth, even when you're just sitting back listening, once again, we've got plenty of people sitting in the classroom that never say anything. They never ask any questions. They just sit there, watch what happens, take what they can from it, waits for that power point slide where they can just copy down the equation that they need to use for that one particular problem and then wait and get home and try and work it out.

Celeste: Yeah, that's what I do. No, I have no idea, I just copy it down. (first interview)

There was no agreement among the students on cheating. For them it came down to exactly what the definition of cheating was. If it was simply copying someone else's answers, then they felt that cheating was not really possible. If cheating constituted using the forums to get the work done as quickly as possible with little to no learning, then cheating was rampant.

Lurkers

Lurkers are recognized as students that read the forum posts but rarely, if ever, contribute posts to the forums. These students were seen by others as behaving in a dubious fashion since they tended to leech off of others. Certainly an important concept in the blended class environment, lurkers drew out many responses. Among the six interviewees, there was unanimous recognition of the term lurker and their presence in the forums. When the question about lurkers was first posed, Celeste immediately exclaimed, "Which is me! Yes, I am a lurker...because by the time I get on there they've already asked the questions I have and they've already answered all of them." (first interview) In regards to the forum and collaboration, she continued saying, "I mean I'm kind of just a lurker so I don't; I didn't really work with them as much as read how they worked together and then did my own thing." (first interview) When I asked her about why she was a lurker in the forums when she is obviously very social in class, she responded, "Because I procrastinate and I don't do the WebAssign until it's too late for me to post. So I just read other people's." (first interview)

Mikalah had a different opinion on why people were lurkers:

Because I think they're afraid that they'll get the question wrong. They'll offer help and they won't ask any questions, they just want to see who's thought about this before that. Even if I go on and don't answer a question, for my question: if these numbers don't

work I'll end up, before I even work an equation ten thousand times and just get them all wrong, I ask someone, "Ok, these are my numbers. It's not working for me." Or they think that if they attempt to answer a question they'll feel totally dumb because they'll steer a bunch of people wrong, which isn't true. There's been numerous times where someone's come on and they provided a totally wrong explanation and then someone else is like, "Hey, this is how you did that." Isabel did that just recently. (first interview)

Isabel indicated that the reason may be somewhere in between these two ideas:

Because if they don't understand a certain thing, of course, they're not gonna post trying to help and then if someone already asked it, they're not... or if they don't feel like asking, they know eventually someone will. Especially if they don't want to look stupid, having to ask, "Oh, I don't know how to do this." so it's easier to just look at the answers and not have to actually interact. (first interview)

She did not see people as fitting neatly into any category, particularly the lurker:

I don't know, there's lots of people that do mixtures of things. Like some people do all of the things you said and some people just ask questions and there's just like mixtures. I can't think of anything else besides these. People don't just do what you said they do. They do mixtures of things...yeah, some people do all of the things and some people just do one. It just changes. (first interview)

Kevin's opinion of lurkers demonstrated his desire for more effort on their part when he said, "I think that they should at least try and contribute something to the forums or in class at least. Or show that they understand it so you know that they actually are doing something instead of nothing." (first interview) He felt that people were lurkers because, "they don't want to [post], maybe they just don't want to, and maybe they are just nervous about being criticized by their

posts because some people are really self-conscious. Even on the internet which is, there's some anonymity about it." (first interview) However, he considered being a lurker okay if:

They're the kind of people that want to do it by themselves but they just need a little help, they just go look up the formula and find the concept and do that. And don't post at all.

That's all right. As long as they get it. (first interview)

Richard talked about a change from lurker to community member that occurred for him as the forums developed:

Yeah, when I first got on them I was confused and I didn't know what I was doing, so I clicked around and I was finding stuff, and then, I didn't understand at first and, before, I was one of the lurkers and stood back and I watched people answer questions. And then like after I started getting the hang of it and I started answering other people's questions in the forum. (first interview)

He felt that lurkers existed because:

It's probably just their personality, like, same thing in class, like, if you have a group project or something like that and that person's just like quiet, sitting in the back... They should talk more. But if they don't understand something then they will just have to sit there and wait for somebody to put the answer or they could just ask, "How you get this?" and get their question answered. (first interview)

Jen quickly admitted, "Yeah, I'm one of them" (first interview) when the topic of lurkers came up in the live interview. Like Richard, she "did that for a while, but I've started posting a little more... I was one of those people, I just stole everybody's answers or how to do it. But I've gotten into this where I actually want to learn more." (first interview) She thought that other people were lurkers because, "they don't understand it so they just figure, "hey, I can get this

done and make it look like I understand it but not really.” They don’t want to really know.” (first interview) Jen also added an interesting perspective on lurkers:

If there weren’t “lurkers”, there would be no need to post if you think about it, i mean yeah, those who are really smart and get almost all of it need help sometimes too, but most of them are good friends so they would find ways to communicate with each other without the forums, so i mean...would there even be much of a point in the forums if there were no lurkers? (online response)

When the question of how students viewed the roles of themselves and others in the forums, several mentioned the role of lurker. Cary commented, “I admit to being a lurker a good bit of the time, but I try to understand the problem and try it myself before I enter lurker state. Also, since the answers are entered in, it takes less thinking.” (online response) Jacob was very direct, “id like to help but im just too lazy. I do of course some times yet most the time i am a lurker along with most the other people on this forum =D.” (online response)

Many others admitted to being lurkers the majority of the time but mentioned that they also spent some time trying to help. Mike’s view of himself exemplified this:

i lurk...ness stealing answers from everyone else so i can get a good grade, but once i get started i have to finish it that day so i try the problem that no one has gotten yet until i either figure out the answer or get hoarse from screaming at the computer and calling it a lecherous, but i suppose i occassionally help out or try to even if im wrong, and occassionally ask for help if im lazy (online response)

Curtis remarked in the same vein:

I do a little bit of everything on here. A lot of the time, I’m just a lurker and try do everything with as little effort as possible. But if I figure something out that no one else

has yet, I'll put the formulas up for everyone. For something like this to work right, everyone's got to pitch in a little. (online response)

Alex saw himself as "a jack of all trades" (online response) and summed it up nicely as well as seeing future benefits:

I feel like I kind of paved my own path in the form of classifications. I am somewhat of a lurker, but am also willing to provide instruction. Also, I ask when I need help, or on the ever so rare occasion that I am bored I use the forums to socialize. Webassign has allowed to, in a way, show people how a society can work together towards a common goal and achieve something...This can help us later on in life to already have developed the skills to communicate with others in a way to accomplish something. (online response)

Lurking is a fairly common and recognized part of the forums. These people produce little in the way of social interaction in the forums because it is believed they are shy or they just don't feel the need to say anything, just get the help that they need. Their online behavior is not necessarily similar to their in-class behavior as Celeste's and Jen's interviews revealed.

Lazy Thieves

One of the most distressing aspects of the online class was the student who went beyond lurking. Instead of mainly looking for help, they became lazy thieves. These students were recognized by their peers as contributing little or nothing to the forums; simply waiting until the final few days, day, or even hours, and then using the work of others to complete the assignment with as little effort as possible on their part. There is difficulty in defining exactly who qualifies as a lazy thief since a lazy thief may never post anything, making it impossible to discern between the student who does not use the forums and the one who abuses them. Furthermore,

how much help would a student need to provide in the forums while still taking answers and yet not be classified as a lazy thief? Still, the students were confident that this behavior existed.

Isabel reflected:

A lot of people, they just use it as the easy way out to get around having to try the problems for themselves. I don't think everyone does that, but a lot of people have. So that messes up their actual understanding of physics because then when they ask a question in class, and you try to explain it, they're like, "I don't understand any of that" and you're like, "You kind of have to build up to it". So the free responses are so confusing. If you look at it, it's mostly the people that haven't really tried in physics, in WebAssign. (first interview)

She continued remarking on the effect she felt it had on the grades of the lazy thieves

You shouldn't just go there and plug in the answers. You should try and do them by yourself first because if you just plug in all your numbers it hurts you on the Free Response [assessments] and the Finals cause you have no idea what you're doing. (first interview)

Kevin had noticed the same thing, and in the interview the idea of lazy thieves noticeably bothered him since he frequently helped others out in the forums. "I think that they should at least try and contribute something to the forums or in class at least. Or show that they understand it so you know that they actually are doing something instead of nothing." (first interview) He thought the lazy thieves were:

Pretty common, because there's some lazy people who just like don't do anything in class, just wait for someone to post the formulas or how to do all of the problems and then just fill it in for an easy grade. (first interview)

He also contributed the behavior of lazy thieves to the ease of access to solutions in the forums:

Some people know that since it's not due during class can be a real, like, on the day that it's due you don't have to worry about getting it in class, it's usually due at like 11 pm, you can just go home and do it, at the last minute, but you might forget and you end up at 10 o'clock scrambling to find all of the formulas, put your numbers in and get the answers. (first interview)

Richard never indicated that he witnessed or suspected that lazy thieves were present. Common comments from him indicated he felt that people worked together for the most part. Although this quote was used earlier, it demonstrates his view:

People don't normally ask for answers, they want to ask for equations and how to get like and I'll just start answering, I've never said, "give me your numbers so I can answer your question." I'll give them the formula and how to use it and then I show the method I did with my numbers and my equation and their numbers with their stuff...like I haven't ever seen anybody say, "give me your numbers and questions and I'll answer it" (first interview)

In fact, it appeared that he felt any use of the forums contributed to students learning physics, "In other classes, like they [students] will have a question or two, but in this class, mostly everybody will learn [even] if they don't answer a question or put in a comment." (first interview)

Jen indicated that she knew of students that used the forums, "...just to get answers" and "they just figure, "Hey, I can get this done and make it look like I understand it," but not really. They don't want to really know. They don't understand it." (first interview)

Isabel spoke of the frustration she felt in not being able to do anything about the lazy thieves, and that the only solution she could think of would do more harm than good:

I don't know how you could change it really. It's kind of frustrating sometimes. Some people try really hard to actually help and then you know that some people are just on there and will get every single answer, so it's frustrating to see that. I don't think there's anything you can do to change it because the only other option would be taking it away and it would be unfair to the majority of the people. It would be much worse overall to not have them. It's really annoying because students never... Teachers sometimes take stuff away just because a couple of idiots mess it up when the majority are using it for actually learning and actually working on it. There's a lot of people I have actually seen trying to learn it but then there are a lot of people that just literally go in there and get every single answer. So I don't really know which way it would be. (second interview)

She did however point out that the lazy thieves' behavior carried a built in penalty:

if you try to talk to them about it they totally don't get what they're doing. And then you see them in class and they get zeros on the free response, really bad. And you just feel bad that they never learned it. It's their own fault but still, it's just misusing the WebAssign and then you don't understand it all and it messes them up. (second interview)

In fact, during the second interview she went further and faulted the online class directly, "It makes it a lot easier to not learn the material and still get the work done. Because in traditional [classes] you sort of have to figure it out and in this you can get away with not figuring it out." (second interview) However she seemed to feel that this previous statement only applied to the lazy thieves because she also claimed that for most students, "You have to do a little work while you're inside [WebAssign], you have to at least plug in the numbers and so you do a little more work than just copying down [when in the traditional class]." (second interview) So the lazy

thieves would be forced into a situation where they could not truly cheat and may get something minimal from the blended class design by the elimination of just copying another student's paper as in the traditional class. But the trade off would be learning how to plug in numbers to an equation and not learn the physics concepts behind the problem. Isabel's conflicting statements hinged on whether or not the lazy thief would revert to merely copying if they were in the traditional class.

During the online posts regarding this question, students echoed these concerns. One student, Joseph, spoke about this issue and hinted at a potential solution:

Some of the negatives of working together are: although you can only look up the equations you need it is very tempting to just look at all of the equations to avoid all of the work, there is no bonus for figuring all of the equations out yourself or for helping someone else out: this leads to a lot of lazy people depending on a few select people, and the forums remove the need from needing to pay attention in class b/c as long as one person remembers the equation everyone will be ok. (online response)

Would the addition of some sort of bonus for helping others in the forums alleviate this problem to some degree? It is certainly something that could be investigated.

Some even remarked that they behaved in the fashion of a lazy thief though they used the more generic term of "lurker" in describing themselves, since the term lazy thief was not a part of the class' vernacular. David stated, "I am a lurker. I get on the forums to get answers so I can finish as fast as I possibly can without putting forth any real effort. Honestly..." (online response) and Earl, "I am not going to lie, I am a lurker. I also must say I am not proud of my past actions. Coming on to web-assign with no real motivation except to better myself is terrible. I always say

im going to change but it never seems to happen. The important thing is that I do get my web-assign done.” (online response)

As noted previously, several students recognize this behavior in themselves but do not entirely give in to becoming a lazy thief. Jacob said, “id like to help but im just too lazy. I do of course [help] some times yet most the time i am a lurker.” (online response) Bobby added:

I believe that I go through and use webassign forums to just get my work done faster but I do post when I feel it is quite necessary especially when there is an abundant amount of stupidity circulating around the forums. (online response)

Curtis felt as though he helped by being a backup in times of need:

I do a little bit of everything on here. A lot of the time, I’m just a lurker and try do everything with as little effort as possible. But if I figure something out that no one else has yet, I’ll put the formulas up for everyone. For something like this to work right, everyone’s got to pitch in a little. (online response)

Ray was very enthusiastic, but recognized lazy thief tendencies in himself:

I love webassign. It is super awesome. I occasionally try to help other people, but as I usually do webassign just hours before the deadline, the answers are already up. I suppose this makes me a lurker because i’m not much help.... I definately get a lot of help from a lot of other people though. so that is pretty neat. (online response)

The lazy thieves are a problem both for the community and, more importantly, to themselves.

The ability of these students to post quick solutions requiring no significant thought on their part makes other students feel used while the thief benefits. Only a few calculator key strokes and a few hours are needed for the thief to post the same homework grade as the hardest working students in the class. Granted, when assessment time comes around, the thief’s decision to steal

and not learn becomes apparent. How can the blended class be altered to reduce or eliminate this harmful activity?

Socializing

Using the forums to simply socialize was one of the benefits and annoyances that students talked about. Once the forums became established they evolved from pure discussions of physics to public meeting places where almost any topic was fair game. Jen noted, “They [the posts] got more specific to physics at one point and then they started drifting away from physics to other stuff and now they’re mainly not physics.” (first interview) Isabel’s view disagreed, “Mostly it [the forum] is [used] more for physics because mostly students find another way to socialize.” (second interview)

Students recognized that the technical aspect of the forums was very basic, and they soon wished the forums would be upgraded at some point by the WebAssign programmers to include more advanced functionality to support and develop their ability to socialize. They suggested the upgrades might include the use of avatars (online personas/cartoons that represent the user) or the ability to personalize posts by adding music. Celeste felt the forums should have purely social add-ons and become more like Facebook and MySpace. “It [the forums] needs pictures... You could have music. Like MySpace pages have music, you know, like playlists. Like an ‘About Me’ section.” She had noticed that physics was no longer always the topic in the forums:

You know how conversation is? First it started out as talking about the problem, but the problem’s about an airplane and then somebody’s like, “Oooh, I saw a really cool airplane the other day” and then they’re talking about airplanes and stuff... They post if they have a question or some people just post for the sake of posting, I guess. And then

some people talk about stuff; not just in a school kind of a way, but then they talk like it's an IM [instant messaging] or something. (first interview)

Mikalah noticed the same thing saying, "Everyone just works together. People might play with each other sometimes," (first interview) and then she went on to talk about the nature of the socializing, "we go and we post dumb conversations." (first interview) When asked to explain she said:

It's fun. I can go onto WebAssign when I'm not even doing physics homework, just to start a conversation with people. Yeah, I do that. I still see that people are getting their work done. But there's definitely more socialization posts. Because I think people are just like...WebAssign is like their second MySpace. That's really all it's become. And you go on and there's this one conversation about god knows what and then there's this other conversation about how to do this problem. So you get this best of both worlds. But people still get their work done. (first interview)

Isabel commented on the advent and establishment of socializing, saying, "people talk more on the WebAssign, and they also seem to goof off a lot more on WebAssign." (first interview) She felt that so much socializing was occurring that WebAssign should:

Maybe create a separate section for people that just feel like posting to post. Because if you're trying to look for answers you just scroll through random stuff. It doesn't even Matter. So maybe that would help, have a separate section for that, since it happens a lot. I mean, the people that are posting solutions help out and the people that are asking questions let other people know what to post and then there's people socializing which makes it entertaining and so everyone sort of puts as a community, shapes it into what it is. (first interview)

When Kevin was asked about this social feature of the forums, he felt that the socializing occurred, “because they’re bored and they want to entertain themselves and see what other people say to them trying to be funny.” (first interview) He, among others, recognized Richard as being one of the catalysts for the socializing, “some people respond to Richard by saying to stop being so dumb and tone down the posts or some people will just say shut up. And they like to ‘troll’ him a lot, which is always funny.” (first interview) When asked, Mikalah concurred about Richard’s impact on who shapes the forum discussions, “Richard. Don’t tell him I said that. It would not be boring without him, thank you very much, no it wouldn’t be, we can live without you.” (first interview) Celeste spoke of his odd “cheeseburger posts” (first interview) which are off the wall comments but felt that his posts make the forum, “more relaxed. Because I don’t even know Richard and half the people in our class don’t but they’re like, “shut up.” And I don’t think people would actually do that in other classes or any person.” (first interview) A typical back and forth discussion where the students are simply teasing each other reads like this:

Heather

Mr. Smith take a chill pill thank you have a nice day

Sun, Sep 21, 2008 07:23 PM

Richard

Mr. Smith is my father and im all good, i took 5 chill pills dis morning n im taken bout 8 right now! =)

Mon, Sep 22, 2008 05:09 PM

Mikalah

HEY RICHARD SHUT UPPP OMG!!! phew that felt good :)

Mon, Sep 22, 2008 05:17 PM

Brandon

^^^^

hero ty [thank you]

Mon, Sep 22, 2008 06:30 PM

Richard

y do u guys all hav directed anger towards me, all of you know that if i was lik everybody else n was quiet n boring u all would feal lik a part of ur physics class was missing

Mon, Sep 22, 2008 06:38 PM

Brandon

yea it dosent mean its a good part. some may rejoice

Mon, Sep 22, 2008 07:52 PM

Cary

Heather, i think you need to write him another prescription of chill pills. this time up the potency. hahahaha.

Mon, Sep 22, 2008 08:21 PM (forum posts)

Although this exchange may sound harsh and unfriendly, it surprisingly is not. The students recognize that they are just playing around. Jen said, “They [the students] are pretty much real close, everybody’s pretty easy going about it. We all interact pretty well; make fun of each other a lot. Both online and in class.” (first interview) In fact, Jen found these forum posts interesting in and of themselves, “I like to observe how people interact. Like I will read all of the posts and not even post for a while and just see how everybody’s communicating together. That’s always been interesting to me.” (first interview) As Richard said about these conversations:

If I answer a whole bunch of problems and then at the bottom I'll be like, "Yeah, I'm the best, whatever" and then somebody be like, "Oh, that's a bit overstated" then they'll put their little comments at the bottom. Well I say something like I'm done, I'll say I'm done with WebAssign or everybody else ask me for questions cause I'm awesome like that with WebAssign and everyone else will come and ask me... Yeah. If something happens in class and it's funny I will post it on WebAssign and that's gonna get everybody else posting... That's fun! It makes it more fun. Like if I didn't do that and I was just answering questions it'd just be like no fun there'd be no social life in it. (first interview)

Because of this socializing, Richard and others noticed their group of friends grew:

People I don't normally talk to in class actually answered my question [posted in the forums] then, then I guess when I'm actually back in class after answering my question, um, it's more of a friend now I can talk to... Before when I first got into the class, I knew maybe 5 or 6 people, now everybody knows me in this class and the other classes too. (first interview)

Jen stated:

I mean we can have these goofy conversations that we wouldn't normally have on the forums but we talk a lot more that way. Cause people I would never talk to in class I talk to in the forums... we had a nice strand going today about ice cream... yeah, you get to see what other classes are like... and then also, you get to communicate with more people so you can see how different people work. (first interview)

She went on to say, "It's [the socializing] usually better than in other classes cause you know each other." (first interview) Jen had quite a few things to say about the socializing she observed

in the forums, most likely due to the fact that she said she enjoyed just reading and examining the posts:

I made more friends. Like people I never thought I'd talk to or get to know. You realize what more people are like and such... Yeah, I think I actually had someone to come up to me and they're like, they were either in the class and I didn't realize it or they were in another class and I saw them on the forums and they started talking to me, I was like, "what? Who are you?" and I was, "Oh! Ok! From physics!"... I mean, we're allowed to work in this class, through the forums. In other classes, they consider that cheating, usually. So we communicate a lot more... um yeah, me and Cary and Riley all get on AIM [AOL Instant Messenger] and like at night we'll work on out and I would've never talked to either of them even though I sat next to them. Now we're actually like very good friends because of it, doing homework and stuff... We can help each other out so much better so much more... People do [the forums] it just to talk... They're pretty much real close, everybody's pretty easy going about it. We all interact pretty well; make fun of each other a lot. Both online and in class. (first interview)

Kevin said something similar, "If you post a lot on the forums, people will know who you are if they didn't beforehand and they'll talk to you outside of physics. And that's good for making friends, that you can get online." (second interview) Richard saw this relationship between the traditional and online class as well:

You get to hear opinions from other people in other classes and if you help somebody, let's say you're a quiet person, and you help somebody out. When you get in the class they'll have an opportunity to communicate more face to face. (second interview)

He took it further and spoke about the expanded audience that the forums made possible. He thought the best aspect of the blended class was the ability to “to talk to everyone at on time and not having to talk to one person individually.” (second interview)

The research questions posted online for students to respond to generated a similar set of responses. Cary said, “We have the occasional fling on the forums just for fun.” (online response) Isabel noted the social time as well, “Most people are studious and serious, others just post to have fun and let others know that they were here. Such as another way of text messaging...Many people go to chat with friends.” (online response)

One student, Catherine, did have a dissenting opinion:

And there are two or three topics written simply for the purpose of bragging about being done with an assignment, talking to others, announcing a birthday, etc. Since Webassign is school related, I think the forums should be used for posting equations, formulas, answers or values, not for socializing. Save that for AIM...that’s just my opinion. (online response)

Within the forums were, of course, several examples of this socializing. The socializing commonly involved rambling conversations that bounced around in a silly fashion:

Topic: sooo im bored... anyone need help right now?

