Virtual learning from the Iowa high school student perspective

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Virtual learning from the Iowa high school student perspective

by

Lance Alan Wilhelm

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Education (Curriculum and Instructional Technology)

Program of Study Committee:
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Ames, IA
2002

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Lance Alan Wilhelm

has met the dissertation requirements of Iowa State University

Signature was redacted for privacy.

Major Professor

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For the Major Program
# TABLE OF CONTENTS

**LIST OF FIGURES**  
vi

**LIST OF TABLES**  
vii

**GENERAL INTRODUCTION**  
1  
Research About the Effectiveness of Distance Learning  
2  
Dissertation Organization  
3  
References Cited  
4

**VIRTUAL LEARNING IN THE UNITED STATES AT THE HIGH SCHOOL LEVEL:**  
EFFECTIVENESS, ISSUES, AND CONCERNS  
6  
Abstract  
6  
Introduction  
6  
Gaps in the Research  
10  
Definition of a Virtual High School  
12  
Purposes and Goals of Virtual Schools  
13  
Evaluations of Effectiveness  
15  
Additional Research is Needed  
18  
Institutional and Administrative Concerns  
19  
Teacher Concerns  
27  
Student Concerns  
33  
Potential Areas for Further Research  
38  
What Student Attributes are Needed to Succeed in a Virtual Learning Environment?  
38  
Does This Type of Learning Isolate Students? Or Make Them More Engaged?  
41  
How to Improve Dropout Rates  
42  
Conclusion  
43  
References Cited  
44

**A CASE STUDY OF TWO HIGH SCHOOL STUDENTS AND THEIR STRUGGLES**  
IN A VIRTUAL CLASSROOM  
51  
Abstract  
51  
Introduction  
52  
Methodology  
56  
Data Collection for the Case Study  
57  
Data Analysis  
58  
Validity  
60  
Results  
60  
The Initial Interview  
63  
The Second Observation and Interview  
68  
The Final Observation and Interview  
73
<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Appendix F: Letter to the Parents of the Participating Students</td>
<td>172</td>
</tr>
<tr>
<td>G</td>
<td>Appendix G: Directions for Administering the Survey</td>
<td>174</td>
</tr>
<tr>
<td>H</td>
<td>Appendix H: School Information Page for Virtual Learning Survey</td>
<td>176</td>
</tr>
<tr>
<td>I</td>
<td>Appendix I: Virtual Learning Survey Cover Sheet</td>
<td>178</td>
</tr>
<tr>
<td>J</td>
<td>Appendix J: Online List of Virtual High Schools</td>
<td>180</td>
</tr>
<tr>
<td>K</td>
<td>Appendix K: Map of Iowa's Area Education Agencies</td>
<td>184</td>
</tr>
<tr>
<td>L</td>
<td>Appendix L: List of Virtual Classes Taken by the Participants</td>
<td>186</td>
</tr>
<tr>
<td>M</td>
<td>Appendix M: Virtual Courses Listed by Curricular Area</td>
<td>190</td>
</tr>
<tr>
<td>N</td>
<td>Appendix N: Institutions Offering the Virtual Classes Taken by the Survey Participants</td>
<td>194</td>
</tr>
<tr>
<td>O</td>
<td>Appendix O: Human Subject Approval for the Case Study</td>
<td>196</td>
</tr>
<tr>
<td>P</td>
<td>Appendix P: Transcripts of Interviews Used in Case Study</td>
<td>201</td>
</tr>
<tr>
<td>Q</td>
<td>Appendix Q: Sample Online Self-Tests</td>
<td>218</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1. School responses to the survey mailings 102
Figure 2. Gender of the survey respondents 103
Figure 3. Grade level of the respondents, by percentage 104
Figure 4. College plans of the students responding to the survey 105
Figure 5. Percent of courses in survey data by type of institution 111
Figure 6. Primary teaching methods used in the virtual classes in this survey 115
Figure 7. Additional teaching methods used in the virtual classes in this survey 117
LIST OF TABLES

Table 1. Virtual courses taken by the students in the survey, arranged by content area 106
Table 2. Top virtual classes in terms of enrollment 108
Table 3. Comparison of ICN usage data with institutional data from the survey 109
Table 4. Reasons given for why the students took virtual classes 113
Table 5. Enrollment by gender in the most commonly-taken classes 120
Table 6. Comparing levels of satisfaction between genders 121
Table 7. Comparing levels of satisfaction across grade levels 121
Table 8. Comparing levels of satisfaction between ICN and browser-based classes 122
Table 9. Reasons listed for why students would take the virtual course again 123
Table 10. Reasons listed for why students would not take the virtual course again 124
Table 11. Most negative aspects of the virtual classes 126
Table 12. Student perceptions about the amount of learning in their virtual classes 127
Table 13. Student perceptions about the amount of effort required in their virtual classes 128
Table 14. Comparing rates of satisfaction across GPA's 130
Table 15. Percent of students who indicate they would take the class again 132
Table 16. Comparing levels of satisfaction across categories of perceived learning 133
Table 17. Comparing levels of satisfaction across categories of perceived effort 134
Table 18. The most commonly mentioned positive aspects of the virtual classes 135
GENERAL INTRODUCTION

Distance learning has a long history, existing in various forms for over 150 years (