New Post

Cary

i think we got all of the stuff covered now... im really bored and im not really doing much good sitting around. anyone?

Tue, Aug 26, 2008 09:24 PM

David

dude if all u have to do is physics when u get bored...u need to find a hobby

Wed, Aug 27, 2008 06:22 PM

Cary

hahahahah. ok... let me see... i just biked like 22 miles today, practiced mah saxophone, and i am about to eat a 3ft gummy snake i bought at walmart. hobby... pssh... you just need to realize physics is the easiest thing in the world.

Wed, Aug 27, 2008 06:36 PM

David

then come to my house and do it for me if its so easy then ull have somethin to do. a gummy snake lol wtf who goes to walmart and buys a gummy snake. but bikin 22 miles and playin the sax i guess those are hobbys so ill take that back

Wed, Aug 27, 2008 06:40 PM

Mikalah

i read that and you still do need a hobby... and if physics is soo easy then how come a couple days ago you were posting asking for help on the questions

Check And MATE

ooo

Wed, Aug 27, 2008 06:42 PM

David

oooooooooooo

Wed, Aug 27, 2008 06:46 PM

Cary

it is easy. its the careless mistakes i make. so stop hating. i get 95% of the concepts he gives us. and now all these people are cramming. STOP HATING ON ME!!! i have hobbies.... hahahaha. really, i do.

Wed, Aug 27, 2008 10:38 PM (forum posts)

Richard, playing the clown, even created a fake thread where he announced all of the answers could be found within:

Topic: Richard's "How to do all the Problems" =)

New Post

Richard

SIKE!!!!!!!!!! give me a myspace or yahoo and i'll help individually b/c last time i did this ppl were ungrateful so now those ppl will get no HELP FROM ME ha ha =)-

****(this message does not involve the following ppl: Patar, Isabel A.K.A. Mrs. I Know Everything, Brandon A.K.A " i love potatoes", Elena A.K.A "i skip skool to eat Mcdonalds...and didn't take Richard =)", Pam the Bam, & Kevin the Wild.)*****

Mon, Nov 24, 2008 03:16 PM

Arthur

dude, what kind of cruel joke is this??????

Mon, Nov 24, 2008 05:00 PM EST

Isabel

Well don't i just feel loved...lol!

Tue, Nov 25, 2008 05:18 PM (forum posts)

When Mikalah was asked if she just used the forums to work on problems she emphatically answered, "NO! I go on WebAssign when I'm bored. I like to go on and insult

people! Ha-ha! (I like to) keep up with the random discussions... And then I just socialize in general, no Matter where I am.” (second interview) She did indicate one negative experience she knew of, “People quit helping because someone is insulting them. But it was actually kind of funny.” (second interview) However, she was the only person that mentioned seeing this. Kevin believed, “You can talk to friends there [in the forums] and if you have no other way of talking to some other friends, you can just talk there.” (second interview)

Interestingly enough, the forums did not merely extend the physics lessons; they became their own social setting. The forums created friendships within and among the physics classes which then grew into other online communication such as instant messaging. Blowing off steam was common because the students had found a safe environment that made them feel as though they were still in class and participating in the work and socialization which they comfortably know as school.

Teacher

A common thread in the student conversations involved their changing roles. For example, one of the most common role changes was students performing as teachers. Students realized early on that the forums opened the door for them to explain the physics concepts to their peers and to help them understand the class lessons as well as how to do the problems. At the beginning, students would simply post the answers to questions. When many of these teachers realized that a large number of students were being lazy thieves, some started posting answers that contained more in-depth explanations to try and keep others from simply getting the answers in the easiest manner possible. Now the rest of the students would have to read the posted explanation instead of plugging their numbers into the equation provided by one of the

peer teachers. Though a few students elevated themselves to the status of an authority in physics, peer teaching resulted any time a student helped out another.

Celeste described what typically happened after an assignment was posted:

In the very beginning, like right after you post it, some people post all their solutions or formulas or whatever and then slowly after that people will ask more and more questions as it gets closer to when it's actually due. Like two or three days before it's due is when people really start to do it. And it kind of drops off until when I get on there and there's like one person going, "Wait! Somebody come back on! I don't know what to do." (first interview)

Mikalah recognized the value of this arrangement saying:

We just go online and we get a reinforced lesson... We can ask each other. So it's like doing homework but not by yourself but having a whole group of people; and it's not even just for your classroom. You can get questions that other people ask, so you don't feel really stupid thinking you're the only person that didn't understand this and you can ask people from the class how to do this and that and so it just works. (first interview)

Though she did not specifically label herself as a teacher she mentioned:

If I'm done with WebAssign, help other people. If I'm there and I'm finished early, I can help a bunch of other people. Like I'm the kind of person that even though I was done a day before, I go back on the night before, for anything and then, there's going to be someone that's like, "My question, my numbers aren't working for this" and I know I get those points sometimes. When someone else works out something for you, your numbers aren't always going to work. So I go back on there and I just help other people. (first interview)

She also saw Richard as a student who had transformed into a teacher. Listening to her views gives you the sense that despite the teasing and play-fighting she engages in with Richard, she has a fair degree of respect for him:

He used to always be the person who got help, now he's the person always paying attention in class and writing down the formulas when someone else needs them. He also has become the person to solve it out and to work out the problem with his numbers and when he hits something, even if it's a dumb mistake, then the next person that makes that stupid mistake can come and see it, because of him. And I know that he makes a lot more mistakes than some of the smarter people who would post answers to questions. So it helps out a lot. (first interview)

Jen said almost the same thing about Richard, "Like how Richard in the beginning he took answers, asked for answers, and then he started realizing that he should actually help to, so he changed the way he used it and became really helpful." (first interview)

Isabel similarly remarked:

I end up doing a lot of explaining stuff to other people in this class. Cause people realized I'd gotten a lot of the physics stuff...even if you don't post they [students] still try to figure out answers and help people...it [is] really easy to ask other people's explanations (first interview)

She added later that in addition to giving the students practice in how to be teachers themselves, there was an added benefit for the classroom teacher as well:

I know the chemistry class I'm taking has it online too. But we don't really use the forums and that results in people going to Ms. Kennedy every five seconds. We work on WebAssign in class and go, "Ms. Kennedy, I don't get this, I don't get this." It seems like

in physics, not that many people have to come up to you and ask you what to do because everyone is helping everyone. So that sort of relieves questions off of you and teaches us how to explain stuff to each other. (first interview)

Mikalah echoed a similar experience, “It takes works off the teachers that when a student understands a particular problem, he/she explains it to another student.” (online response)

During Isabel’s second interview she expanded on this:

In general there’s so much of students helping each other when in the normal class you don’t see it. Because in the normal class you see the students more go to the teacher and it’s just incredible how much students help each other out online compared to in class. (second interview)

Kevin spoke in a way that revealed he had actually developed a teaching methodology, “I keep people from going insane...So maybe a couple of days before it’s due I’ll go by and see how people are posting and everything, and try and fix all the problems that’s going.” (first interview)

Richard commented that he did the same thing, saying, “if I finish with it and then I go back and other people are “How do you do this? How do you do that?” and I’ll help somebody through their problem set.” (first interview) He also had a preference for the peer teachers saying:

I think it makes it more easier for them [student learners], cause sometimes, like you hear one person’s voice like every day all day; it gets kind of repetitive. And you miss somebody at your level explaining it...when you hear it from somebody your age and in their language, it’s better to understand. (first interview)

He also worried that “when a teacher explains something, they explain it at their level.” (second interview) At Kevin’s second interview he indicated that the homework was now more than simply getting the work done, it had become teaching as well. He said, “That’s really all I use the

forums for, to get the work done and teach others how to do stuff.” (second interview) Despite Richard’s stated preference for speaking in the forums because he can reach everyone at once, he found this inadequate in some teaching situations:

Like I’m smart but sometimes they don’t understand my explanations so I help them a lot in class too. Personally I would rather say it face to face because sometimes I don’t sit at home and type a whole explanation of what I’m talking about. If I can say it, I can get it done faster and I can help you and I can give you more of an example and all of that stuff. (first interview)

Several students responded in the online questions that the peer teachers were valuable and helpful. Harry said:

Web assign’s awesome because you don’t have to be right next to someone to get help. If you’re stuck on a problem you can either post a question or look for where it was already answered...I can look in the forums and ask people who, even if I don’t really know them, are smart enough to answer difficult questions. (online response)

Cary mentioned:

Well, the WebAssign forums can help explain the problem. For example, you are 100% sure that you have the problem right and it just won’t take the answer. Most of the time, some one has an explanation to the question. Careless errors like not converting your units are pointed out most of the time, too. (online response)

The forums themselves are replete with instances demonstrating peer teaching:

Billy

you’re most likely counting the squares wrong, and stop making a new topic everytime you have a question, just follow up on the topic about it before lol. look at the

checkerboard, it starts from the MIDDLE of the first square, then three more squares and stops at the MIDDLE of the 5th square.. so if you think about it, it's really 4 squares. then same with the other leg, it starts from the middle of the first square, through one more square and stops in the middle of the 3rd, so really there are 2 full squares. so your two legs should have the dimensions of 17.2 and 8.6. then use the Pythagorean Theorem and solve.

Thu, Aug 14, 2008 08:05 PM (forums posts)

Another example of peer teaching:

Topic: 17 and 18

New Post

Arthur

if anyone knows how to do 17 and 18, please help!!!!!!

Thu, Aug 14, 2008 09:06 PM

T.J.

If u haven't figured 18 out already... You use the planes traveling speed as the hypotenuse and just take off the /s to make it a distance. Then you put in your angle of take off in. You are looking for the distance on the ground from the start to where the plane takes off to where it is after 1 second relative to the ground(look at this problem as if a right triangle). Then use cosine because u need to find the cosine of theta(your degree of take off) which is equal to adjacent(X value, or the ground) over the hypotenuse(your traveling speed minus the /s). You find the cos of theta then multiply it by the hypotenuse and you have your answer!

Fri, Aug 15, 2008 04:27 PM

T.J.

And i also need help on 17 b/c i dont know where “_ degrees north of east” points...

Fri, Aug 15, 2008 04:27 PM

Ginny

the “north of east” means the hypotenuse, so you use cosine and sine to find the lengths of the legs.

Sat, Aug 16, 2008 12:12 AM

Jason

Yeah, it’s just a fancy way of saying north east, which, as Ginny pointed out is the hypotenuse. If something goes north east, it went a certain distance north and a certain distance east right? If you make the northeast line the hypotenuse of a triangle, the legs will represent the distance north and the distance east.

Sat, Aug 16, 2008 08:31 AM

Arthur

thanks for the help, it took me forever to figure them out before you guys helped.

Sat, Aug 16, 2008 07:42 PM (forum posts)

Peer teachers were the backbone of the forums. They provided much needed and appreciated help to the other students in the class and essentially increased the reach of the classroom teacher by becoming self-appointed teaching assistants. Several students such as Richard, Isabel, and Kevin became leaders in the teaching community of the blended class both online and in class.

Student

Most likely the majority of the activity on the forums involved students being just that, students. But their view of how they go about being a student in the blended class shifted

dramatically from their traditional classroom experience, and they noticed it. Often students spoke of the differences between what they would do for their traditional classes and for their blended class. The primary transformation they noted was their ability to reengage with so many of their current classmates and to meet new classmates from other physics classes outside of class hours to discuss physics and work together. To truly continue to be students in a class community instead of being a lone student searching for phone numbers and a buddy to help them out was a great boon that was sometimes beneficial and sometimes abused as previously discussed.

Celeste noted this expanded community with increased activity:

There's more interactions... It's not like, I'm just talking on the phone and I just happen to bring up our homework that I had a problem with, it's like, that's what the posts are for; is to talk about homework... after that people will ask more and more questions as it gets closer to when it's actually due. Like two or three days before it's due is when people really start to do it... We just go online and we get a reinforced lesson. (first interview)

Mikalah noted another benefit for the students was that the assignments "aren't on paper; you don't have to keep up with all of that stuff." (first interview) She found the discussions helpful because:

We can ask each other. So it's like doing homework but by yourself but having a whole group of people; and it's not even just for your classroom. You can get questions that other people ask, so you don't feel really stupid thinking you're the only person that didn't understand this and you can ask people from the class how to do this and that and so it just works. (first interview)

Isabel intimated that:

It's helpful for when you're at home and you can't ask a student cause they're not next to you but you have to figure out another way, and that makes it really easy to ask other people's explanations when you're doing your homework at home. (first interview)

Even though Kevin and the other students recognized himself primarily as a teacher, he noted that he had his moments of being a student as well:

On the forums at least I post the equations for every problem sometimes and if they're wrong, if I messed up somewhere then I get people to tell me then I correct them. If I need help with them then someone else will post the formula. If it's wrong, I'll correct them and vice versa. (first interview)

Richard, another recognized leader and teacher, expressed the same sentiment. "I go on [WebAssign] and see if I can do any of them. And if I have trouble with it, I will go on the WebAssign [forums] and say "How do you do problem whatever?" (first interview) He felt the common student interaction was one of give and take because he would then turn around, "And if I finish with it and then I go back and other people are "How do you do this? How do you do that?" and I'll help somebody through their problem set." (first interview) The forums made learning easier:

When I'm talking [in person] to somebody and I'm asking them a question, and they tell me, it's more confusing to get it all, I might like understand it, but then I kind of forget what they say, but if I ask somebody a question [in the forums] and they explain it, it's like, all there, then if I still don't get it, I can ask them again and they can explain it all. I can visualize it. (first interview)

As she previously stated, Jen was originally dissatisfied with getting a perfect score on the homework without understanding the material. Once she realized that that was not what she wanted out of physics, she found that WebAssign's format made it possible for her to work more on the problems. Her student persona increased:

I didn't really like it at first. I was like, "this is stupid. Why do I have to pay for this? I don't understand it, It's like, "why am I doing this when you can just give me paper?" but it makes it a lot easier, the fact that we can answer questions 15 times, it makes you work at it. So just answering it and turning it in [like in a traditional class] and be like, "ok, I got it wrong but I'm not going to look at it and see how I got it wrong." But now you have to actually go back and fix it. (first interview)

Mikalah made an interesting statement concerning student preference and comfort in the forums. When asked whether or not she would want the actual classroom teacher participating in the forums, she unequivocally answered:

No. I'd be more uncomfortable if the teacher was on the forums because then it feels like I either wasn't paying attention in class or, I'm sure teachers don't think this but, no one wants to feel like they're dumb. Especially when the teacher is right there. So I'd rather ask a student because you can learn something so much better when it's a student explaining it to you. They use more layman's terms. (second interview)

From the questions posted online, there were many responses to the aspect of performing in the role of student. Joseph provided a summary of what he saw as the positives of the student role:

it is easy for students to stay on task (because it hard to get off task because all of the topics are related to physics and you can easily ignore the one that aren't), it easy to stay focused because if you get stuck you can find help quickly and easily on the forums, it

tests your knowledge effectively because you can learn from your mistakes (which is a great opportunity since you don't get that opportunity much in life) and you get the help that you need w/o searching through a lot of unrelated stuff on google. (online response)

Many others spoke of the convenience of being a student outside of the traditional classroom.

Harry said, "Web assign's awesome because you don't have to be right next to someone to get help. If you're stuck on a problem you can either post a question or look for where it was already answered." (online response) Jason concurred saying:

Previously, I would generally only talk to my friends when working on homework, whereas with webassign, I don't need to know someone's phone number or email address or whatever to work with them. The forums are right there for everyone to use. There have been several questions that I was completely stuck on, but I was able to do them with the help of people on the forums. Perhaps more importantly, I didn't just figure out how to do the problem, I was able to better understand the underlying concept. (online response)

Florence had this to say:

The forums are very helpful when I try to do webassign. Calling a friend to ask for help isn't particularly convenient, considering equations and physics problems are really hard to explain over the phone in general. With the forums, equations can be written out and explained, and this is much easier than trying to get help over the phone! (online response)

Typical student conversations from the forum posts demonstrated that their working together involved many of the activities discussed in this section, such as behaving as a teacher and collaborator as well. This data showed several behaviors: clarifying teacher comments,

reminding others of what happened in class, answering questions, and helping with a problem, to name a few. At this time, the class had just started and the county had yet to provide textbooks:

Topic: number 1a

New Post

Paolo

what is a vector

Wed, Aug 13, 2008 04:15 PM

Isabel

He said to skip all essay questions.

Wed, Aug 13, 2008 06:35 PM

Billy

duhhh lol but a vector is an arrow to answer the question.

Wed, Aug 13, 2008 06:41 PM

T.J.

Stop sleeping in class like u always do...lol

Wed, Aug 13, 2008 07:22 PM

Heather

how are we supposed to read the sections if we dont have a book?

Wed, Aug 13, 2008 07:22 PM

T.J.

u too? he said that not to worry about the reading for now.

Wed, Aug 13, 2008 07:24 PM

Mikalah

about the reading basically he said we covered most of what we were supposed to read in that nice lecture so yeah forget that

Wed, Aug 13, 2008 07:37 PM

Heather

but i like to have the info in front of me to reference it. i cant remember everything

Wed, Aug 13, 2008 08:23 PM

Mikalah

lol very true I'd like to have a book right now.....hey does anyone get number twelve? My units keep coming up wrong...

Wed, Aug 13, 2008 08:34 PM

Billy

Yeah, I need help with #12 too.. it keeps saying it's wrong.

Wed, Aug 13, 2008 08:48 PM

Heather

yeah same here and the one with the 13% grade. i dont get it :]

Wed, Aug 13, 2008 08:49 PM

Billy

Do you mean #13, about the 11% grade? lol just think of it as a right triangle, and use sine, cosine, or tangent to solve for the angle.

Wed, Aug 13, 2008 08:53 PM (forum posts)

Students found the online forum aspect of the blended class capable of bringing them together outside of class in several positive ways. They could reflect and review what had been taught in

class, answer each other's questions quickly, practice physics, and have a sense of greater community among the various physics classes.

To What Extent is the Blended Class Allowing Students to Create and Manage This Community?

The community in the blended class quickly became much more than the traditional classroom community, and the students recognized this and appreciated it. Though the blended community started off in uncertainty due to the newness of this class, the students adapted and adopted this new class format and structured it to suit their needs. None of the students mentioned ever having had a blended class before, or even an online only class, and those interviewed all stated they had never had a blended class before. This meant the community developed of its own accord without the students having experienced a previous model to shape and influence it.

Early Community Formation

The early community was marked by confusion and uncertainty over how to do the homework in WebAssign and how to use the forums. Celeste said, "Like in the very beginning, nobody posted and then slowly more and more people. You know at first it's just the really outgoing people and then slowly, more and more people just randomly post questions or comments." (first interview) She noted that after a while, "people [would] just post for the sake of posting, I guess. And then some people talk about stuff; not just in a school kind of a way, but then they talk like it's an IM (instant message) or something." (first interview) This indicated that the students were becoming more comfortable with the online work as they started to treat the forums like other forms of online communication that they were familiar with. As she mentioned earlier, "First it started out as talking about the problem, but the problem's about an

airplane and then somebody's like, "Oooh, I saw a really cool airplane the other day" and then they're talking about airplanes and stuff." (first interview) When Isabel spoke of the beginnings of the truly blended class, where the online component was starting to be used by the students, she said:

It was helpful because sometimes you couldn't get a certain problem but I didn't use it that much...At first people were doing it more of, they don't say anything until someone asks, but now people have gotten to the point where they just post all of the solutions. So it's changed more of a, it's just an automatic thing for some people and it used to be a had-to-ask kind of thing. (first interview)

This online help developed further to a point that it spilled back into the regular classroom:

With the forums, people that didn't really know each other as much, have gotten to know each other better by helping each other, so now they help each other even more and they're just comfortable asking even in class. I mean at first people weren't really asking on, but now in class we're like, "Oh, did you get this?" and it's just a lot more comfortable because you get to know people more. I guess, because like, in the beginning of the year, even our class was kind of quieter and like some people didn't know each other and you didn't really think they'd help each other out, and then now, I think any single person would help any other person in our class. Like I can't think of anyone that wouldn't help another person. So at first people wouldn't have done that; now it's more like a community. (first interview)

Kevin noted the same thing, saying:

At first, no one was really posting on them, except for a couple of people and I was like, "oh, this isn't going to be that helpful to me. I'll just have to learn how to do it on my

own” and then I saw some people really needing help on it and I decided to post some formulas (first interview)

He pointed out that students transferred their online functionalities from other online experiences such as instant messaging or posting in non-WebAssign forums, saying, “like CAPS LOCK is people yelling.” (first interview)

Richard also spoke about the initial hesitancy by students to use the forums:

Yeah, when I first got on them I was confused and I didn’t know what I was doing, so I clicked around and I was finding stuff, and then, I didn’t understand at first and, before, I was one of the lurkers and stood back and I watched people answer questions. And then like after I started getting the hang of it and I started answering other people’s questions in the forum...In the beginning, nobody posted and I was like the only person asking how to do any questions. And then like you can have like one, three, four, or more of different posts of people saying to help stuff. Yeah, after the people started asking more questions and people I’d never seen used to be on there used to be on there ask questions, get answers and stuff. (first interview)

He also noticed how Isabel changed from the beginning of the community, both online and in the class. Now Richard and Isabel can be seen hanging together in class and talking. Richard said, “Like I can give an example, one person, Isabel, when I first came into class at the beginning she was quiet, she never said anything. Then she got to posting on here and now me and her are cool.” (first interview)

Jen had a similar experience at the start of the forums, saying:

Yeah, at first it was nobody’s posting or everybody’s posting and all of a sudden it’s like, er, I don’t know, it definitely got better. Everybody at first was kind of iffy about it but

then everybody realized, “hey this is just really simple and relaxed” so they started using it. (first interview)

She also noticed some peer pressure in the early community formation:

Like how Richard in the beginning he took answers, asked for answers ,and then he started realizing that he should actually help to, so he changed the way he used it and became really helpful...Richard, he actually understands some of it. Like after awhile everyone was yelling at him, so he'd start posting answers instead of just asking for them.

People changed how they use it over time. (first interview)

Students becoming more efficient and stabilizing the online forums was something on which Jen remarked, saying, “We got better on topics now in the forums. We're better at actually doing our homework rather than just random crap now.” (second interview)

The four research questions posted online produced only one supporting datum since none of the questions touched on this code (early community formation) that developed from the analysis. It came from Mikalah who said:

Coming into the clas I'm sure no one had a clear idea of physics and could just do everything right away. It [WebAssign] made it easier to ask for help because you know and understand that if you have a question likely one of the other hundred students might have thought the same exact thing and so we're all able to help each other. (online response)

However, the forum posts themselves show how they developed. The first set of posts were brief:

Crymes, Jonathan

Please have a good time and don't procrastinate!

Wed, Aug 13, 2008 12:28 PM

Mikalah

ok Mr.Cymes :)

Wed, Aug 13, 2008 07:22 PM

Cary

hahahahah. talking with the teacher on a forum... priceless.

Tue, Aug 19, 2008 09:34 AM (forum posts)

They later became more specific and informative. This next post comes from the first homework assignment and shows where students first touched on the idea of being more efficient when one student asks for help on problem fourteen only to be told it has already been posted:

Topic: number 14 anybody

New Post

Arthur

i need help with 14

Thu, Aug 14, 2008 09:10 PM

Billy

I already explain #14 in one of the other topics.

Thu, Aug 14, 2008 10:21 PM (forum posts)

Later Richard tried to set down some rules to make the forums better. Though it generated a lot of discussion, the rules ended up being generally adopted:

Topic: FYI: For All Students Who Post On Web-Assign!!

New Post

Richard

1) Please For this section if someone already asked for the problem Dont put another post about the same problem cause then everything gets junky and messed up! 2) don't make a post just to start your own personal conversation with sumone thats so annoying 3) don't ask for 15 different problems at 1 time, ask 1 problem per every 1 post If Everyone did this i'm sure everything would Be a whole lot easier on web-assign for everyone
thanks, sincerly

LiL Ro #22

Tue, Sep 9, 2008 04:38 PM

Mikalah

And this is coming from God?

Tue, Sep 9, 2008 11:06 PM

Cary

OOOOOOOO!!!! this is a regular conversation ready to happen. lets start it in spite of Richard... Nice one Mikalah!!! (high five)

Wed, Sep 10, 2008 09:34 AM

Richard

1st you spelled my NAME wrong and its right on the LEFT!!!! 2nd Mikalah where r u gettin dis god stuff crom??? and 3rd im ending the conversation so NO high five =(-

Wed, Sep 10, 2008 04:21 PM

Cary

1st- I dont care too much to look at your name for the correct spelling.

2nd-She got it from you being "lord" of webassign.

3rd- That high five was to Mikalah.

Thu, Sep 11, 2008 10:07 AM

Richard

1st i dont give a..... 2nd i dont give a..... 3rd i don't give a flyin.....

Thu, Sep 11, 2008 05:13 PM

Ray

excellent idea.. im tired of clicking on a million random topics titled “HELPPP
MEEEEEEEEEEEE!?!?!?” just to have to see what number problem is or is not being
explained.

Sat, Oct 11, 2008 04:12 PM (forum posts)

The blended class' online community developed quickly once the students realized the powerful tool at their disposal. They developed a rudimentary structure and honed it over the weeks of the first semester until they had a fairly efficient and useful forum community. The students were quite capable of creating this community and managing its presence. Soon the community stabilized, and after that point the forums were an integral part of the blended class to the students. However, before the stabilization occurred there were several instances of early community frustration.

Early Community Frustration

A common experience shared by many of the students was frustration at the beginning of the forums. Though this dissipated fairly quickly as students completed assignments and tackled new ones and formed the early community, it was still a prevalent theme. Also, the forums seemed to be the only true part of the blended class that created frustration, even though they were merely an offered extension for getting help with the online homework. Practically no one spoke of difficulties in learning how to do the online physics problems. Mikalah admitted mild

frustration at first, “I was confused. It’s a matter of clicking New Post, typing in your question and then waiting a couple of minutes, maybe an hour or so, for an answer.” (first interview)

Richard mentioned the same frustration saying, “if they don’t understand something then they will just have to sit there and wait for somebody to put the answer” (first interview) and he gave a brief rundown of how things developed:

When I first got on them [the forums] I was confused and I didn’t know what I was doing, so I clicked around and I was finding stuff, and then, I didn’t understand at first...before at the beginning nobody else would post anything and everybody would be quiet, but then like I got more open and answering questions and other people like and when I explain it and they don’t get it other people will be like, ok, this is how you do it, and here’s how I do it my way (first interview)

Like Jen had earlier remarked about Richard, “in the beginning he took answers, asked for answers, and then he realized he should actually help too.” (first interview)

Kevin found frustration in the way things started off saying:

Yeah, the reason why I haven’t been doing that for the past couple of chapters is, one, I don’t have a lot of time cause I have a lot of other work to do. And because I don’t feel like I should be giving answers to people who just want an easy grade and won’t do the work. (first interview)

The online questions produced some responses on early community frustration. Isabel spoke of the frustration when she said, “this does not work when a person simply post all of the answers through equations, this does help the student simply find the answer but is no help to furthering the understanding of the problem.” (online response) Cary found both frustration and solution:

Well, the WebAssign forums can help explain the problem. For example, you are 100% sure that you have the problem right and it just won't take the answer. Most of the time, some one has an explanation to the question. Careless errors like not converting your units are pointed out most of the time, too. (online response)

The problem of lurkers was still brought up as Jason pointed out, "Others simply ask questions when they need help but don't post much otherwise. And, of course, there is a fairly large group of lurkers." (online response) Mike, Earl, Stephanie, and David each admitted that they were lurkers, so it was apparent that the community recognized and pondered the situation of non-active community members.

The actual forum posts revealed a different kind of frustration that, though remained present throughout the class, found an organized attempt at eliminating it from the community. Bluntly, the students were frustrated with the physics problems. However, the forums were quickly recognized as the solution, and the members of the community worked at lessening this frustration through a growing careful consideration of their solutions' posts and through setting up rules as seen previously in Richard's attempt. Many students spoke of the problem of simply getting a solution with no explanation, and they were answered with posts that incorporated explanations:

Topic: #16! Still not working!

New Post

Mikalah

And yes i did try the $A^2+B^2=C^2$ thing. My anwer keeps going in wrong. Ok i get it, each square's side is 4.3...but my answers still not going in right. what am i doing wronggg?

Its the only question i have left on this thing!

Thu, Aug 14, 2008 07:28 PM

Billy

you're most likely counting the squares wrong, and stop making a new topic everytime you have a question, just follow up on the topic about it before lol. look at the checkerboard, it starts from the MIDDLE of the first square, then three more squares and stops at the MIDDLE of the 5th square.. so if you think about it, it's really 4 squares. then same with the other leg, it starts from the middle of the first square, through one more square and stops in the middle of the 3rd, so really there are 2 full squares. so your two legs should have the dimensions of 17.2 and 8.6. then use the Pythagorean Theorem and solve.

Thu, Aug 14, 2008 08:05 PM

Billy

wait, I messed that up.. your dimensions should be 24.32447327 and 12.16223664. you can figure the rest out from there ;]

Thu, Aug 14, 2008 08:24 PM

T.J.

If that way is too hard for sum of yall, treat the board as a grind where point A is at (0,0) and point B is a (2,6). Once u find the distance just multiply that number by the length of the side of the squares on the board and u have your answer.

Fri, Aug 15, 2008 04:07 PM

T.J.

Oh, forgot to put in the middle to use the distance formula to find from point A to B.

Fri, Aug 15, 2008 04:09 PM

Catherine

Make sure you use the Pythagorean Theorem to find the hypotenuse of each INDIVIDUAL square...you should find the length of each jump (the hypotenuse of one square) to be around 5.374 and then you can find the lengths of each side. After you've done that, use the Pythagorean Theorem again to find the hypotenuse of the entire triangle.

Fri, Aug 15, 2008 11:22 PM

Catherine

Oh wait, we all have different numbers included in the question don't we? Whoops...if that's the case then disregard the figure I posted in the previous comment...

Sat, Aug 16, 2008 03:40 PM (forum posts)

Though brief and not terribly problematic, early community frustration helped shape the community. Students were confused in general as to what the blended class meant and how it would evolve, but once they overcame their hesitation the confusion turned into confidence and beneficial interaction. In particular, the forums became recognized as a wonderfully helpful form of classroom extension.

Community Stabilization

Once the blended class community found its footing, it stabilized into a structure in which the students found great utility and enjoyment. Comments ranged from the feeling of safety in knowing they could always find help for the homework, to increased friendships and cross-class interaction, and ultimately to the opportunity to really learn the physics that was presented in class. Celeste found once students overcame their uncertainty over a blended class as compared to a traditional class, there was more working together, "A lot more, because it's

more allowed. Like in other classes, I mean it's allowed to an extent, and on some occasions you do group work, but most of the time it's "teacher teaches, you listen, you do your homework." (first interview) She saw a more student-centered class coming out of the blended class. She commented that there was now a prevailing pattern for the community working the homework problems:

Like right after you post it, some people post all their solution or formulas or whatever and then slowly after that people will ask more and more questions as it gets closer to when it's actually due. Like two or three days before it's due is when people really start to do it. And it kind of drops off until when I get on there and there's like one person going, "Wait! Somebody come back on! I don't know what to do." (first interview)

Isabel found the same thing:

There's definitely a lot more of it [working together], because in other classes, most people would just, you don't help anyone unless they specifically ask you or, but like in this class people will just post help and they don't have a second thought about it. It's kind of weird for other classes just randomly explaining stuff. But in this class, everyone is just trying to help each other out. (first interview)

Mikalah also spoke of what she had seen the forums become:

I still see that people are getting their work done. But there's definitely more socialization posts. Because I think people are just like...WebAssign is like their second MySpace. That's really all it's become. And you go on and there's this one conversation about god knows what and then there's this other conversation about how to do this problem. So you get this best of both worlds. But people still get their work done. (first interview)

With respect to getting work done she noted there was now a feeling of community support:

Before you would not ask someone, “Oh, I don’t get this, I feel stupid.” But now you can just go right out and say it and be like, “I totally don’t understand this problem” and so the next person thinks it’s incredibly easy and they won’t say anything about that. And if you’re shy about that, there’s other to be like, “Oh I don’t get this” because we don’t want to call someone dumb. And so, they have to help. (first interview)

Isabel likewise noted:

It just adds another element of being a community and knowing each other better. Cause especially since the class I was in, I didn’t know anybody in there cause I was put into the honors class. So I didn’t know a lot of people, now I, everybody knows each other and that just adds to knowing each other...at the beginning of the year there’s people that you wouldn’t even, that didn’t really explain anything. But now you see them on WebAssign explaining answers. (first interview)

Kevin reflected, “Because we’re all posting on the WebAssign forums and knowing who each other are, so there’s no shy people and everyone basically knows everybody else.” (first interview) Richard spoke of what happens now when an assignment is posted online:

For me it’s, when you first put it up there, that’s usually when I get it done and that’s when I start like (slaps hands) I have to go. Then maybe two or three days after that a bunch of people will start putting up questions and posting, but the closer and closer you get to the deadline the more and more people post like, we had one chapter a while back where like three days before and there was only like four posts and I got lucky like the night it was due because people were everywhere, everybody was asking questions about how to do things. Cause all the posts were nice. (first interview)

He continued, speaking of the typical behavior among students working on the problems:

People don't normally ask for answers, they want to ask for equations and how to get like and I'll just start answering, I've never said, "give me your numbers so I can answer your question." I'll give them the formula and how to use it and then I show the method I did with my numbers and my equation and their numbers with their stuff. (first interview)

Jen felt that students had created an unspoken code of behavior in their posts where people were:

Helpful and they realized nobody's going to make fun of them if they put something wrong.

J: yeah, I find it interesting that people will flame other people for something that is typically not related to their inability to do a problem. They'll flame somebody for something completely...

Jen: like spelling...or not getting conversions...like not realizing it's supposed to be kilograms instead of grams or something like that. (first interview)

Mikalah noticed that now:

There's a lot more help. It's not just put your numbers into the equation and get your answers; it's explain it now too...People talk to each other more and now the class is one big person. You know, sometimes the smartest kid in the class will not talk to the kid who doesn't get anything because they're a nerd and whatever, but now in WebAssign, you're going to have to talk to the smartest kid in the class no matter what you say. I feel it's breaking down social barriers and it integrates everyone. (second interview)

Cary pointed out that it has become standard that:

People ask for help, then it is explained. It would be great if it was a "give a little, get a little" situation, but most people who actually get it do not need as much help. So they give a lot but do not get a lot. This is the exact opposite for the others who do not input

and get lots of help. Every person who fills their role shapes the forums. (online response)

The forums themselves abound in examples of what the community has stabilized into. Note that the stabilization occurred quickly. Even though the class had started in early August, and it took a week to get students enrolled into WebAssign, by early September the blended community had become an indispensable part of the class. A common example of community interaction without a specific answer to a physics problem follows:

Richard

i need help with 16 part b

Wed, Sep 3, 2008 09:24 PM

Richard

nevermind

Thu, Sep 4, 2008 04:16 PM

Rose

haha well do u mind telling me... i can't get the right answer... plz!!! =)

Sat, Sep 6, 2008 10:36 PM

Rose

haha.... oh nvm! gosh this thing is so friggin picky... i had gotten it wrong cuz of the decimal

places. lol.

Sat, Sep 6, 2008 10:42 PM

David

NEVER PUT NVMD OTHER PPL NEED IT IF YOU POST IT PLEASE JUST LEAVE

IT AND DONT BE SO SELFISH GOSH

ok so if anyone could help me with 16b that would be great thanks

Sun, Sep 7, 2008 05:26 PM (forum posts)

A more common example that deals specifically with a physics problem is demonstrated in this post. The topic of the post even references the rules that Richard suggested earlier in the school year:

Topic: In accordance with Richard's Law (which I support..)

New Post

Susan

I need help with the direction part of number 26, and I have copied number 28 from class, (please excuse my breach of rules, but technically this is a problem and a half, not two) but when I tried solving it I kept getting my answer rejected. If I do not have a reply by Friday, I will ask Dad. Thanks in advance for help! :-)

Wed, Sep 17, 2008 05:51 PM

Nikki

Can anyone help with all of 26? I took really awful notes on this one during class, and now I have no idea what to do, haha.

Thu, Sep 18, 2008 12:23 PM

Nikki

Oh wait nevermind, Jason just helped me. And Isabel, for the direction, you do inverse tan of 60/40 (I think we all have 60 and 40 for our numbers there, right? If not, it's the vertical over the horizontal)

Thu, Sep 18, 2008 12:28 PM

Susan

Thank you, Nikki

Thu, Sep 18, 2008 04:08 PM (forum posts)

After a very few weeks the blended class community had found its footing and was functioning in an expected fashion for the students. Students knew they could find socialization, help with problems, peer teachers posting solutions, as well as lurkers, and lazy thieves. Friendships across the classes were expected as well, and the face-to-face meeting of people previously known only as an online personality was the order of the day. These characteristics of the blended class demonstrated the fashion and extent to which the community had stabilized.

Community Strengths

Both strengths and weaknesses surfaced from this community behavior. Strengths will be presented first. Students described many different experiences that contributed to the strength of the blended class community, both online and in class. These strengths exhibited themselves in several ways. One of the ways that Celeste spoke of was the help offered through the reflection and guidance afforded by the community:

Because, you go through your WebAssign and then you don't know one and so you just go on there and there's a whole long post on how to do it and somebody's like, "Oh wait, my numbers didn't work." And then they tell you, Remember to convert this to this."

And stuff like that. They're like reminders, I guess. (first interview)

She also credited the blended class with helping to prove to herself, a gifted student, that she had the ability to ask a question without having to worry so much about her gifted class peers seeing her as stupid:

It helps. And not just from the blended class thing although that does help to because it's people who maybe you don't know as well. Because I don't know some of the kids who are in the regular AP class. So it helps to get their take on it because I know everyone in our class. So when I ask a question, maybe, people just roll their eyes. But to a regular ed kid who doesn't know me, maybe they don't, I guess if I were to actually ask a question.
(first interview)

She believed that other students, as well as herself, found the blended class increased their grasp of physics, "I think it's [the views of other students] probably the same as me. You get different views and it reinforces what you did in class." (first interview) Mikalah felt:

I think people 'get' physics more. I think I'd be lost without someone helping explain this problem to me...[it] help[s] because, ah, it's probably a little more half and half because I think less on the questions now but at the same time I do learn more because I get less frustrated myself when I can't solve something. So that helps a lot." (first interview)

Mikalah pointed out strengths in collaboration and convenience that she felt all students enjoyed with the online component:

We go home and our homework assignments aren't like most other classes. They aren't on paper; you don't have to keep up with all that stuff. We just go online and we get a reinforced lesson because we can go and do our homework assignments online and then we log on to this WebAssign thing. We just login...and then we can ask each other. So it's like doing homework but by yourself but having a whole group of people; and it's not even just for your classroom. You can get questions that other people ask, so you don't feel really stupid thinking you're the only person that didn't understand this and you can ask people from the class how to do this and that and so it just works. (first interview)

Isabel also saw strength in the help offered by the online community and mentioned that at first she did not think the online community would be so important to her:

I think practically everyone thinks the forums are helpful because it helps them get WebAssign done because typically you always have some questions you don't understand, so, even if you don't post they still try to figure out answers and help people... at first I thought I wouldn't really need it as much because I guess at the beginning of the year like I didn't really use it as much but then the farther you got into it, the more complicated things got and you had to use it more. And then also I realized more when I was explaining stuff to people, you remember it better and you understand it better yourself...there's definitely a lot more of it [help], because in other classes, most people would just, you don't help anyone unless they specifically ask you or, but like in this class people will just post help and they don't have a second thought about it. It's kind of weird for other classes just randomly explaining stuff. But in this class, everyone is just trying to help each other out. (first interview)

A common occurrence that Isabel noticed was the help:

Like a lot of times people whenever they've figured out a problem that everyone else has been having trouble with. In other classes you just sort of don't do anything about it but in this class people will be like, "Oh! I finally got this one!" and they'll post an explanation about it on the forums. And so, it sort of different for other classes. (first interview)

She also realized the connections that were brought out in the forums and how they spilled over into the regular classroom:

People that didn't really know each other as much, have gotten to know each other better by helping each other, so now they help each other even more and they're just comfortable asking even in class. I mean at first people weren't really asking on, but now in class we're like, "Oh, did you get this?" and it's just a lot more comfortable because you get to know people more. (first interview)

Kevin noticed that the forums helped increase and smoothed the interaction of students:

But also because we're all posting on the WebAssign forums and knowing who each other are, so there's no shy people and everyone basically knows everybody else. Yeah, like a couple of people in this class that like sit in the back and don't really talk, they sometimes post a lot on the forums and ask questions to get their physics done. (first interview)

The community strength Kevin found in the blended class was in how it extended the class:

It's like you're in physics even when you're on the internet on the forums cause everyone's talking all the time and asking questions, whereas other classes you're just in there for an hour a day and you can't ask questions about it and get a straight answer from somebody...The physics just keeps on going after school... People in class will ask people that posted a bunch of information how to do stuff and it really shows who knows what and how to do stuff...it creates bonds...and the online forum really keeps everybody in the same spot. (first interview)

This strength made it possible for him to keep up with the class when he was out, saying, "Like I was sick for the last WebAssign but I still got it done because I was looking at the forums." (first interview)

Richard echoed the sentiments of the other interviewees on what he saw were the strengths of the blended class community. He hinted that the time lag that occurred between class time and getting home to work on the physics was eliminated:

We would learn how to do something and then you go home and go on WebAssign and like apply it to a problem and even if you don't get it and then you can post and ask other people how to do the problem. (first interview)

He also felt that the forums were beneficial to all students whether they posted or not saying, "In other classes, like they [students] will have a question or two, but in this class, mostly everybody will learn [even] if they don't answer a question or put in a comment." (first interview) The contact with other students was also a strength of the blended class of which he spoke, preferring it to the isolation of other classes:

I like not having to look in a book and understand all that and then it gives you more examples of the problem and then like you can ask questions and get answers and it's just a whole lot better than just having the time to understand it and call somebody... I think it's better for student's working together because when you ask a question and like one person gives you an answer and you are like wow this helps and another person gives you an answer back. (first interview)

Jen summed up some of the strengths she found in the traditional class:

You [the teacher] make it really easy to learn. The way it's [the blended class] done and setup; it's really relaxed. It makes learning easier. You don't have so much stress. You can concentrate on it easier without... it's hard to explain. (first interview)

In keeping with Jen's interest in observing other people, she noted, "you get to see what other classes, like, how they interpret it. And then also, you get to communicate with more people so

you can see how different people work.” (first interview)

Another strength that she spoke of, and which supported the views of the other interviewees, was that she learned who many more people were, which was greatly different from her traditional classes. She pointed out Kevin as an example:

Well, in class, more people will be like, “Hey Kevin!” But nobody would have known to ask him before, cause he’s usually pretty quiet; well, in the sense of doing work you know. He’s not quiet, but nobody knows he’s actually really smart and understands everything. But when he posted stuff online everybody was like, “Oh, he understands this, we should see if he can help.”... We all interact pretty well. (first interview)

Mikalah spoke of the community support, “There’s a lot more help. It’s not just put your numbers into the equation and get your answers; it’s explain it now too. I mean it’s not really much of a change but it helps.” (first interview) These explanations directed to the entire community made her feel that, compared to a traditional class, students were learning:

More physics. Because now that people explain it I know, and people use more variables so they don’t just write ‘Current.’...But I saw everything and it refreshed my knowledge of how to do just about everything that we learned this chapter just by looking at his explanation. I think others, unless they’re in a hurry to get through it, a day before WebAssign is due, I think everyone should definitely have learned more physics from this so long as someone has explained it instead of just putting the formula there. (first interview)

She felt the online community was crucial to her success in physics:

I think I would have failed...I would have cried if there hadn’t been forums. Point blank. Homework is so much easier on WebAssign because it’s one less book I have to take

home and...I'm not just copying someone's answers, because it's foolproof a little bit. And I have to kind of do the problem by myself unless I absolutely don't get it and someone else works it for me to see where I went wrong. But without it I think it would have been, physics, which is a lot of numbers and I really don't like math, would have been a lot harder. (second interview)

The ability for all of the physics classes to work together she found as the best aspect came:

From the online component, people in all the other physics classes interact with every other physics class without ever having met them. Be it insults, be it helping each other with answers, anything. They need each other a lot easier and they are all, it's like they are all instantly friends. [If] You put us all in one room; we'd all be able to talk. It wouldn't be awkward and we wouldn't segregate ourselves by class or anything. (second interview)

This was likely due to the fact that:

I'm one of those people that doesn't like asking help for the teachers or raising my hand or feeling remotely stupid in front of anyone. And some students just, even asking another student they'll be like, "That's a really easy problem. You're stupid." But in WebAssign no one calls anyone dumb honestly which I've noticed and you wouldn't expect that from a bunch of teenagers but it happens. And so now I can just go on it and I can understand things a lot easier without actually asking for help. (second interview)

Isabel spoke of the physics learning that the forums generated, "when you have to explain something to someone you can't just barely get it, you have to completely get it. And so when I sit there and explain something it helps me understand it better. Benefits me also." (second interview) She found it particularly important in the physics blended class:

Because we've never done anything like physics before and so it's formed sort of a safety net. When you're doing WebAssign you know, "Well if I can't figure this out I have that" and so it made it less new. I probably would have done more exchanging phone numbers and exchanging Facebook groups or stuff like that. (second interview)

There was also a community sense of gratitude of which Isabel spoke:

Because everyone sort of does like a give and take kind of thing where everyone feels thanking to other people for helping you and then you feel the accomplishment of helping other people and it sort of gets everyone connected when you normally wouldn't have been. (second interview)

This support meant less stress for the students when they were confronted with difficult homework assignments:

You know you aren't going to sit there and freak out about, "Oh gosh, I don't understand this at all" and you just feel like, "I know I can get this done, no matter what, because I can just go on here and look at all of the explanations if I get confused on something." And so you don't feel like you might not get it done. Well, I mean some still don't get it done of course, but you don't feel like you might not have the ability to get it done.

There's a large freak-out factor because this is AP Physics. (second interview)

Isabel went so far as to claim that the blended class actually forced students to create more bonds with each other:

I definitely think it creates more [bonds] because whenever people help each other they feel a sense of thankfulness back to the person and then they are more likely to talk to them and create bonds. So it just whenever you have, not have to, but basically are forced to talk to each other online you create bonds with each other a lot easier. (second

interview)

These bonds made it less likely for students to become frustrated, despondent, and quit trying in the physics class:

Well, in traditional classrooms sometimes the students just give up on a thing and say, “Oh, well I can not get this grade” and will just move on to a new topic. But in this people can easily go look and find explanations and they basically have a lot more access to help so they are lot less likely to just give up on it. And they actually can learn what they did wrong and figure it all out a lot easier. (second interview)

Kevin found that the forums made for a better environment for initial introductions among students:

Well, they are impersonal because it’s not face-to-face, it’s through the internet, but sometimes it’s better to be impersonal than personal because you can talk to people a lot easier on the internet than in real life sometimes. (second interview)

The online community had such a tremendous impact on Kevin that he claimed that the blended class was “the only class where I get my homework done on time. Or done.” (second interview)

He also spoke of the thread common among all interviewees saying, “If you post a lot on the forums, people will know who you are if they didn’t beforehand and they’ll talk to you outside of physics. And that’s good for making friends, that you can get online.” (second interview)

Richard spoke of the benefits of community interaction when, “I would help people and then I can actually meet new people that I didn’t know how needed help maybe in another class and then I can see them in real life and be like, “Oh, ok, I see you.”” (second interview) The overall structure of the blended class made Richard believe that students learned:

More physics. Because you don’t always have enough time in class to get everything that

you don't know. And sometimes there's a problem where you just type it in on the forums and somebody else can answer it for you. Then it will be easier. You can understand it better. I feel it's the same way for others. Like for the most part the people who get on to ask questions, it's helpful but for those people who don't want to get on and don't post anything, I guess they don't know that advantage yet. (second interview)

Furthermore, the communication within the greater physics community helped:

Because you get to hear opinions from other people in other classes and if you help somebody, let's say you're a quiet person, and you help somebody out. When you get in the class they'll have an opportunity to communicate more face to face... like shy people who wouldn't necessarily go around asking for someone's email or phone number, you don't have to give out all of that information. (second interview)

In fact Jen confided, "I probably prefer online because I'm more of an online person. I communicate better online usually." (second interview)

The online research questions generated several comments supporting the strength of the community through its interaction. Florence said:

The forums are very helpful when I try to do webassign. Calling a friend to ask for help isn't particularly convenient, considering equations and physics problems are really hard to explain over the phone in general. With the forums, equations can be written out and explained, and this is much easier than trying to get help over the phone! (online response)

Lisa pointed out that "The forums are effective and if we had them for other classes I would know how to do work there as well." (online response), and Joseph spoke of the help, "I think it is really good to have the forums because the teacher isn't always around if you need help and

the forums function as place where students can learn off each others knowledge.” (online response) Linda agreed saying:

I would like classes that were blended because it would be easier to communicate with people about the information going on in class. A science class with forums is very helpful because you can share knowledge about how to do certain problems. I would like more classes with forums so people can help each other to understand the material better. (online response)

Jason, a very computer literate student, added:

I really like the blended class model. Manipulating information is so much easier with a computer than it is with a pen, a piece of paper, and a book. Sure, keeping things traditional at times is good, but computers are no longer the future, they are the now, so why not use them in every way possible, including our education? Cloud computing is becoming more and more popular, making an online class environment a very real thing, and I say we use every tool possible to help us learn. (online response) (cloud computing is internet based development and use of computer technology such as WebAssign)

Harry felt the strength of:

The forums are probably the most helpful thing in this school. Students working and helping other students just seems to be a lot better of an idea than “Hey, here’s 200 pages of text, you have 17 tests tomorrow” like in other certain, unnamed APUSH (AP US History) classes... (online response)

Once again, the forums themselves are filled with examples:

Topic: pretty much

New Post

Jack

for 16a: its just $\sim \cos \theta$ times \sim pulling force times \sim distance

for me $\cos 20 \times 260$ (newtons) $\times 5$ (meters) equals 1221.6 joules

Tue, Oct 21, 2008 07:58 PM

Jack

but freakin cant get 16b

Tue, Oct 21, 2008 07:58 PM

Kevin

i actually meant 16b i got a but not b

Tue, Oct 21, 2008 08:02 PM

Kevin

thanks a bunch lillian, now i just need 19 and 16b

Tue, Oct 21, 2008 08:08 PM

Kevin

just 16b now then i'm done

Tue, Oct 21, 2008 08:40 PM

Logan

all i remember was Crymes saying something about the FUN equation

Wed, Oct 22, 2008 06:59 PM

Logan

for 16b

Wed, Oct 22, 2008 06:59 PM

Richard

cheeseburger

Wed, Oct 22, 2008 08:03 PM

Peter

quit freakin sayin crap like cheeseburger. you're not funny and it just ticks us off even more than we already are for having to do all of this.

Thu, Oct 23, 2008 05:45 PM (forum posts)

The strength of the blended class community comes through in several ways. The primary strengths were exhibited in reflection of physics, learning physics, helping each other, socializing, encouragement, and other forms of support both in the traditional class and the online class. Students found that working online opened pathways to interacting with students outside of their class period and also helped them to actually meet these individuals face-to-face. There seemed to be more talk about students learning to openly communicate, whether it was educational communication or socialization, than the actual communication. Students seemed to recognize their shortcomings in communicating with others regardless of how well they believed they already communicated. They found this to be a skill of paramount importance, apparently more important than learning physics, because they knew that this open and free communication skill would carry well beyond the physics classroom and into their everyday lives. They spoke several times of wishing that this form of blended class was used in other settings for just this reason: increased communication among one another, not with the teacher. This is the greatest strength of the blended class.

Community Weaknesses

The blended class community did exhibit weaknesses, and the students realized what they were. Their concern over these weaknesses was expressed fairly uniformly throughout the

semester as was evidenced by the interviewees' statements and online posts. Primarily, the greatest asset of the blended class -- the ability to communicate -- was also seen as its greatest detriment. Students could easily procrastinate and get all of the homework answers without having to work through the solution. This hurt the way many students viewed the community and, more importantly, hurt the students that gathered answers without doing the work. The students felt that this contributed greatly to the poor assessment scores of students who they recognized as being the lazy thief version of the lurker. If they don't actually do the work, then it comes back to bite them both in their tests and in their understanding of physics. This pattern was easily pieced together through straightforward discussions from the students. Mikalah remarked, "Twenty minutes is like five now because someone has already done it." (first interview) and pointed out that there was little variety in the students she saw using the forums:

There is about the same group of people who are always on WebAssign, posting something or another and their names just come up often and then there's the lurker, which are people who aren't on WebAssign. So I guess that says something. (first interview)

The community was not inclusive of all students. Isabel added:

A lot of people find the forums out to be an easy way to finish the WebAssign but they also realize that they need to try and do it by themselves sometimes because they see how they can do really badly on other stuff because of not trying on it. There's usually like a couple [of posts] and then the night before or the night before, the night before, there's like a million posts because everyone's being on at that point. Which, I mean, is understandable because a lot of people, they don't think about it and they're like, "Oh wait! It's due real soon!" so you don't see the posts really gain a lot until very close to the

due date. But sometimes there's posts after the due date, you still see people going back and they're like, "Wait, I never got that!" (first interview)

She came back to this topic later in the interview, adding more details:

Well in any class there's lots of procrastination of course, because especially in the gifted students they're always procrastinating except for myself. But it definitely made it easier to procrastinate because you can get on and within 5, 10 minutes, you can plug in all your numbers. So sometimes people wait til the last second and then the dates have been changed by an hour on when it's due and they can't turn it in and they have a fit the next day in class. It does help procrastination if you let it. It makes it easy to procrastinate. (first interview)

Kevin expressed the same opinion:

In the back of every math book there's always answers to some problems in the back and you can just go to the forums and look up the equations and then put your numbers in and it's like looking up the answers. As long as you understand the concepts...I think that's pretty common, because there's some lazy people who just like don't do anything in class, just wait for someone to post the formulas or how to do all of the problems and then just fill it in for an easy grade. (first interview)

He continued, noting the effect it may well have on students that behave this way, saying:

It can harm personal work habits, like people waiting till the last minute...some people know that since it's not due during class can be a real, like, on the day that it's due you don't have to worry about getting it in class, it's usually due at like 11 pm, you can just go home and do it, at the last minute, but you might forget and you end up at 10 o'clock

scrambling to find all of the formulas, put your numbers in and get the answers. (first interview)

Likewise, Richard saw increased forum activity as the deadline approached. There were students “asking a lot of questions, like if they don’t understand my explanation then some people answer the question, but then as we get closer and closer to the deadline, it seems like everybody just starts asking questions like.” (first interview)

Jen also felt the blended community did not necessarily promote the learning of physics. Her own personal experience was that when people “don’t understand it...they just figure, “hey, I can get this done and make it look like I understand it but not really” they don’t want to really know, they don’t understand it.” (first interview) There needed to be some way to:

Make it where I have to do more, because everybody posts how to do it. I just, if it’s like the last day I won’t even try and do it, I’ll just get the equations, plug it in and go...you can procrastinate a lot. (first interview)

Isabel concurred:

It Matters who you’re looking at because some people, they get by with learning less physics because of the forums. Because they can just get the answers and get by...you know that some people are just on there and will get every single answer, so it’s frustrating to see that...you just feel bad that they never learned it. It’s their own fault but still, it’s just misusing the WebAssign and then you don’t understand it all and it messes them up. (second interview)

She also saw the procrastination inherent in the system:

But most of the time it just makes it easier to procrastinate because you know that you can get on there and within like 15 minutes you can go on there and find all how to do

them all and not have to figure them out. And so it makes it like you don't worry about it as much. And you can be, "Oh I can do it in the last 10 seconds" or something. You're not as responsible with it. (second interview)

In the second interview, Kevin had come to:

think that they would learn more physics if they didn't have the forums, because the only way that a person could learn the stuff is by the book and they would read it and as they read they would learn more stuff and remember more stuff. (second interview)

But there was not much to be done about it because, as was previously quoted from Kevin, "Every community has some bad people in it, some rule breakers." (second interview)

Yet another student, Jen, felt there was less learning because of the online community's use of the forums:

Probably less because with the forums I'm not forced to understand it since we just answer it for each other. For others, it's probably a little of both. For those that actually post answers, they actually understand it instead of those that just get on and don't understand most of it. I think it both helps them and hurts them...I wish it would make me have to work at it more. (second interview)

The online responses supported the interviewees' opinions about the weaknesses of the online community. Stephanie responded, "Most of the time I am a lurker on the forums, but I do ask the occasional question. I don't ask too many because the don't ever get answered." (online response)

David concurred, "I am a lurker. I get on the forums to get answers so I can finish as fast as I possibly can without putting forth any real effort. Honestly..." (online response) Bobby granted that

I believe that I go through and use webassign forums to just get my work done faster but I do post when I feel it is quite necessary especially when there is an abundant amount of stupidity circulating around the forums. (online response)

Linda weighed in saying:

I would have to say that pretty much all the time I am an lurker. I mainly use the forums to get help with problems. Every now and then I might ask for help if people's explanations are confusing. If I have the answer to a problem post it. Typically though, someone else already has the answer so I don't post. (online response)

Ray's post supported what many people complained about, "I usually do webassign just hours before the deadline, the answers are already up." (online response)

Here is an example of a typical post that occurred early on where one student posts all of the equations in one post. This allows others to simply plug their unique numbers that are randomly generated by WebAssign into their calculator and get the answer. There is likely little, if any, learning of physics in this behavior, even though students must be literate in deciphering the listed variables i.e. "W" stands for "Work." The leaders in the forums have stopped doing this for the most part at the request of the teacher, and because the leaders recognize that their help was being abused. However, others still occasionally put up posts similar to this one in the forums. I have left the entire solution list in this post intact to demonstrate the time and effort the poster put into listing all of the equation solutions. It also originally included special HTML coding so that superscripts like " x^2 " and subscripts like " v_f " (final velocity) were correctly displayed. This coding was not retrievable when the data were collected and is therefore absent here:

Forum: Chapter 6

Topic: new idea

New Post

Kevin

equations for all problems, GO!

14.

$$W = Fd$$

15.

a. $W = Fd \cos T$

b. $W = Fd$

16.

a. $W_{\text{pulling}} = F_{\text{pull}} d \cos T$

b. $F_N = mg - \sin T$

$$F_f = \mu F_N$$

$$W_{\text{friction}} = F_{\text{fric}} d$$

17.

$$Fd = (.5)mv^2$$

18.

a. $W = \Delta KE$

$$W = (.5)mv_f^2 - (.5)mv_i^2$$

b. opposite of a

19.

$$W = (F_{\text{retro}})(d)[\cos(180)]$$

$$W = (.5)(m)(v_f)^2 - (.5)(m)(v_i)^2$$

20.

a. $W = Fd\cos 180$

d is the is the number given in part minus the original distance

b. opposite of a

21.

$$PE = mgh$$

h = vertical component of right triangle

22.

$$(.5)mv_{\text{top}}^2 + mgh = (.5)mv_{\text{bottom}}^2$$

23.

a. $KE + mgh = (.5)mv^2$

b. $KE + mg(h - \#) = (.5)mv^2$

24.

$$h = (.5)r$$

25.

$$\Delta KE = W_{\text{chain}} + W_{\text{friction}} - mg(h_f - h_o)$$

26.

a. $E_{\text{lost}} = mg(h_f - h_o)$

b. $F = (E_{\text{lost}}) / d$ given in part b

27.

$$P = mgh / t$$

28.

$$P = mgh / t$$

29.

a. 3

b. 0

c. -9

30.

a. 93

b. 0

c. $93 = (.5)mv_f^2 - (.5)mv_i^2$

31.

$(.5)mv^2 = mgh$

i hope i didn't mess any of it up

Thu, Oct 23, 2008 09:52 PM

Bruce

Nice HTML Formatting.

Thu, Oct 23, 2008 09:57 PM

Bruce

But Maple's prettier...

Thu, Oct 23, 2008 09:59 PM

Kevin

well i'd rather do the work myself(via calculator) than having some fancy schmancy machinery program to do it for me

Thu, Oct 23, 2008 10:03 PM

Bruce

Well, it's an headache trying to keep track all the variables...

Thu, Oct 23, 2008 10:17 PM

Cary

thanks a billion Kevin. got done 3 hours earlier than planned. woo! go Kevin.

Fri, Oct 24, 2008 09:23 AM

T.J.

Kevin's post makes more sense than all those useless words on ur thingy...

Fri, Oct 24, 2008 03:36 PM

Zach

I LOVE YOU (no homo)

Fri, Oct 24, 2008 04:58 PM

Clarke

yea zach, me too.

Fri, Oct 24, 2008 05:06 PM

Kevin

if any of these don't work, yell at me until i fix them

Fri, Oct 24, 2008 06:51 PM (forum posts)

The weaknesses of the community were not serious enough for students to feel they outweighed the benefits. That the blended class was a much better form of classroom was universally agreed upon by the students. However, that did not preclude problems. It did make students ponder how the negative aspects of the blended class could be lessened without harming the advantages they found in the blended class.

Creation of the community is completely controlled by the student and only bounded by the confines of the technology. Students recognize these limits and suggest many upgrades that they feel will make the online community a more active and user-friendly place. This control over creating the community is even more in the hands of the students than the traditional classroom, because the traditional classroom has very strict limitations due to time constraints. The blended class breaks these constraints, extending the class beyond the 50 minutes into

however much time the student needs. This extended class time allows for socializing, making friends, reflecting on the lessons, teaching others, and also abuse. The abuse that many saw in the community came from students using the forums to turn their homework assignment into a plug and chug exercise where they gained little to no understanding of the material. Though this was still a step up in the minds of many students from copying answers from another student's paper, they realized that this still minimized effort and learning, and pointed out that this showed itself in the assessment grades of students who did this.

How does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class?

There are several ways in which the blended science class community is similar to and different from the traditional science class community. These issues will be presented here. Primarily, students viewed the blended class as a natural extension of the traditional class community. They were not surprised by the inclusion of online components to the class, were very accepting of them, and have now come to view them as a more mature, modern, and very natural progression of the educational process. The characteristics to follow in the rest of this chapter are commonly voiced by students as they talk about what their blended class experience is like compared to their other classes, which are traditional classes. Therefore many of the comparisons are not explicit differences but rather demonstrate how students feel and see their blended class as a natural, evolutionary advancement of the traditional class, rather than as a replacement of or extinction of the traditional class. In fact, several mentioned that they would prefer the blended class model from here on out and seem to expect that this will become the norm rather than just an experimental endeavor. They assume that the blended classroom is the future and that it is only a matter of time before the traditional class disappears.

Expanding the Traditional Classroom Community

The first common thread among students, and the largest, was the many different ways in which the online component had expanded their traditional classroom. Celeste enjoyed that the blended class allowed all of the AP Physics classes to work together saying, “I like that. All of our classes are separated: gifted, AP, non-gifted AP and I like it when it’s mixed... There’s more interaction, I guess.” (first interview) Mikalah found the same was true for her, “I also connect to everybody else in a bunch of different classrooms. I know I’ve made a bunch of different friends in the other physics classes. I get help from people I didn’t even know before...” (first interview) None of their other classes incorporated this cross class interaction. Mikalah found that, “well, number one, it’s less dull.” (first interview) She went on to compare her work habits in her traditional classes to the blended class:

I have study groups for some classes, and other AP classes or other assignments are just homework and most students, well let’s not lie, like when some students don’t do their homework they end up copying, to state the facts. But in WebAssign there’s no need to do any of that because the answers are randomly generated and then we know what we’re doing, we can go ask someone else who’s done it. (first interview)

Isabel spoke of her traditional classes saying that “more times in class teachers encourage you to be quiet and not help each other and in physics we’re on WebAssign and you encourage us to give solutions to each other.” (first interview) Because of this community interaction:

You get better at explaining things because you can’t just explain it how it makes sense to you cause they don’t get it. So you have to explain it farther and that helps over time to figure out more things to, how to explain it to people, how other people understand it. And in traditional classes, you can just be, “you can just look at my paper”, but the

forums actually explain it more. You learn how to do that. It's definitely expanded working together a lot more than other classes. Most classes you just do it on your own or ask the teacher. so it helps out a lot. (first interview)

Kevin's traditional class community experience would use alternative and, for him, uncertain methods of communication:

In other classes they would call you after school. Which sometimes can be a hassle to some if you're doing something else I guess. And that would be like in other classes.

With the forums you can, like, my house is in a bad place for cell phone reception for my service provider and like I can't really get that many calls in there, but the internet is always connected and I can always go check and see if anybody needs anything there.

(first interview)

But even this had further potential downfalls:

Other classes some people can just be jerks and say, "you should have been paying attention to the teacher" which most people aren't. But in other classes you can't really get that much help from other students cause if you don't get it and you listened to the teacher then odds are the other kids don't get it. And at the forums, you can go look it up cause you're already on the internet. (first interview)

No longer was the classroom bound to class hours. Kevin noted that the blended class setup made it so "the physics class extends throughout the day in the forums, so there's more time for it. And people can keep on asking questions whenever they like." (first interview) Richard spoke of how the blended class community was "more college style, not like the other classes where you just kind of sit there on a bridge and don't come to school for." (first interview) He disliked that community work in his traditional classes was where "you usually do it in groups where they

separate us into like two's or three's or however many and you just talk it. Yuck." (first interview) Students worked together "a lot in this [the blended] class. In other classes, like they will have a question or two, but in this class mostly everybody will learn [even] if they don't answer or put in a comment." (first interview) He voiced a typical concern of students in traditional classes where they worry about re-asking a question if they don't understand it the first time and said the blended class community fixed this:

It's more, I dunno, when I'm talking to somebody and I'm asking them a question, and they tell me, it's more confusing to get it all, I might like understand it, but then I kind of forget what they say, but if I ask somebody a question and they explain it, it's like, all there, then if I still don't get it, I can ask them again and they can explain it all. I can visualize it. (first interview)

Compared to a traditional class, working in the blended class allowed Richard to:

It's just that you can talk to the whole class at once with that one post. So like if, instead of like a regular class where if you don't understand it, you call one person and they don't know how to do it; with WebAssign you're not gonna understand it and you ask about it and everybody in all of the classes can answer your question. (first interview)

This increased interaction gave him a more active role in the lives of his classmates:

People I don't normally talk to in class actually answered my question then, then I guess when I'm actually back in class after answering my question, um, it's more of a friend now I can talk to...Before when I first got into the class, I knew maybe 5 or 6 people, now everybody knows me in this class and the other classes too. (first interview)

He believed there was a good deal of value in this expanded exchange of ideas. "I think it makes it [learning physics] more easier for them, cause sometimes like you hear one person's voice like

every day all day; it gets kind of repetitive. And you miss somebody at your level explaining it,” (second interview) he said. Mikalah said:

There’s like 100 percent difference in how people help each other in physics class. In another class we can’t. So what difference is that? I’m sure in, well, in another classroom they see the problems and they help, but people print out the WebAssign and we come and we work on it in the classroom. Or we have the equation for this so we’d help each other like, “Ok, this is the number, you put it in here. (online response)

Students realized that the blended class increased their social group’s size both for learning physics and for meeting people as compared to the traditional class. Jen found how the blended class enhanced the traditional class and extended beyond it saying, “I mean, we’re allowed to work in this class, through the forums. In other classes, they consider that cheating, usually. So we communicate a lot more.” (first interview) Isabel found the same situation true from her views of the blended versus traditional class. She said:

In traditional work you have to figure it all out yourself. Well, ideally the teachers want you to do everything yourself and that you can ask the teacher for help. You’re not really supposed to sit there in class and talk the entire time. And WebAssign is completely different. You are encouraged to basically sit there and help each other and sit there and explain it to each other. It’s just completely different set of how to do it. (second interview)

Isabel felt the blended class also:

Creates more [bonds] because whenever people help each other they feel a sense of thankfulness back to the person and then they are more likely to talk to them and create

bonds. So it just whenever you have, not have to, but basically are forced to talk to each other online you create bonds with each other a lot easier. (second interview)

This sentiment was repeated by Kevin when he spoke of the blended class community as compared to the traditional science class:

Yes [there are more bonds between students], because there's more interactions between students in the blended class than other classes... [The] Best thing is the interaction between the students which is it's more than in other classes. And that's what I think is the best. (second interview)

Jason eloquently stated that in his experience in the blended class compared to a traditional class:

The biggest change webassign has made...is that I can easily work with everyone who has the assignment. Previously, I would generally only talk to my friends when working on homework, whereas with webassign, I don't need to know someone's phone number or email address or whatever to work with them. The forums are right there for everyone to use. There have been several questions that I was completely stuck on, but I was able to do them with the help of people on the forums. Perhaps more importantly, I didn't just figure out how to do the problem, I was able to better understand the underlying concept. people I don't normally talk to in class actually answered my question then, then I guess when I'm actually back in class after answering my question, um, it's more of a friend now I can talk to. (online response)

Linda showed a preference for the blended class in comparison to traditional classes she had:

I would like classes that were blended because it would be easier to communicate with people about the information going on in class. A science class with forums is very helpful because you can share knowledge about how to do certain problems. I would like

more classes with forums so people can help each other to understand the material better.

(online response)

Florence found the blended class a better, more open environment:

The forums are very effective in science, and I think they would prove helpful in other classes too. Instead of just calling a friend for help, it's so easy to just type a question on the forums, and in just a little bit, get an answer written out for you to see. I like the idea of this class being "blended." I don't mind doing webassign for homework, and I always do it first when I have other homework. It's different, and not like regular pen and paper homework. If other classes had online work or homework, I think the work would be less stressful and easier to get done. (online response)

Once again, the online forums are bursting with just such examples of the help, reflection, teaching, and socialization that the students speak of as being so much richer than their traditional classes:

Topic: Number 38

New Post

Florence

Can anyone help me with this one?

=] thanks

Fri, Sep 19, 2008 07:54 PM

Logan

First, write the equations for the tension. for the block on the table, it is $T=m*a$ and for the second block it is $F_w - T=m*a$. F_w is the force due to wieght (the newtons given).

for the mass of the 1st block, divide the newtons given by 9.8. do the same thing for the second block.

then, substitute the $m \cdot a$ for the first equation for T in the second equation. then just solve for a. after that, its easy to find T

hope that helped

Sun, Sep 21, 2008 02:34 PM

Zach

Is m the mass of both blocks together in the final substituted equation?

Mon, Sep 22, 2008 07:45 PM

Cary

uhhh... a tad better explanation. sorry... not getting it.

Mon, Sep 22, 2008 10:13 PM

Nikki

Yeah, I agree with the person above me (who I do not know, hahah) but WHAT?! I am so lost on this one.

Tue, Sep 23, 2008 12:28 PM

Elena

he could have just put n the equation

$$m_1 a = -m_2 a + -m_2 g$$

but for 38 B can someone help me?

Tue, Sep 23, 2008 04:24 PM

Isabel

For number 38-

Part A- to find acceleration you find the net force(weight of hanging object) and divide it by the mass(the weight of the two block together divided by 9.8)

Part B-to find the tension take the acceleration and divide it by the mass of the block on the table(wieght divided by 9.8)

Wed, Sep 24, 2008 08:25 PM

Mike

For part B I did this :

My given number of block on table 486N.

Acceleration= 2.956

$(486/9.8)*2.956=$ ANS

Ans=146.59

Hope that helps.

Sat, Sep 27, 2008 07:28 PM (forum posts)

The upcoming presidential election produced a long post of which only an excerpt is given here.

Strangely, the post ended in Mikalah going back to asking a physics question because this was

where she found all of her classmates:

Topic: Obama Vs. McCain

New Post

T.J.

Post who ur voting for... just want to know cuz im stuck on a problem and waiting for an answer. I know its not bout physics so dont make a comment bout this being a educational forum for helping people because i have been :]

Thu, Oct 23, 2008 06:52 PM

Steve

I'm 16...

Thu, Oct 23, 2008 07:56 PM

T.J.

we are having a school vote sum time soon i forgot all the details... i was just talking bout who ur in favor of.

Thu, Oct 23, 2008 08:00 PM

Lillian

me too Curtis... stupid voting ages...

Thu, Oct 23, 2008 08:01 PM

Logan

i just gotta say this.. NADER '08!!!!!!!!!!!!!!!

Thu, Oct 23, 2008 08:02 PM

T.J.

bagdad, whos nader????? im missing the point?

Thu, Oct 23, 2008 08:03 PM

Arthur

ralph nadar is in a different party. he always runs for president but never gets enough votes.

Thu, Oct 23, 2008 08:06 PM

T.J.

lol, figures i never pay too much attention to politics anywayz.

Thu, Oct 23, 2008 08:08 PM

Logan

hes part of the green party, whcih are basicly a bunch of commies...hey, that sounds like a party for you Jacob! just kidding man

Thu, Oct 23, 2008 08:12 PM

T.J.

Yay commies!!! accually... NO

Thu, Oct 23, 2008 08:14 PM

Logan

yeah , he's probably gonna end up committing suicide because no 1 ever votes for him...

Thu, Oct 23, 2008 08:16 PM

Lillian

wow. interesting... well im like coach Holcombe in the whole no political parties thing... but i honestly dont think either of them can fix these economic issues so it really doesnt matter which wins.

Thu, Oct 23, 2008 08:17 PM

...

Logan

what i dont really like is how Obama's policies and stuff are really socialist ideas. after seeing how terrible socialism did in europe, i dont want a pres who believes in that stuff

Thu, Oct 23, 2008 08:25 PM

Logan

but y are we talking about this anyway? we're just a bunch of 16 and 17 yr olds who cant vote

Thu, Oct 23, 2008 08:27 PM

T.J.

lol... ya know ppl are more opinionated for this election, i think we might get like 80% of eligible people to vote.

Thu, Oct 23, 2008 08:28 PM

Logan

its gonna be crazy no matter who is elected. it could be an even higer %

Thu, Oct 23, 2008 08:31 PM

Lillian

yeah voter turn out is going to be really high i bet. i dont know about 80% though since isnt it normally like ~30%?

Thu, Oct 23, 2008 08:31 PM

Logan

yeah, but like Hicks said, if the economy's good, less people will vote. if its bad and there are alot of issues goin on, it swings WAY up

Thu, Oct 23, 2008 08:33 PM

Jason

Yoda for president! Hahahaha. As long as Obama doesn't get elected I'll be happy.

Thu, Oct 23, 2008 09:27 PM

T.J.

well last election it was like 51% or sumthing close to that

Fri, Oct 24, 2008 03:46 PM

Zach

Curtis Colbert anyone?

Fri, Oct 24, 2008 05:13 PM

Steve

If i could vote, colbert is who i would vote for, he would be great, as long as you're not a bear

Fri, Oct 24, 2008 05:30 PM

Zach

We hold these truths self-evident, that all bears are created equally evil.

Fri, Oct 24, 2008 08:50 PM

Zach

to be*

WTB [willing to buy] Edit Button

Fri, Oct 24, 2008 08:50 PM

Mikalah

hey someone help me with 16 Bee and 21 Bee since you guys have nothing to do I'm stuck on those parts because i suck and Kevins method confused me on the second part of those

:]

Fri, Oct 24, 2008 09:20 PM

Mikalah

21 A 75.0-kg skier rides a 2770-m-long lift to the top of a mountain. The lift makes an angle of 14.3° with the horizontal. What is the change in the skier's gravitational potential energy? sorry it has no B i just cant read haha

Fri, Oct 24, 2008 09:22 PM

Mikalah

16 A 2.50 102-N force is pulling an 70.0-kg refrigerator across a horizontal surface. The force acts at an angle of 24.0° above the surface. The coefficient of kinetic friction is 0.200, and the refrigerator moves a distance of 6.00 m.

and i got 1370.32 for part A

Fri, Oct 24, 2008 09:23 PM

Richard

OBAMA OBAMA OBAMA OBAMA OBAMA OBAMA OBAMA

Sun, Oct 26, 2008 12:33 PM (forum posts)

Students felt that when they compared their blended class communities with their traditional class communities, they found several advantages to the blended class community. There was less stress in working the homework problems. The students enjoyed greater and easier communication among their classmates both in their actual class period and from the other class periods. The communication involved socialization as well as discussion and reflection on their physics class which were frequently comingled.

Possible Problems

When comparing the blended class community to the traditional class community, students spoke about their actions and the actions of others that caused them concern and

problems. Although they readily agreed that they preferred the blended class community, there were several items that arose which overlapped problems they encountered in the traditional class community. Few offered any solutions to the problems, and at least one, Kevin, simply believed that there would be community problems no matter what type of class community in which the students operated.

Celeste pointed out one of the biggest problems created for a physics class using the blended class community compared to the traditional class community:

I mean with physics it's different than language arts or whatever because with physics it's like formulas, so you just plug in your numbers. So if you just have the formula, you have the answer. But for language arts I guess you would probably talk or discuss what it meant, you know, like a poem or something...I just wait until the night before it's due and then do it all the night before. (first interview)

It could take her very little time to complete the homework, meaning it minimized reflection and effort for her:

I normally, depending on what I'm doing, obviously, and what other things I have to do. I mean at the least I give myself two hours. If it's due at 11, the very latest I'll start it is 9...It's beautiful for procrastination. It's fabulous, it is not good for it, but it helps it because some people just work better under pressure. And you're not punished for it that way. I like it. (first interview)

Celeste claimed that she would:

do the WebAssign like 10 o'clock at night, the day it's due. So when I get on there, everybody's off and they've answered all the questions... I can procrastinate and I can do

it at the last minute and it's not necessarily a bad thing because there's a whole bunch of forum posts on how to do problems. (first interview)

Mikalah noted that one person can end up doing the work for many because of this new community, saying, "most recently someone...has gone in and paid attention to all of the classroom, wrote down all the notes, and then they put the formulas there [on the forums]." (first interview) Mikalah exhibited a similar behavior saying, "Twenty minutes is like five now because someone has done it already." (first interview) She held onto this view through the time of the second interview, "it just lets you blow off...until the last minute." (second interview) Isabel remarked, "The forums have become very much a place that has just basically all the equations...It's really easy to get the answers that way [from the forums] and then forget everything because you didn't really work it out." (second interview) She went on to say, "But they also realize that they need to try and do it by themselves sometimes because they see how they can do really badly on other stuff because of not trying on it." (first interview) This problem really concerned Isabel and she continued:

A lot of people, they just use it as the easy way out to get around having to try the problems for themselves. I don't think everyone does that, but a lot of people have. So that messes up their actual understanding of physics because then when they ask a question in class, and you try to explain it, they're like, "I don't understand any of that" and you're like, "You kind of have to build up to it". So the free responses [assessments] are so confusing. If you look at it, it's mostly the people that haven't really tried in physics, in WebAssign...it definitely made it easier to procrastinate because you can get on and within 5, 10 minutes, you can plug in all your numbers. So sometimes people wait til the last second and then the dates have been changed by an hour on when it's due and

they can't turn it in and they have a fit the next day in class. It does help procrastination if you let it. It makes it easy to procrastinate. (first interview)

She worried that there was nothing that could be done about this without doing more harm than good to the blended class:

I don't know how you could change it really. It's kind of frustrating sometimes. Some people try really hard to actually help and then you know that some people are just on there and will get every single answer, so it's frustrating to see that. I don't think there's anything you can do to change it because the only other option would be taking it away and it would be unfair to the majority of the people. It would be much worse overall to not have them. It's really annoying because students never... Teachers sometimes take stuff away just because a couple of idiots mess it up when the majority are using it for actually learning and actually working on it. There's a lot of people I have actually seen trying to learn it but then there are a lot of people that just literally go in there and get every single answer. So I don't really know which way it would be. I do feel that this is better than traditional homework because another thing you don't just sit there and try once and you don't know if you got it right or wrong; you try over and over until you get it right. So you actually learn it instead of say out of a book of problems you're like, "Ok, I think this is the answer" and the next day in class you're "Oh, well I was wrong and I don't know why." So you definitely learn it a lot better. (first interview)

Kevin agreed, saying:

It's just like looking in the back of the math book for the answers. Cause in the back of every math book there's always answers to some problems in the back and you can just go to the forums and look up the equations and then put your numbers in and it's like

looking up the answers. I think that's pretty common, because there's some lazy people who just like don't do anything in class, just wait for someone to post the formulas or how to do all of the problems and then just fill it in for an easy grade. I think that they should at least try and contribute something to the forums or in class at least. Or show that they understand it so you know that they actually are doing something instead of nothing...I think that they would learn more physics if they didn't have the forums, because the only way that a person could learn the stuff is by the book and they would read it and as they read they would learn more stuff and remember more stuff. (first interview)

He also pointed out that it took some time for the forums to start up because:

at first, no one was really posting on them, except for a couple of people and I was like, "oh, this isn't going to be that helpful to me. I'll just have to learn how to do it on my own" and then I saw some people really needing help on it and I decided to post some formulas, then I posted this one thing that was "do you have a problem? Just say and I'll help with it" and it got out of hand so I just decided to post all of the formulas in one convenient place. (first interview)

Then, after the forums became popular, another issue, though not serious, arose in the form of "a lot of spam. It used to be, ask a question, get an answer, but now people have been posting just a bunch of random stuff." (first interview) Richard held a dissenting view on all of the cross-class communication saying, "It's too many people at once. I would change about it, I would separate it by class, cause if you have somebody from a different class, answering your question, you could be confused, cause you [the teacher] did something different." (first interview)

Jen noted the problem of using the forums to get easy solutions with little effort:

People can like post every equation. It's helpful and it's not because it helps me to get my homework done but I don't necessarily learn it as well. I usually pick up physics a lot better than I have. Like I understand it to a general sense but I haven't really got to know what physics is. So it's like I don't really learn as much, but I still have a good grade...I was one of those people, I just stole everybody's answers or how to do it. But I've gotten to this where I actually want to learn more. Before, I just wanted to get it done, but I actually want to learn this because I don't like not understanding it. (first interview)

So strong were her feelings on this one point that she wished there was a way to change the homework to avoid this temptation:

Make it where I have to do more, because everybody posts how to do it. I just, if it's like the last day I won't even try and do it, I'll just get the equations, plug it in and go. So I'd actually learn it. Because I'll fail the AP test if I actually take it, most likely (first interview)

The online question, ““Has WebAssign changed the way you interact with your classmates in completing assignments/working together? In what ways? Can you think of particular instances of working together? How did they help you or were they helpful to you?” generated several responses that addressed this same issue of needing little effort and understanding of physics to successfully complete the homework. Cary said:

A downside to it is that we don't really learn how to do the equations. A lot of people, including myself, have forgot all about WebAssign and cram by using the equations posted. We learn the concepts in class, but the actual application of it is lost. (online response)

Joseph concurred, adding:

Some of the negatives of working together are: although you can only look up the equations you need it is very tempting to just look at all of the equations to avoid all of the work, there is no bonus for figuring all of the equations out yourself or for helping someone else out: this leads to a lot of lazy people depending on a few select people, and the forums remove the need from needing to pay attention in class b/c as long as one person remembers the equation everyone will be ok. (online response)

In fact, several students openly admitted to this behavior and referred to it as “lurking.” Jacob bluntly said, “I’d like to help but I’m just too lazy. I do of course sometimes yet most the time I am a lurker along with most the other people on this forum =D” (online response) and Earl added:

I am not going to lie, I am a lurker. I also must say I am not proud of my past actions. Coming on to web-assign with no real motivation except to better myself is terrible. I always say I’m going to change but it never seems to happen. The important thing is that I do get my web-assign done. (online response)

Curtis found this line of answers to be indicative of him and offered, “A lot of the time, I’m just a lurker and try to do everything with as little effort as possible.” (online response) Another example of one student asking for solutions and another student merely listing them with no explanation of the physics behind the solution follows:

T.J.

If someone could please list the basic formulas used to solve these equations. I missed a day of notes when the formulas were given so I have no base on how to start these equations.

It would be greatly appreciated. ; D

Thu, Oct 23, 2008 02:46 PM

Forum: Chapter 7

Topic: REVITALIZATION

New Post

Kevin

15.

(N)(s)

Direction - same direction as average force

16.

(N)(s) = (kg)(m/s)

17.

(N)(s) = (kg)(?m/s)

Direction - upward

18.

(kg)(?m/s)

19.

(N)(s) = (kg)(m/s)

magnitude, so the answer is positive (forum posts)

It was obvious to students that although they viewed the blended class community as a better model than the traditional class community, there were still serious problems. The blended

class made procrastination easier because answers were readily available. This was in and of itself not so much of a problem as the fact that students need not learn hardly any physics in the process of completing their work. Several students offered suggestions on how to remedy this: remove the forums altogether, alter the way students can get to the information in the forums, make it where the students, as Jen said, “have to do more.” (first interview)

The possible problems that became apparent when the blended class community was compared to the traditional class community were in most cases simply variations on the problems students already knew of from their traditional classroom experiences. Although these problems were not eliminated, the students agreed that their negative effects were lessened. The biggest concern was the capacity of the forums to provide students with ready-made solutions, which only required students to take the numbers given to them in their problems, plug them into their calculators, and get an answer. Though the small benefit of the student-unique online problems practically guaranteed that students did at least some work, as compared to traditional classes where simply copying another student’s paper was the common practice, students knew that this was no real solution. It was still possible to get a good grade on the homework but still not understand the material which resulted in low assessment scores. Being efficient or lazy, it was hard to tell which, the students commonly opted for relying on the few students who would put up solutions to many or even all of the problems. Another effect derived from this behavior was a great tendency to procrastinate. Since students realized that it was possible to get their assignment done in less than a few hours before the time it was due, it was common for students to wait until the last minute. This meant that rather than having reflective time over the course of the assignment, there was practically no reflection during the rush to get online and finish the assignment in as little time as possible, relying on the posted work of others. But this was still

seen by students as a step up from the characteristic cheating in the traditional class of simply copying another student's paper assignment. It seems they felt the situation was improved, but not by much, in the actual intent of learning physics. They felt it was greatly improved in the speed at which they could get the assignment done and out of the way.

Reflection

One of the benefits talked about by the students was how the blended class brought the traditional class home with them. They could reflect on the lessons taught in class, reinforcing concepts that they learned and reviewing concepts that eluded them in class. More than one-on-one or face-to-face reflection, this was reflection as a unit, reflection as a community. Celeste spoke of going:

Through your WebAssign and then you don't know one and so you just go on there and there's a whole long post on how to do it and somebody's like, "Oh wait, my numbers didn't work." And then they tell you, "Remember to convert this to this." And stuff like that. They're like reminders, I guess. (first interview)

She felt that working with other students "helps to get their take on it [the physics concepts]." (first interview) Mikalah spoke specifically about this:

We just go online and we get a reinforced lesson because we can go and do our homework assignments online...and then we can ask each other. So it's like doing homework but by yourself but having a whole group of people... You can get questions that other people ask, so you don't feel really stupid thinking you're the only person that didn't understand this and you can ask people from the class how to do this and that and so it just works. (first interview)

The reflection had other facets than just reviewing the physics concepts, Mikalah noted “they go and they have questions on how to do this problem; don’t miss that on here. It’s like reducing the chance of human error because you pick up your dumb little mistakes before you even make them.” (first interview) One of the effects, whether it’s good or bad in the long run may be hard to determine, is that the online reflection is almost always successful in the blended class community but not always in the traditional class community. Says Mikalah:

If you think that you are totally lost on this, know that 10 other people are totally lost on it and so you’re going to go and, no matter what happens, you get help on WebAssign in the forums. You don’t have to wait until the next day to come to class and be like, “Oh I can’t do my homework assignment because I totally didn’t get this question.” Which is what happens in other classes, because it’s right there and that just makes it ten times easier. (first interview)

She gave an example of the reflection she observed with her classmates:

Caroline, she prints out her WebAssign often. She gets help from Kevin, she gets help from Billy. And then we’re in the lab that day you weren’t here and I figured out how to do this problem, so I just went around and was like, “Hey, these are your numbers, this is how you do that” and everybody’s like, “Ok, yeah.” And on WebAssign we always have that whole post equation and remember to change this grams to kilograms all that stuff. And Richard puts his specific examples in there and works that stuff out there too. (first interview)

Isabel found the reflection necessary for success in the class:

Because at first I thought I wouldn’t really need it as much because I guess at the beginning of the year like I didn’t really use it as much but then the farther you got into it,

the more complicated things got and you had to use it more. And then also I realized more when I was explaining stuff to people, you remember it better and you understand it better yourself... you get better at explaining things because you can't just explain it how it makes sense to you cause they don't get it. So you have to explain it farther and that helps over time to figure out more things to, how to explain it to people, how other people understand it and in traditional classes, you can just be, "you can just look at my paper", but the forums actually explain it more. You learn how to do that. (first interview)

Furthermore, the traditional class community did not offer help to this extent. Isabel felt students typically had no community for help:

In other classes you just sort of don't do anything about it but in this class people will be like, "Oh! I finally got this one!" and they'll post an explanation about it on the forums. And so, it's sort of different for other classes... whenever you don't understand something you get it figured out for you and whenever you don't understand something, you explain it and that way, a lot of times, if you don't understand some of the homework and you never get the chance to ask a teacher you'll just never understand that. And so WebAssign, it's pretty foolproof. If you want to figure it out, you can somehow. But if you don't want to, you can also get around it. If you use it correctly, it can help a lot. (first interview)

Kevin agreed that in the blended class, compared to the traditional class, reflection means:

There's a lot more help in this class. Because it's like you're in physics even when you're on the internet on the forums cause everyone's talking all the time and asking questions, whereas other classes you're just in there for an hour a day and you can't ask questions

about it and get a straight answer from somebody... And people can keep on asking questions whenever they like. (first interview)

He stated that this made learning physics, “easier for some. You learn it in class and then if you don’t write it down you don’t necessarily remember it when you get home. But if you see the forum for it, you remember the concepts.” (first interview) Richard also found the time for reflection a better way for him to learn:

I like the way it connects together. Like what you learned in class and then you get on WebAssign and do the problems, it comes together... I would say, that basically, like, if you ask me a question face-to-face I’m not going to know, but when I’m at home and I’m sitting at the computer and I’m doing it or whatever, and then I have a chance to write it down, and when I write it down and it’s more clear. If I see it, it’s not as confusing. (first interview)

He later generalized his own experience to others saying, “If you do it [use the forums] the right way, and you really don’t understand it and then you have to show it to someone else you understand physics a whole lot better.” (first interview) Possibly most important to him was the opportunity to have a peer’s explanation because it increased both his knowledge and the knowledge of the person teaching the physics, saying, “I think it makes it more easier for them, cause sometimes like you hear one person’s voice like every day all day; it gets kind of repetitive. And you miss somebody at your level explaining it.” (first interview) Jen commented that the reflection, “still makes you figure it [the problems] out because we have to do our own numbers and its repetitiveness makes it... it keeps it in your brain better.” (first interview) The online problems made reflection an imperative to finish the problems:

It makes it a lot easier, the fact that we can answer questions 15 times, it makes you work at it. So just answering it and turning it in and be like, “ok, I got it wrong but I’m not going to look at it and see how I got it wrong”. But now you have to actually go back and fix it. (first interview)

Mikalah mentioned that when she could go back into the WebAssign and the forums she found that concepts and problems that she didn’t understand in class were now clear to her. She also believed that learning from the reflection required that the forums be used for more than just getting an easy solution:

Jacob’s last post on the WebAssign he says, “Oh, let me just put it up because people are lazy and they won’t and it’s not very hard.” But I don’t know, I thought, I looked at it and thought, “Ok, these are actually pretty easy.” But I saw everything and it refreshed my knowledge of how to do just about everything that we learned this chapter just by looking at his explanation. I think others, unless they’re in a hurry to get through it, a day before WebAssign is due, I think everyone should definitely have learned more physics from this so long as someone has explained it instead of just putting the formula there. (second interview)

Isabel’s second interview drew out similar thoughts on the importance of proper reflection:

It’s to get answers and to also to help further my understanding because when you have to explain something to someone you can’t just barely get it, you have to completely get it. And so when I sit there and explain something it helps me understand it better; benefits me also. (second interview)

Likewise, Jen mentioned in her second interview that the blended class offered more in the area of meaningful reflection than the traditional class:

When it's online and we're forced to explain it as we're doing it, you get it better. Before, if you'd come in and copy somebody's homework really fast before you had to turn it in, you wouldn't get anything from it, but this way you do actually have to figure it out yourself. (second interview)

The forums had several instances of students announcing to the community when their own reflection got them to the solution of a problem. There was typically a fair degree of excitement and pride associated with successful solutions:

Mikalah

never mind i got it myself lol just used the good ol brain and actually though it out (got tired of seeing the red X) and i had the problem you explained a long time ago i was just too mean and lazy to post how to do it...lol..and i figured out the airplane problem! i know its prob lame but to me its an accomplishment cuz i just COULD NOT get it first time around

Mon, Aug 25, 2008 06:51 PM (forum posts)

Another example from Cary:

Cary

I know, he explained it in class. I totally had the biggest brain fart in existence that I almost knocked my house down. Can anyone help? I'll smack myself in the head when I see what I did wrong. PLEASE!!!!

Mon, Aug 25, 2008 06:23 PM

Cary

Well, I was being a retard and was using the radius as the distance around the equator. I just figured out how illiterate I really am. hahahaha. The tips are completely awesome.

Fri, Aug 22, 2008 09:23 AM (forum posts)

David's success was also due to his own reflection:

David

thats not right either. i swear theres somethin screwed up with mine. i dont know how we got diff answers tho. this is what i did

$$V_x = 610 \text{ m/s}$$

$$dy = 0.026 \text{ m}$$

$$g = 9.8$$

$$dy = V_{iy} * t + \frac{1}{2} g t^2$$

$$0.026 = 0 + (.5)(9.8)(t^2) (V_{iy} * t)$$

$$t^2 = .0053 \text{ so } t = .073$$

$$dx = v_x * t$$

$$? = 610 * .073$$

$$dx = 44.5$$

and thats right!!! awesome i got it right tryin to explain what i did to get it wrong i think i just rounded wrong the first time

Sun, Sep 7, 2008 09:27 PM (forum posts)

Another example from Richard as well as one from Diana:

Richard

i got it BY MYSELF!!!

Thu, Sep 4, 2008 04:16 PM

Diana

Ok, yay I actually understand it now. This is gonna be hard to explain without pictures

though... It might be easier if you draw a picture as you read... (forum posts)

Examples of group reflections have already appeared in several instances in this chapter and will not be repeated here.

Several students spoke of the superior opportunity to revisit, learn, and explain the lessons taught in class. They agreed that the online forums provided a great benefit to learning, but only if the students chose to participate in the opportunity. Certainly students could still avoid any meaningful reflection by merely being lazy thieves. That aside, students spoke of being able to reflect by themselves due to the feature of WebAssign which let them attempt the same problem up to 15 times to get a correct answer. They agreed that even if they were being lazy thieves, that this still did not eliminate the possibility of ‘stupid’ mistakes such as incorrectly plugging numbers into their calculator or having their answer in the wrong units such as centimeters instead of meters and needing to do the conversion. Numerous times they spoke of appreciating the ability of their fellow students to provide an explanation on their level rather than the teacher’s level and the ability to read these peer teachings as many times as they wished and at any time that they wished. Another advantage of the blended class community’s reflection over the traditional class community was the ability for one student’s explanation to address the entire community at once and in perpetuity, as opposed to a one-on-one phone conversation where the student may not be able to talk at the moment of the call or may not know how to do the problem either. The complexity of the problems in the AP Physics class also made students aware that without the forums, their grades and understanding of the material would suffer. Group reflection was almost mandatory for a level of success, whether it occurred with minimal learning or complete understanding of the physics.

Traditional Classroom Community

There were other general comparisons that students made between the blended class community and the traditional class community. A common theme was the difference in the way students would get together to help each other with the class, from the work to the concepts. Celeste pointed out that in her traditional classes calling others “On the phone, I guess, is the most common. Like outside of school.” (first interview) Unlike the forum communication, she said, “Normally it’s just one-on-one. Or Catherine and Florence (twins both taking my class) they normally have study session at their house and if you talk to them when they’re doing that it’s a whole bunch of people in one room.” (first interview) She found this differed from the blended class in that she saw students working together:

A lot more, because it’s more allowed. Like in other classes, I mean it’s allowed to an extent, and on some occasions you do group work, but most of the time it’s “teacher teaches, you listen, you do your homework” (first interview)

Interestingly though she felt that the way the students interacted in class compared to online were “Probably the exact same way.” (first interview) Kevin mentioned similar traditional classroom interactions saying:

In other classes they would call you after school. Which sometimes can be a hassle to some if you’re doing something else I guess. And that would be like in other classes. With the forums you can, like, my house is in a bad place for cell phone reception for my service provider and like I can’t really get that many calls in there, but the internet is always connected and I can always go check and see if anybody needs anything there. (first interview)

He also spoke of the limited interaction and help present in the traditional class setting saying in

Other classes some people can just be jerks and say, “you should have been paying attention to the teacher” which most people aren’t. But in other classes you can’t really get that much help from other students cause if you don’t get it and you listened to the teacher then odds are the other kids don’t get it. And at the forums, you can go look it up cause you’re already on the internet. (first interview)

The blended class was superior to the traditional class for Kevin in his personal work habits. He found there was:

Less late work than other classes, at least for me, because I have a bad habit of not turning stuff in on time. That usually comes and messes me up near the end of the semester. But with this you can get an extension which it’s still late, but you have more time to finish it in. And in other classes some teachers, if it’s just a class work assignment, some teachers won’t even take it late because it was such a small assignment, but it’ll still hurt your grade. (first interview)

Richard found the blended class community to be:

More college style, not like other classes where you just kind of sit there on a bridge and don’t come to school for... it’s different because Webassign forums it’s more like they are helping you more, it’s kind of like they help you more, like in a regular class, in a different class when you’re helping somebody, just like say something to kind of get them going, but on Webassign, it’s more detailed. (first interview)

He used as a basis for comparison his sister, who is in college and had described her college classes to him. His traditional classes usually worked “in groups where they separate us into like two’s or three’s or however many and you just talk...yuck.” (first interview) He did not feel that he acted differently in the blended class compared to the traditional class community but saw

that others did, saying, “I would say I act the same in class as I do on the forums. Other people like people you don’t even normally think could answer a question like in class could answer it easier online.” (first interview) The blended class community drew him out of his normal behavior in the traditional class so that he became a part of the community:

How do you mess up a procrastinator? Like if I was just given problems in a book, I would be like everybody else and wait to the last minute and then if I didn’t know how to do it then I would just be sitting there with the book. But see, now when I learn them in class and I go back home and do the problems quick so I have time to answer people’s questions and they’re like, whoa, he’s already done all the problems. (first interview)

Isabel found that the online community had a different focus than the traditional class community:

Because in traditional work you have to figure it all out yourself. Well, ideally the teachers want you to do everything yourself and that you can ask the teacher for help. You’re not really supposed to sit there in class and talk the entire time. And WebAssign is completely different. You are encouraged to basically sit there and help each other and sit there and explain it to each other. It’s just completely different set of how to do it. (first interview)

Kevin dissented, preferring in-class discussions like the traditional class community:

I like the in-class discussions better because online people sometimes misspell words and they use a lot of bad grammar, cause it’s easier to type worse grammar than it is to type good grammar so they just type it cause they’re lazy. So the in-class discussions are more comprehensible. (second interview)

Richard found the mass communication better than the one-on-one communication of the traditional class community:

Cause in the posts you're talking to everybody at one time and it's not direct. When you're calling somebody it's more like talking to that one person one-on-one or whatever and you don't know what they could be doing. When you post on there, it's on their time, when they can get on and they can answer it when they feel like it. If you call somebody they can be in the middle of doing something and then you gotta get back to them and stuff. (second interview)

Harry had this to say about the blended class community as compared to the traditional:

Web assign's awesome because you don't have to be right next to someone to get help. If you're stuck on a problem you can either post a question or look for where it was already answered. So, yeah I guess webassign has changed my interactions with people in a sense that, instead of calling the limited phone numbers I have of people who are only mildly intelligent, I can look in the forums and ask people who, even if I don't really know them, are smart enough to answer difficult questions. (online response)

Jason also noted a difference:

I think the biggest change webassign has made in the way I collaborate with classmates on homework assignments is that I can easily work with everyone who has the assignment. Previously, I would generally only talk to my friends when working on homework, whereas with webassign, I don't need to know someone's phone number or email address or whatever to work with them. The forums are right there for everyone to use. (online response)

In the traditional classroom community students felt hindered by the lack of easy interaction outside of class. Communication was typically by phone or required a meeting place for students to get together. In the case of the phone call interaction they complained that the other person could end up having little help to offer or their help was not received in a timely fashion. Added to this was the need of getting their number and having it handy. The problems for meeting together outside of school, at someone's house for instance, suffered from the opposite—too many people in an unorganized environment. It also was less convenient than the online portion of the blended class. The students were happy that the forums either eliminated or greatly alleviated these problems. Kevin found that in the blended class compared to the traditional class he was more likely to finish his work, and Richard considered the traditional class to not be as college oriented as the blended class. Jason found the asynchronous communication of the forums a great benefit because it pooled the resources of all of the classes into a permanent place that could be accessed by essentially everyone. Isabel believed that the blended class encouraged students to work together, which made it “completely different” than the traditional class. In these ways the traditional class community, for the most part, paled in comparison to the offerings of the blended class.

Summary

This chapter presented the personal interviews, online responses, and forum posts of students in the AP Physics blended classroom. The participants' discussions of and activities in the blended class revolved around the community they formed, its characteristics, and how they felt it compared to the only other form of class they were familiar with, the traditional class. The next chapter will discuss the conclusions illustrated by the data as they pertain to the stated research questions.

CHAPTER 5

Discussion and Conclusions

This chapter will discuss the patterns and codes as outlined in Chapter 4 and I will draw conclusions as to the structure and issues of the blended class in light of the research questions. Obviously the goal of any classroom improvement is to make what works in the classroom stronger and lessen, or even eliminate if possible, the weak points. This study has identified several strengths and weaknesses of this particular blended class model and these will be identified and discussed here as well as posing future questions for further research.

What are the characteristics of the student community formed in the blended secondary science physics class?

In regard to the first research question, there were several characteristics of the student community formed in the blended class that were uncovered and these were listed as the section headings in the previous chapter: collaboration, authority, cheating, lurkers, lazy thieves, socializing, teacher, and student. Each of these will be discussed here including interweaving their relationships to each other where applicable.

Collaboration

The most prominent and discussed opportunity afforded to students in the blended class was the ability to collaborate at any time from any computer with internet access and have their discussions saved for future reference. This was their first realization and mention that there was a community at work greater than the traditional class. It must be remembered that no student claimed to have been in a blended class before and several pointed out that this was definitely their first time in a blended class. Therefore, this form of school collaboration was new to them. In fact, the mere concept of collaboration in the traditional classes was mostly foreign.

Frequently they spoke of the traditional classroom teacher as viewing such collaboration as cheating. Simply put, they loved the forums even though they recognized that there were serious flaws such as the lazy thieves. Just as Hoffman (2006) described, the online component went from collaboration to a “collaboratory” (p. 37) where the students participated in developing this nontraditional environment and provided each other with the resources needed to complete the assignments and hopefully come to a greater understanding of the physics material. Strength in numbers accompanied greater confidence in a student’s belief that they could successfully finish assignments on time in this fast-paced college level class. Many of the students felt that the fear of being seen as “stupid” by their classmates was effectively eliminated by the presence of the forums – certainly a great relief in the minds of socially cautious teenagers.

Collaboration also meant the forums let students work cross-class, meaning all of the physics classes shared one forum, and was considered a great benefit by the students and resulted in them making many more social contacts and friends. This helped to build an expanded community of peers that Kevin called an “unlimited resource” taking the roles of teachers and students, which will be discussed in greater depth later. It must be remembered however that the collaboration was promoted by the unique homework problems that WebAssign generated for each student. As Richard pointed out, “if everybody had the same problems, I think there’d be a lot more copying.”

Authority

The act of collaboration in the forums allowed for the blended community to recognize and elevate some students based on the help that they provided to the community. These individuals consistently demonstrated a willingness to use their time and understanding of physics to help others with their homework. As such, several students were seen by the

community as authorities; students who could be relied on for their ability and knowledge to assist their classmates. Strangely enough, these students did not necessarily start off as authorities in the class. Certainly, ones such as Kevin surprised their classmates with their proficiency in physics and exceptional skills because even though they had been well-known to their classmates for years, they had never stepped forward to assume the function of a teacher or a leader. Kevin, a heretofore shy teenager, became a popular, respected, almost awed, presence among the physics classes. In Richard's case, he went from his history of solitary effort at homework to a student that regularly asked for help on the forums (so much so that other students complained about his constant requests for help) to an authority. Once again, his classmates had never seen this potential in Richard. Richard jumped into this position and rose in standing, respect, and popularity with his peers while he maintained an air of jocular provocation with them.

Is It Cheating?

This was by far the most contested question among the respondents and generated the widest variety of responses. It became readily apparent that students could not decide if getting help on the forums constituted cheating. They agreed that having someone log in to another's account and do their homework was cheating, but all except Kevin claimed they had no knowledge of anyone actually doing this. Kevin reported hearing of some students paying others to go in and do their WebAssign for them. Is this hearsay and, if not, is it really possible to stop this form of cheating outside of creating an assessment environment? Doubtful. Mikalah flatly stated that that would be working too hard for someone else. Therefore, classic cheating in having someone do your work for you or simply copying your paper was not a realistic possibility for the students. However, that left the question of where the line for cheating was

now drawn. This became a grey area for the students as they fully believed that the online homework forced them to take on some of the responsibility of completing the homework themselves since each person had a unique problem set. But they could not agree if simply plugging their numbers according to the instructions of another student constituted cheating. In their minds, that was at least doing something and that was a step in the right direction if ultimately a fruitless endeavor. They believed the end result was the same: if you did not assiduously apply yourself in understanding the problems, you learned little to nothing and the assessment grades would bear this out. Kevin's comment that "every community has some bad people in it, some rule breakers" summed up the opinions of all. Celeste was convinced that removing the forums would only increase students cheating by trading passwords. The teacher/researcher is also unsure of where the line for cheating is now. Certainly, little is gained by students logging in 30 minutes before an assignment is due and gleaning all of the answers from the forums with no effort or learning of physics whatsoever.

This may actually be an interesting question for the teacher of a blended class to pose to the classes at the beginning of the semester and once again near the end. It certainly opens fascinating discussions and could provide a solution as yet undiscovered. In the meantime, the students' views that the behavior of gathering answers with minimal effort and learning are on target and a serious problem. In this regard, the blended class does appear to guarantee a nominal amount of work on the part of students, but the result is negligible to true learning.

It must be noted that nowadays students with almost any standard textbook can go online to a site like Google or Yahoo Answers and type in the problem from the book and bring up a web page where someone has answered the question. The web has stored the collective solutions of who knows how many students? Possibly millions. This makes cheating easy for anyone with

Internet access. WebAssign does what is probably the only thing that can be done to combat this by randomizing the numbers in each problem thereby insuring that the student at least has to accommodate the answer to their specific numbers. Can something further be done to randomize questions within a topic so that online help is not so readily obtained? Though the online forums are decidedly better, they are not cheat-proof and some students, as with any other setup, will take advantage of that.

Lurkers

Lurkers were students that read the forum posts but rarely, if ever, contributed to the online discussions. They were not necessarily shy or reclusive students, in fact, one of the most outgoing, sociable personalities in all of the classes, Celeste, was an admitted lurker. The forums were a godsend to her as a place to find help, but they offered no attraction for any other purpose. She was grateful for the help of her peers and respected them for it, but did not participate because she felt she waited until the last minute to get the work done and therefore it was too late to post anything useful. Her in-class behavior and her online behavior were polar opposites. It appears that many students are not active participants in the online community though they are active participants in the classroom. Once again, there is a mixture here. Some students flourish in the online community, some in the traditional classroom community, some both, and some neither. Some students (e.g., Lisa) feel little need to join the online community. In Lisa's case this is not surprising; she is very much her own person in class, comfortable both by herself and with a group. She demonstrates a great deal of independence.

Several students still equated lurking with students who were shy or easily embarrassed individuals, fearful of being wrong in a public place and being seen as stupid. Kevin felt the forums or class should have some form of required component that forced lurkers to contribute

in some way. He did concede that some lurkers may just be people that are capable students but solitary individuals who only visit the forums for the few problems they cannot figure out. If that were the case, he saw nothing wrong with lurking. Yet most students mentioned the lurker's behavior of waiting until the last hour or two, going into the forums, and getting all of the problems done with almost no effort, reflection, or learning. Further probing into this perception of lurkers led to another online well-defined and recognized persona, that of the lazy thief.

Lazy Thieves

So prevalent was this form of lurker that it established a specific designation. A lazy thief is a student that, like a lurker, contributes little, if anything at all, to the forum discussions but goes farther by abusing the forums. Their abuse is using the forums in as minimal a form as possible with the only real intent of completing the assignment. They wait for others to do all of the work in creating and posting the solutions then log in, get the answers, finish their assignment without learning much of anything. This differs from other lurkers who truly attempt the problems on their own, only using the forums to get them past difficult spots, but do not contribute to the online community.

Isabel repeatedly pointed out that she noticed students she knew who behaved as lazy thieves were clueless when test days came around. She felt this offered some modicum of justice for their failure in actually learning the physics concepts. Kevin said he stopped posting straight solutions partly because of the lazy thieves.

The lazy thieves were seen to be the most serious flaw to the structure of the community and practically the only flaw in the blended class community. Students readily agreed that the benefits of the blended class greatly outweighed this problem and that this was still better than the traditional issue of cheating by merely copying someone else's paper. The reasoning being

that at least in WebAssign the lazy thief had to still work the problem using their own numbers and suffer any mistakes in calculations, unit conversions, or applying the solution (unless they had convinced someone else to do it for them as Kevin said he knew sometimes happened). Even with advanced high school students there is still a serious lack of studiousness on the part of several students. And what would be the demarcation between using the online community effectively and abusing it? Certainly it would be whether or not the student adequately learned the material. This leads to the importance of accurate assessment and not heavily weighting the homework assignment. How this behavior compares to college students and corporate learners in blended classes would be an interesting point of comparative research for future studies.

One possible solution to the lazy thieves is to carefully weight the online homework grade against the assessment. By judiciously determining a homework weight that insures it get done while weighting the assessment grade enough to make certain students know that they must understand the material to manage a passing grade in the class, the online forums could have the number of lazy thieves reduced. In fact, I did just this starting second semester in my classes. I shifted 5% of the grade from the online homework onto the assessment category. Though it is both too early to tell and not rigorously tested (it is my class after all and I am allowed to do this), this appears to have created a more accurate grade in representing what students have learned. Unfortunately, although the students have recognized what is happening, it seems that they are more resigned to this result than altering their behavior to meet the new challenge.

Socializing

According to students, the blended class greatly increased their socialization and was a primary joy for them. Much more than just an outside workspace, the forums allowed for a great extension of the traditional class that became a safe and familiar place to hang out. Combining

cooperation, goofing off, and mingling, the forums fostered and nourished an online community that fed back into the individual classes both for its academic purpose of learning physics and its real-life purpose of growing young adults.

Learning is social and as Masie (2006) stated, “Blended learning recognizes and aligns with the social dimensions of learning.” (p. 25). The online community is neither subordinate, separate, nor even derivative of the traditional classroom community. It is simultaneously independent and dependent, parallel, directing, and vibrant. To think that the online community is lesser than the traditional classroom community is a mistake. It is its own creature, in its own right. It has its own personality traits, its own dynamics, its own language, and even its own members as evidenced by the lurkers and lazy thieves. Many students behave differently in their online persona than in their ‘true’ in-class persona such as Celeste, Kevin, and Richard. Why is this? Anonymity prevalent in the online only class model does not apply here; the students see each other on a daily basis, so it cannot be that reason. Whatever the reason, socializing takes on a new perspective in the blended class. No longer are students expected to sit quietly, pay attention, take notes, and infrequently interact. It is now also an expectation that they get online and work together. Once they established the forums for working on problems they quickly turned to using the forums for pure social interaction as well.

Working within the very basic technology of the forums brought out a desire that the forums be upgraded to behave more like a MySpace (www.myspace.com) or Facebook (www.facebook.com) account. Students wanted to post pictures, play music, create avatars, add instant messaging, and put up “about me” sections. They *wanted* to interact more. However this didn’t stop them from pushing physics work aside and heading off on tangent conversations that included humor, good-natured insults, discussions about the presidential election, and whatever

else caught their attention. They were blowing off steam. Jen indicated the forums were a great place to relax, “we talk about ice cream, Vaults (a soda), stuff like that.” It was almost like an online water cooler at the office; built-in entertainment. Students could take a break whenever they wanted and they frequently did. As Mikalah said, “It’s fun...just to start a conversation with people...WebAssign is like their second MySpace.”

Inappropriate online behavior was kept in check mainly by the students. The maturity of the students meant they were mostly self-moderating and moderated others. Furthermore, it is reduced by the fact that students cannot edit their posts. They know they will get busted for a bad post and what was truly interesting is they felt safer in knowing that there would be no question as to guilt. Even if they gave their password and login ID to someone else, it was understood though never spoken that that lapse in security was their error and they were responsible for the consequences. This is likely because they have other online accounts and already know this. Only once did the teacher have to post a warning to avoid acronyms that included swear words which, in and of itself, is pretty tame.

Everyone agreed that their circle of friends increased due to the blended class community. Once again, cross-class communication introduced the students to people they had never met before even though they may have been in the same schools for years and even the same classes. These online meetings opened opportunities for more comfortable face-to-face introductions and communication.

Teacher

The forums allowed for students to essentially become peer tutors where they could help others while simultaneously developing their own knowledge and skills through explanation, practice, and reflection. Communication skills, math skills, teaching skills, and leadership skills

were all cultivated by their chosen role of teacher in the forums. Many students pointed out that they preferred this type of teaching to the classroom teacher. Explanations could be read and reread, clarifications asked for, and the level of the explanation was commonly viewed as being more on the level of the student. There was more depth and care given to the posted answers and Mikalah appreciated getting a “reinforced lesson... We can ask each other.” These teachers effectively created their own online classroom where students could come and go as they pleased, taking what they needed when they needed, and asking questions without being rushed or needing to fit it within strictures of a traditional classroom.

Richard and Kevin were the most prominent examples of teachers who also came onto the scene, unexpected by their peers. Before the blended class, no one mentioned ever having seen them as leaders, smart, or effective help in tutoring. In fact, Mikalah and Jen were clear in speaking of how surprised they were by the leadership roles they had taken on in the forums. They found Richard and Kevin intelligent, diligent, and a great help when they needed explanations and solutions. Richard was seen as being the lesser skilled of the two, but made up for it with tenacity and an unflappable resolve to listen to others when they informed him he had made errors in his explanations or was unclear and then going back and correcting his mistakes. These extra teachers, as Isabel astutely noted, made the necessity of getting the classroom teacher’s attention to return to going over concepts and problems a redundant exercise. The students knew the forums could replace this need, possibly even supplanting it. Kevin, though he seemed unaware of it, had developed a teaching methodology. This was a remarkable discovery; something the researcher should have anticipated but didn’t. This may well be the first truly reflective teaching in the lives of the students, well beyond simply trying to answer their friends’ questions.

Student

The forums extended the blended class allowing students to continue their primary concern in regards to the class of just being a student, aspiring for a grade and knowledge; usually in that order. However, how they went about being a student was not the same in the blended class as in the traditional class. Now they had the ability to really sit down and collaborate and work with their classmates in an amazingly easy fashion. Suddenly, communication, interaction, knowledge, socialization, learning, reflection, and time spent exploded like it never had before for them. At first they did not know what they had; several commented that initially the forums just sat there unused until a few bold souls stepped forward and sampled the forum's possibilities. After that there was no turning back and all of the interviewees unanimously exclaimed that the idea of now losing the use of the forums was a cause for great distress. Essentially, their cry was, "How could we learn without the forums?" A daring statement indeed, denoting a complete acceptance and realization of the strength of the forums. To be sure, there is abuse of the forums going on, but it must be remembered that this question was asked of the interviewees—students selected specifically for their prominence in and proper usage of the forums. They could not imagine going back to a traditional classroom environment or even what this AP class would have been like if the forums had never been available. It was interesting. They behaved as if their eyes had been opened to a possibility they had never considered and shuddered at the thought of going back.

Being a student was easier now and more productive but, as with most opportunities, they had to walk through the opened door. No longer were they doing their homework by themselves, they were a part of a cross-class community. Asking questions came without hesitation and there was less fear of looking stupid. They were comfortable. Joseph listed the positives for the online

student in ease of access, being able to focus, learning from mistakes, and straightforward help from classmates.

To what extent is the blended class allowing students to create and manage this community?

The second research question probed the extent to which students could create and manage this extended community. Though there was change in the amount and depth of interaction between students in the traditional classroom setting ranging from just becoming aware of the greater cross-class classmates to becoming good friends, the majority of the creation and management of the community occurred in the online realm. This was not a surprising result since the traditional classroom setting was familiar and for the most part fixed in its daily activities. In contrast, the online part of the blended class was new, had little teacher influence, and was for all purposes a blank slate waiting to be drawn on. The students took to the task with relish and went through several pains and successes as they developed the early community.

Early Community Formation

The obvious initial confusion for students in learning the capabilities and limitations of a blended class are to be expected at this age since the vast majority or even all of them have never experienced a blended class before. This means that the students need some introduction and training for the blended class style and what behaviors are permissible and which are not. For example, teaching students to not simply post solutions but rather post explanations or post solutions with explanations. Another topic to teach would be online etiquette. Though many are already familiar with some online etiquette from their other online experiences through personal interest forums, MySpace, Facebook, and instant messaging, many are not and many more are not familiar with how their behavior needs to be altered from a public or semi-public online setting to an online school setting. I had to post once to the students about not using acronyms

that include profanity such as “omfg” (oh my fucking God) because some students had not been convinced by their peers that such acronyms were inappropriate. Therefore, students are performing self assessment and are self moderating their online environment. They keep each other in line with their comments and will manipulate (not necessarily in a bad way) and try to guide the behaviors of others.

Probably the most striking aspect of this blended class was that the online community was a purely student-centered community. It was not just an extension of the traditional class; it was also its opposite by not centering on the teacher. Indeed, the teacher was only present twice in the forums: once to post an introduction to the forums at the beginning of the year and once to remind them about what constituted an inappropriate post. Because the community was student-centered, it allowed for greater collaboration and increased opportunity for the student community to develop as the students directed. The more opportunities and time that students had to engage each other in both socialization and learning, the stronger the in-class community became. This was evidenced by statements from students saying they now know more students in the class and are not as shy around them now. Despite great differences from an online environment, the social aspects of the traditional classroom community are largely the same.

The students were initially unsure what to do with the forums. Many pointed out that no one posted at first because no one knew what would happen. That quickly changed, literally within two weeks of the online class' availability. Once students saw that posting a question was an easy and effective way of communicating and learning there was no holding them back. Isabel spoke of how the students went from waiting for someone else to post before saying anything to having no apprehension in posting their own questions. This boldness echoed back into the traditional class setting helping to build community among students as they more readily

recognized each other from the online community. The ice had already been broken in what they saw as a safe environment.

Students also brought with them their bag of communication tools learned and honed in their other online activities such as blogs, instant messaging, MySpace, and Facebook. Emoticons to help clarify emotions and attitudes, caps lock for emphasis and yelling, “LOL” (laugh out loud) and “ROFL” (rolling on the floor laughing) acronyms among others, and even the use of HTML coding to enhance understanding in their posts were immediately and naturally adopted for the forums. This soon developed into students suggesting and debating the creation of rules (that appeared to end up being adopted for the most part) for posting such as only posting one solution per thread, keeping socializing in separate threads from solutions, and only one question per post. Efficiency developed from student guidance.

In this environment, many of the students themselves became more active than they were in class. Isabel, Richard, Kevin, and Mikalah were primary examples of students who behaved in a reserved, sometimes quiet and shy manner in class, but made a complete turn-around in the forums. Once they had established a more outgoing personality within the forums, they became more outgoing in class. This seemed due to two occurrences: they knew their classmates better and were more comfortable opening up to them and their peers had expectations that the person they met online should be more like that person in real life. The friendship that developed between Isabel and Richard was a primary example as well as Kevin’s newfound popularity.

Early Community Frustration

Establishing the community led to frustration during the process of developing the boundaries of the online community as well as how it would dovetail with the traditional classroom community. Many students spoke of the initial confusion and building that was

necessary in discovering what the forums were capable of, what they themselves could do, and could not do. Surprisingly, this confusion did not include the actual online homework arena. The physics problems themselves continued to be a point of confusion and angst, but that was alleviated by the presence and activity in the forums and, simply, a part of the AP Physics class. Granted, it is a simple interface of presenting a problem with a single input box for the answer. Students input their answer (guess), click “Submit,” and the computer immediately tells them if they got the problem right (with a green check mark on the screen) or wrong (with a red “X”). Students quickly focused on the portion of the community in the forums, experimenting, testing, and discovering. Though they could certainly have used more guidance in helping them along, this was not necessary and by the teacher not offering help, merely observing to see if help was truly needed, they gained valuable experience in the genuine novelty of the situation. During the interviews, it was obvious they felt a sense of pride and accomplishment in being given the reins and told the rest was up to them. I got the distinct impression that this rarely happened for them—and they loved it.

Another point of frustration was the same problem experienced in asynchronous communication: students miss out on visual cues, body language, voice inflection, etc. when posting online. Misunderstandings occur, feelings get unintentionally hurt, and clarification is often not asked for because they don’t realize they are misreading the other person’s post and what they intended with it. But, and this cannot be stressed enough, *the blended classroom students have the opportunity to rectify the online misunderstandings when they meet in class and they frequently do!* This allows for a socially self-correcting environment not possible with an online only class and even, paradoxically, increased friendships through the misunderstandings. It is one outcome to feel you were disrespected when you were and another

entirely to discover it was a misunderstanding. Not unlike the two kids who have a fight and end up best friends.

Other points of frustration included the realization of lurkers which was not really more than disappointing to many. The acknowledgment of lazy thieves generated strong feelings and even action in one case on the part of Kevin limiting his posting of solutions. Since these issues have already been addressed, they will not be revisited here other than to point out that their appearance occurred concurrently with the formation of the community.

Community Stabilization

The lack of a meaningful response to the follow up interview question “had anything happened that stood out in their memory since the last time we interviewed” indicated that things had stabilized and were operating in a way that students expected. The stabilization of the blended class community was a wonderful culmination for the students. In-class behaviors of friendship and being comfortable with each other, even across classes, became the standard fare. Students became less concerned about missing or not understanding concepts at the fast pace the teacher covered them in class. This was a new and welcome phenomenon for them as they could feel safe in the knowledge that their questions and confusion could be satisfied later at leisure in the forums. There was no more “teacher teaches, you listen, you do your homework” situation as Celeste put it. The community became a tremendous and reliable support group. Students worked together diligently albeit sporadically with the majority of the posts occurring a few days before the assignment’s due date. In fact, this pattern was so ingrained that many students mentioned that they would not even get onto the forums until a few days before the due date.

Socialization posts were now common, as students frequently took breaks from their work to tell jokes, talk politics, be annoying, and wander aimlessly through the forums. The

socializing made it easier to ask questions that students might not normally ask for fear of being seen as stupid. Mikalah called it “their second MySpace...you get the best of both worlds.”

That’s a powerful comparison given the popularity of MySpace. This is not to be overlooked—the blended class has fused education and socialization. Education and social skills are the primary and simultaneous goals of schools but education is stressed. It is a school after all and students are certainly not assessed as rigorously on their developing social skills as they are their curriculum. That can now change. The traditional classroom has remained the primary tool of education with socialization as almost an aftereffect. Now the blended classroom has become the merchant of both. Several students mentioned knowing many more students now due solely to the blended class. One odd socialization item that occurred and the students noticed was, effectively, a “sacred cow” in the forums. No one belittled anyone else for confusion or questions related to the physics. Poor spelling, bad grammar, not noticing a unit conversion, and just about any other errors were fair game for open and public derision *but not the actual physics*.

Why? There is something unspoken, sacrosanct about this. It’s odd. Without doubt there are students who do understand the physics and could demean others. But everyone realizes that at some point there was some problem that they could not do maybe even in another class entirely and that creates a commonality. Likely it’s that all of them recognize and empathize with being in those very same ignorant, confused shoes. So they have been there; walked in those shoes and it is not a fond memory. The other mistakes that students do make fun of each other about are all mistakes so trivial (at their intellectual level) that it points to carelessness, not ignorance.

Carelessness is not a fault of intellect; it is a fault of observation, of paying attention to what one is doing and to them that *is* worthy of rebuke.

Community Strengths

The community displayed several strengths. Common among these was the ability to ask questions within the community and get explanations that were given by students and therefore on the level of the students. In simple words, it greatly increased communication. All of the students interviewed believed that the blended class community made it possible for them to learn more physics, however not all were convinced that the possibility became a reality. When students did collaborate and reflect on their assignments, it was believed it was always to their benefit. The lessons were reinforced because of the interaction in the online community whether they actively or passively participated. Passive participation is the important and the new result here. Surely active participation increases learning and the passive activity of, to at least some degree, being a lurker is also beneficial. This is somewhat akin to reading the textbook but in this case, they are reading the written teachings of their peers. Community support was ever present so the class was ever present, a definite advantage over sitting alone at a desk at home or for the student that is out sick for days. This support, as Kevin said, made it so that “the physics just keeps going after school.” The class was more convenient.

Isabel and Mikalah contributed their success in physics to the community. Without it they felt they stood no chance of truly learning physics. For others, they believed the class created bonds because other students also recognized they were in a sink or swim situation and the only way to swim was by helping each other. From these bonds of community came academic success where otherwise there would have been none. The bonds increased friendships which in turn generated a more relaxed attitude about their first AP class.

Community Weaknesses

The greatest benefit of the blended class, increased, effective, and easy communication, also gave rise to its greatest weakness. Students could get all of the answers and do almost nothing. All they had to do was wait until the assignment was almost due, log in, look up the solutions they needed, plug in their answers, and be done, never contributing a thing. The interviewees and the class were also aware that it was always the same students in the forums. There was little reflection, little learning, a lot of procrastination, and it, at least, showed up on their assessment grade. Though there was at least that repercussion, it still avoids the issue—students are there primarily to learn physics. Students claimed they could get the work done in anywhere from two hours to 20 minutes before the due time. In fact, I once decided to move up the evening due time, which was normally 11 o'clock, by one hour to 10 o'clock. I actually had at least a dozen students that complained to me that they did not complete their assignment on time because they logged in after the due time. There were certainly more who said nothing to me. I have not come up with a tenable solution to this and neither have the students. Kevin suggested placing a short physics quiz that acted like a password to get into the forums. This is an interesting idea of enforced reflection that would likely require a good deal of experimentation and review to see if it actually helped. Another possible solution to the procrastination is for the assignments to be broken up into smaller assignments with a smaller window in which to complete it. Instead of one assignment due every week to week and a half, have it be three to five problems each with a couple of days to complete them. Logistically this would likely be a nightmare since it requires a much more structured set of lesson plans, uninterrupted by assemblies, emergency drills, standardized testing, etc. that allows the teacher to cover the material that pertains to the current assignment. Personally I did try this when I first

started using WebAssign and it just did not work for me. It was too difficult to get everything covered in a timely fashion so I fell back to one assignment per chapter with at least a week to complete it. Students can get a head start if they like and some do; but most wait until the last minute.

Another weakness of the community is that it is not inclusive of all students. Some are just not comfortable posting online, some are lurkers, and some are just lazy thieves. Preferably, the blended class encourages and develops the communication skills of all students, but it is hard for this to be achieved if they don't participate. One solution is to make a predetermined number of meaningful posts by each student a requirement. I have seen this done before in college classes with mixed results. Some of the freedom of the blended class is lost with this requirement. Some students do not like being forced to participate in the online community. Students are confused on what constitutes a meaningful post. This also requires a great deal of tracking by the teacher. Even if the number of posts is easily tracked by the computer, the computer cannot discern between a meaningful post and a meaningless one, requiring the teacher to read a lot of posts, particularly if it's a prolific class. This does not strike me as a tenable solution. Another possibility is to display the number of posts by each person and associate a displayed title with it such as "Forum Leader" or "Forum Beginner." It may sound silly, but students will increase their posts—some lame and some not— simply to see the number of their posts go up and their online title change. This carrot would not appeal to all students, but it would be interesting to see how many would bite and to what extent. Truthfully, *I* have added posts to online forums for just such a reason.

The final research question (how does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class?)

investigated the comparisons between the blended class community and the traditional class community. Extension was the predominant theme. Students saw the blended class as a wonderful and now necessary extension of the traditional class. The strength of these feelings should not be missed or underestimated. Students were literally horrified at the thought of reverting to the traditional class setting. They felt the blended class was what college would be like and that this was the future of education. It was just that the K-12 teachers and the technology had yet to come together. This means that they definitely assume that college classes are *not* like the traditional class model and one student, Richard, stated that his college-attending sister verified this belief.

How does the blended secondary science physics class community compare to the communities of a traditional secondary science physics class?

Expanding the Traditional Classroom Community

The blended class community greatly expanded the traditional classroom community, extending well beyond the classroom itself. According to all of the interviewees, students collaborated much more, socialized much more, made cross-class friends, and had more fun than in their other, traditional, classes. Not only were the forums responsible for this, but the blended class itself. Students received unique numbers in their assigned problems and were encouraged to work together, a fact that the students noted as completely opposite of the traditional class experience. The forums were the media, the place, for the collaboration, socialization, and reflection. Students realized that, as a result, they weren't as shy, they got better at asking for help and asking questions, they got better at explaining things, and they were more assured of a positive outcome. Asking a question was also no longer a matter of asking the teacher—it was almost exclusively asking their peers. Explanations came at their level, not the teacher's.

Such interactions laid the foundations for more bonds between students, both within their own class and with students from other classes. This was universal among the students. They all saw their circle of friends and acquaintances grow and were glad of it. Everyone was closer to each other. This was a group of almost 80 students—about 10 percent of the junior class. It's possible this one blended class affected the entire social structure of the junior class. Imagine the affect of more blended classes at each grade level. This may well reduce social strife, cliques, fear of others, and even bullying and violence. Certainly a thought worth investigation.

Possible Problems

The blended class did come with its own problems compared to the traditional class. These problems were considered by all of the students involved in the study to be secondary to the benefits provide by the blended class. Ease of access to answers that in turn required little learning on the part of the students was the greatest problem. Mikalah's valid and astute observation that one student could end up doing the work for many because of the forums was echoed by others such as Kevin who *did* feel like he had ended up doing the work for many and ceased doing just that. Unfortunately, the only solutions the students could come up with effectively eliminate the forums, creating a domino effect that they believed would do more harm than good. In fact, Isabel voiced just such a fear stating that teachers sometimes take away good things due to the abuse of a few. Removing the forums might alleviate this problem, but I agree that it would do more harm than good. The solutions to all of the book problems can still be found by simply copying and pasting the first sentence of the problem into Google. All socialization and collaboration gained by the blended class would be lost and everyone would be tempted to become a lazy thief. There would be no more pride in posting answers and the joy of helping out their classmates. There would also not be the change in perception of their

classmates such as everyone seeing Kevin as one of the smartest physics students instead of just the shy, quiet kid or Richard as the outspoken, smart, clown.

Less serious and, to be honest, a humorous side-effect to the forums arose: spam and lots of it. In this instance, students referred to spam not as unwanted commercial emails but rather numerous off-topic or silly postings. On the one hand, students becoming so comfortable with the forums that they began to use it as a playground as well was a great testament to its acceptance with the students. However, the students noted that it was very distracting when it occurred in unwelcome places. Students were aggravated and annoyed when a serious post on a solution would get hijacked onto some inane topic or meandering and they would have to then sift through garbage looking for the help they needed. In at least one instance a fake thread title led students to believe that all of the answers could be found just behind that hyper-text link. Upon clicking on it, they were greeted with a rude surprise—no solutions, just a “gotcha!” Unsurprisingly, this was Richard who had previously expressed displeasure at people who simply farmed the forums for solutions. This may well have been his attempt at getting back at these people by disappointing them. One student suggested setting up a separate area for such mindless socialization. From reviewing the posts, I doubt this would work. Most of the spam posts are interwoven with the problems and I think this is intentional, though subconscious, to reduce stress and keep the forums alive and not stoic. However, it would be a simple matter of creating a separate forum labeled “Spam/Socializing” and see how the students use it and how it changes the forums used for the physics problems.

Reflection

Reflection was greatly expanded by the forums. Students could easily return to and review the material both by themselves and with the help of others. The online component

provided this in two ways: first, it initially provided a revisiting of what was taught in class and, secondly, it provides a permanent discussion of what happened in class, becoming its own teacher. This revisiting is precisely the reflection typically found in the blended class (Bean, 2002) and also made it cross-class reflection.

Many students find the ease of collecting answers a great benefit, but they seem to readily admit that there is little to no reflection on the problems and what physics concepts they are meant to illustrate. Although reflection is practically guaranteed, there may well be much less than the traditional class generates because removing the forums would require students to get help another way (by their book or the Internet, for example) which may in fact be better. This could be a serious flaw in this type of asynchronous learning environment. On the other hand, eliminating the forums may do nothing more than emphasize the digital divide between students proficient at online socializing and research as they create their own asynchronous learning environment or research problem solutions on the internet and the non-proficient student who sits at their computer alone and frustrated. In the blended class, reflection is continually successful; the students had a great deal of confidence in it. Isabel and Mikalah felt the success of the class was even dependent on the opportunity for reflection in the forums. They, and the others, found much more reflection possible in the blended class compared to the traditional class and it was a more useful and meaningful reflection.

Traditional Classroom Community

In general, there were other comparisons between the blended and traditional classes that the students made. The differences in the way in which students worked together were repeated frequently. Students simply have a much harder time working together in the traditional class than in the blended class. The degree to which this was true was a revelation to me. I did not

realize the struggle students went through to get help outside of class and I doubt other teachers do too. In fact, I now wonder if online forums should be more of a requirement for all classes. This would be problematic at least from the standpoint of policing the forums, but the benefits may well outweigh such troubles. Students articulated several issues that hampered their attempts at outside communication. Study groups were hard to come by, requiring a willing host and a fair amount of organization. Phone calls required a number, in some cases good reception, free time on the caller's part and from whom you were calling, relied on them actually knowing the answer, *and* their ability to explain it. While this may sound trivial it was not. Each of these issues were described as very real situations that occurred on a regular basis for the students' other traditional classes. Even when students were given the opportunity to work together in other classes, it still did not compare to the blended class' forums. As Richard so succinctly said about these groups, "Yuck." Harry pointed out that "you don't have to be right next to someone to get help." The blended class fixed all of these issues.

Does It Help Students Learn?

Although this study did not focus on determining if the blended class model helped students learn physics, this researcher came away with some distinct impressions based on eight years of being a blended class instructor, 19 years as a physics teacher, and this study. Online homework has been used in various fashions for years now (Allain & Williams, 2006; Bonham, Beichner, & Deardorff, 2001) and the small amount of research that can be found on its ability to increase student learning is not optimistic. Studies done by Allain and Williams (2006), Bonham, et al. (2001), Griggs (2000), and Sandberg (2001) all indicated no significant difference in student learning between classes using online homework and in-class homework. The first two studies looked at college physics classes, the next a college calculus class, and the last a college

chemistry class. This researcher, unfortunately, had the same feeling: online homework is a huge benefit for students to develop socialization and collaboration skills and to prepare them for future blended classes in college and/or the corporate world, but it does not help them learn physics. As for the teacher, if the online homework is not harmful to the student's learning, it should definitely be used because it is a tremendous savings of time and effort. It should definitely be used because the students greatly enjoy it over traditional homework. It should definitely be used because when it is coupled with online forums it has the ability to transform the social lives of students in numerous positive ways. The educational benefit here is not in knowledge, it is in living. That alone is the greater good. A teacher of a general education class is concerned first with their students becoming better people and secondly with them becoming better scholars. Yet, there appears to be an aspect of comparing the online homework to traditional homework and its effect on learning course content that has barely been examined.

Only one study, Allain's and Williams' (2006), compared classes in which one class had no graded homework. The rest of the studies had all of the homework graded, both online and in-class. Meaning, in the rest of the studies, the students *knew* their effort on homework would affect their course grade. This was interesting. Apparently students performed equally well whether homework constituted a part of their grade or not. Granted, one study is not enough for a generalization, but it does raise a question about the efficacy of homework in college. Does it really have an effect at all and what would be discovered in a high school setting?

Future Research

This study offered up many new questions about the high school blended class and not just in science. These questions will be presented and briefly discussed here.

One interesting question would be discovering if the students would initiate their own forums on a free site if the forums were taken away or if they are now more inclined to create forums for other classes. Many claimed that they would, especially now that they have experienced the power of the blended class. But saying they would and actually doing it are two different things. Would the benefits be worth the, to be honest, small amount of time and effort needed to create an online forum at one of the free forum-hosting websites? How well would they spread the word about its existence and would it be a problem having forums that were not inextricably linked to the online homework website? Would it be as organized and would it have more freedom since it is wholly outside of school control? Might that lack of supervision become a serious problem? The news has recently shown us in the MySpace community where three students cyber-bullied another student so viciously that the child committed suicide. What protections must follow the online portion of the blended class?

Peer pressure is an issue; for example, a fear of looking stupid extends into the forums just like a regular classroom. Is this peer pressure evident in the arenas where most of the research on blended learning is done: the higher education and corporate worlds? If so, then to what extent? Are there other issues that transfer between these three arenas and some that don't? What are these issues and why do some cross over and some do not?

Students' feelings as to whether the blended class helped them to learn more, less, or the same amount of physics seemed dependent on how the students used the forums instead of the forums themselves. If a student used the forums in the way they were meant to be used, they reported them as helpful. Jen, for example, stated that she often used them to just get answers and this in turn hurt her learning physics. This indicates a form of static forum rather than a dynamic forum in which the student constructs the usefulness of the forum out of their own

experiences with it and needs of it and *not* how the forums act. The view depends on the student's actions in the forums not what the forums present to the students. In a word, accountability. A question for future research would be "How can an online forum be designed to help insure that students use it in a beneficial fashion rather than a crutch for answers?"

None of the students participating in the study reported ever having been in a blended class before. Also, none of the students preferred the traditional class to the blended class. This practically begs a quantitative study based on questionnaires to ascertain specific student likes, dislikes, and general attitudes toward the blended classroom model, including in which classes it is most effective and least effective in the eyes of the students. All of the interviewees demonstrated great concern and distress over the possibility of losing the online community. It was actually almost funny. I learned after the first two interviews that I had to preface my question, "How would you feel if I took away the forums?" with a statement that the question I was about to ask was purely hypothetical and I was *not* going to shut down the forums because the reaction from the first two students was outright panic and fear. Now, was this response due to the loss of all of the positive benefits of the blended class or was it the realization that they would have to work much harder to finish their homework now? Undoubtedly both and it would be interesting to determine which answer holds the greater weight with future research.

What can be done about the lazy thieves? A possible solution is a judicious decision on the part of the teacher to reduce the grading weight for the online class and increase the weight of assessment to better ascertain what students learn versus what they merely plug and chug from equations posted on the forums. (I did just this in my classes.) The blended class does *not* solve the issues of student disinterest, distraction, and avoidance of truly studying. It does reduce all of these however and that *is* remarkable and worthy enough on its own to warrant serious further

research into honing a blended class model, methodology, and design for the current and future high school.

It must be stressed that this class was blended in two primary ways: the online forums and the online homework. Though the two are used together in the class, it is not necessary to have the forums to do the homework. Therefore, removal of the forums would alter the blended class but would not stop the class from being blended. In this case, the two compliment each other quite well according to the students, but there is at least one serious issue in this pairing: students can easily use the forums to make completing the work an exercise instead of a learning exercise. Although the students agree that the online homework is a significantly better method of doing homework and does, for the most part, insure that there is much less cheating (such as simply copying someone's paper as is done in the traditional class setting), they readily admit and recognize that the forums cloud the issue. Students expressed concern several times that they can get the homework done and learn little to nothing by using the forums. It comes down to a personal matter: do they just want to get the homework done or do they want to learn? All agreed that the forums amply provide the opportunity to learn more physics by having their peers as teachers. The potential benefit of the forums is clear, but that benefit can simultaneously be negated by those same forums. Another possible solution is that the teacher requires that solutions must be accompanied by an explanation of the solution. Though this may be a minimal gain it at least helps to guarantee more reflection and exposure to the lesson on the part of the reader. To be certain, there are repercussions of being the lazy thief. Assessments will likely demonstrate the student's mastery or failure of the material. What can be done to reduce the lurkers but especially the lazy thieves?

Many students feel that this class is much closer to a college class. Odd, perhaps, that they have that expectation or perhaps they have somehow almost all heard that blended classes are common in college. Many do have older siblings and friends in college who describe what their college classes are like. Many see this blended class as a stepping stone to college, turning an AP course closer to an actual college course. They recognize and appreciate this opportunity. Would other non-AP classes that were converted to blended classes make the students feel that the class was more serious, more like a college class?

The blended class allowed for students to create and manage their community to a great extent. Part of this was due to little, if any, input or direction from the teacher. The students in these classes were intelligent and work-focused. That likely contributed a great deal to the success of the forums as well as the previous experience that students had with online environments from such sources as Facebook, MySpace, chatting, and blogging. At what age and or maturity/ability level can students be given online forums with little teacher supervision? If they were given forums at an earlier grade level, would that adequately prepare them for less supervision in the forums as they got older?

Typically, the gifted and non-gifted students are separated due to state financial mandates for gifted classes. This results in gifted students being isolated with other gifted students as they all have the same classes. Several students (Celeste, Mikalah, Richard) spoke about the forums breaking down barriers between the gifted and non-gifted classes because now they were interacting online with everyone in the AP Physics classes, both gifted and non-gifted. This resulted in new friendships that they readily admitted did not happen in their traditional classes because of the inherent segregation. Each of the students that mentioned this was grateful for this

aspect of the blended class. What effect does the blended class have on mainstreaming students back together that are separated by intellectual ability?

An important question for future study would be the differences between two AP Physics classes where both are given WebAssign but only one class is given forums to use. What will happen to the amount and depth of physics learned between the two classes? Who will learn more? If this study is any indication, the class without the forums will perceive themselves as disadvantaged, but will this truly be the case in regards to learning? Will the class using the forums gain an overall more important set of life skills: the ability to communicate and work effectively within a large group?

What we may be seeing with these online communities of students discussing physics is a new rendering of the collective brain. For example, there is the case of when Einstein was a student in Germany and he and his physicist friends would regularly gather at the local bar to discuss physics for hours on end. The young Impressionist painters similarly congregated in the cafés of Paris and Benjamin Franklin's Junto society debated morals, politics, and natural philosophy. These online communities may be providing an analogous situation. How far can this community go? To what extent could it flourish? Should high schools create school-wide forums that stay in place for years and follow the students throughout their schooling? Should this develop into a true virtual reality environment that supplements the actual high school? Would the increased interaction between students, the hallmark of this study, reduce fear, loneliness, cliques, prejudice, racism, etc?

Another primary question of concern that demands further investigation is: do the online forums do more good than harm? Many students (Isabel, Jen, etc.) indicated that the primary detriment to the online forums was the ability to get answers quickly and easily and end up

learning little to nothing about physics. Granted, this was a personal choice on the part of the student using the forum, but the opportunity for abuse is large. As Isabel pointed out, “this is so evident when students finish WebAssign with a one hundred but get an extremely low free response grade and are left feeling confused.” What can be done to reduce or eliminate this very real problem? Can it be? None of the students had a solution and several pointed out that all systems, no matter how useful or well planned, have “flaws.”

A difficult question to answer is how to bring more students into active membership within the community, to stop being lurkers, without forcing the requirement. Forcing them may well reduce the feeling of freedom and democracy that are pillars and hallmarks of the online community and be detrimental to the online community. Future research should examine the effects of forced membership.

WebAssign literally records every click when a student is logged in. Data is permanently stored so that a teacher can examine several years’ worth of student work in WebAssign. The IP address, every answer they submit both incorrect and correct, the number of minutes they are logged in, and the date and time at which they do all of this. Because of the tremendous amount of quantitative data automatically stored by WebAssign, the blended class practically begs for a quantitative study to supplement the findings here. Who are the lurkers? How many are lurkers? What about the number of lazy thieves? Hard data is there and ready to shed light onto the musings and suspicions that were laid out by the students in this study.

Although it is readily apparent that the online forums are considered a great benefit by students, there are still hurdles to overcome. Teachers must be trained in their use, how to design and implement them so they are effective, etc. In addition, there can be administrative hurdles. In Gwinnett County, the Board of Education guidelines stipulate that all forum posts must first be

read and approved by the teacher before going live. This can be a daunting, time-consuming task that truly lengthens the response time. In truth, this would be a strong reason for teachers to not even attempt forums at all, merely leaving them to the initiative of motivated students to create them at a free forum-hosting website such as www.forumer.com or www.makeforum.org. This eliminates the ability of the teacher to design and guide the forums at all. A great area for study would be determining the importance of teacher design, presence, and guidance in the effective use of class forums. Perhaps students would create and shape it better.

Conclusion

The high school blended class is a quite different class than what is reported in the higher education and corporate blended classes. Unsurprisingly, there is a great deal more immaturity in the high school blended class. That issue, though important, pales in comparison to the opportunity for growth and radically changing the landscape of the modern high school. Students readily accepted and enjoyed the social freedom and ongoing interaction that the blended class offered and became firm believers in its promise. Though recognizing the abuses present in this blended class, particularly of the lazy thieves, they could not dream of going back to a traditional classroom model in the AP Physics class and openly desired that their other classes were blended as well. Variety and breadth of more than just physics knowledge was important to the students. In a safe and open environment with little teacher control, they enjoy hearing more of what others are saying—it is *their* forum and they rule it with a democratic and hopeful hand. The primary reason for this was the love of the community that developed solely due to blended class and the use of the forums as an open and safe meeting place. It became an open school, without walls, and little in the way of rules. The students designed and lived in their own community.

What K-12 educators must come to recognize is the power and opportunity of the blended classes' parallel communities.

The challenge at this point becomes to change the blended class not by reverting but by converting it to minimize its revealed deficiencies and maximize its benefits. Jen probably stated it best

Altogether though, there are some people who post on the forums to actually help out, some who watch the forums only for help, some who post for entertainment and to be funny or liked, and then some who do a little bit of all of it, but it all comes together in the end, it all makes what we consider the forums, to be the forums. [first interview]

It is likely time for researchers in education to cease discussing the differences involved in face-to-face communities and asynchronous communities from the stance that the asynchronous community is secondary or inferior to the face-to-face community. It is not inferior, it is different, with its own traits, foibles, and idiosyncrasies. Many report on the imperfect nature of the asynchronous community but do not comment with an equally critical eye on the face-to-face community. Imperfect does not (imply or) mean inferior. In this case, it is merely different and needs to be treated as such. In fact, new research needs to be conducted that treats the asynchronous community with the same depth and analysis as the face-to-face community has received for decades. The time has come, indeed, it is overdue. The technology has not waited and will never wait for researchers to play catch-up.

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Appendices

Appendix A

Interview Questions for the First Interview

- 1) What are the characteristics of the student community formed in the secondary blended learning class?
 - a) Start by explaining to the interviewee what a blended class and a classroom community are. A blended class is a traditional classroom that has a significant technology-based component added to it. The classroom community is the interaction and behaviors between students, their peers, and the technology in any fashion, not necessarily just educational. Many students in my blended learning class have talked about a feeling of community from their working together. How would you describe our class to a friend who goes to another school? (be prepared to probe ideas, particularly those related to the blended classroom) Can you tell me how you think our class environment compares to one of your other classes? (maybe have them describe a couple of classes; be prepared to follow up on the things students say, particularly those that provide insight into the blended classroom experience)
 - b) Do you work with other people in this class? If so, how do you interact with them? If not, why not? How do you work on class work with your peers in other classes?
 - c) How would you describe the forums to someone who is not in our class? When you first started using the forum, what did you think of it?
 - d) Now that you have had some time to work with the forum, what do you think of it? What would you tell a friend about how the forum is useful or helps you?
 - e) Have you talked with others in the class about our forums? If so, what do you think they think of the forums? Do you think they think the forums are helpful? If so, how? If not,

why not? If you were going to create your own forum what would you include in it? Why would you include those things?

Did their impression change over time?

- f) In what ways did your ability to interact and work with other students change compared to traditional classes?
- 2) To what extent is the blended class allowing students to create and manage this community?
- a) To what extent do you see students helping each other and working together in this class compared to your other classes? Can you give me examples of what you've seen?
 - b) What changes did you see in how the forums were being used?
 - c) What changes, if any, have you seen in the blended classroom helping students to work together? For example, are some students working together that you wouldn't expect to work together?
 - d) What were the online forums like?
 - i) What did you like about the online forums? Why did you like these aspects of the forums?
 - ii) What would you like to change about the online forums? Why would you make these changes?
 - e) How do you normally use the forums? What do you normally do in the forums? (What role do you play?)
 - f) How do you see other people using the forums?
 - g) Who do you think plays a role in shaping the discussions on the forums?
 - h) What kinds of roles do you see other people take on in the forums?

- 3) How does our class community compare to the communities in other science classes?
 - a) How do the classroom dynamics (interaction?) compare to the online class dynamics (interaction)? What differences do you find? What similarities?
 - b) Did the blended class setup help you to work with others and how?
 - i) Did this help or harm your personal work habits and how?
 - c) Aspects of community behavior: What effect do you feel this form of blended class has on:
 - i) How well you learn physics? How well others learn physics?
 - ii) Cheating?
 - iii) Competition?
 - iv) Students working together?
 - v) Procrastination?
 - vi) Late work?

Appendix B

Online Group Interview Questions

- 1) Has WebAssign changed the way you interact with your classmates in completing assignments/working together? In what ways? Can you think of particular instances of working together? How did they help you or were they helpful to you?
- 2) How do you use the online forums? Just to get answers (lurker)? To help others? To socialize and do physics? What role do you play? What role do you feel others play (don't name names, please.)?
- 3) Do you do things that you feel shape or direct the forums? What about others?
- 4) Would you prefer more classes to follow the blended class model and why or why not?

Appendix C

Interview Questions for the Second Interview

- 1) Regarding the first research question:
 - a) Have you experienced anything since we last talked that you would like to say about the blended class?
 - b) Do you feel the online discussions are more or less impersonal than the classroom? Why?
 - c) What do you get out of the community interactions? Is it just to get answers?
 - d) Are you more comfortable with asking a question, like how to do a problem, if the teacher is on the forums? Why?
 - e) Do you feel you have learned more physics, less physics, or about the same than if the class did not have the forums? What about others?
 - f) Do you feel coming into this AP class and not having the forums would have made the class harder? What would you have done about it?
 - g) Have you run across anyone who doesn't like the forums? What don't they like about it?
 - h) Which do you prefer: the online or in-class discussions and why?
 - i) Are there social aspects that you rely on the forums for or do you wait and do your socializing in person?
- 2) Do you rely on the community to a great extent? Would you prefer this class with or without the online community? Why?

- a) Would you want the forums to change in some way so that others have to do more “work” to get the answers? Or do you feel that this is still better than traditional homework?
- b) Do you feel the class is more enjoyable with the forums? Why or why not?
- c) Do you feel a greater connection to your classmates, both in class, from the other physics B classes, and in the forums due to the online part of the class? In what ways?
- d) One student suggested adding the ability to “ghost-post” which means being able to post a question where only the teacher would know the identity of the poster. The idea is they can post a question that they are afraid of being seen as a “stupid” question. What do you think of this? Do you think this would help or hurt the way people interact?
- e) Some students report that they feel “safer” because the forums are available. What do you think this means?
- f) What is the BEST thing you’ve seen happen between students in our classes? Was it from the online component or in class?
- g) What is the WORST thing you’ve seen happen between students in our classes? Was it from the online component or in class?
- h) What’s your impression: the forums are used more for socializing or for physics? Why?
- i) Can you describe a friendship that has been created or has progressed/developed because of the forums? Someone you may have not known very well prior to this class?

- j) Have you helped out other students with the homework either in class or in the forums? How does it make you feel? Which do you prefer to do and why?
- 3) Have you changed your feelings on if the forums make cheating easier? Do you feel this affects the feeling of community among students? How does it compare to the traditional cheating of copying someone's paper?
- a) Do you feel the community helps you to be more or less responsible in your schoolwork? Why or why not?
 - b) In the previous interview, you had said you would really dislike it if the forums weren't there. Can you elaborate more on what effect it would have on you personally, BESIDES the effect it would have on you completing your work?
 - c) Do you feel the online community has a different set of morals or work ethic than a traditional class? In what way?
 - d) Do you feel the blended class creates more bonds between students than the traditional class? Can you give me an example?
 - e) What do you feel is the single WORST aspect of the online class compared to the traditional class?
 - f) What do you feel is the single BEST aspect of the online class compared to the traditional class?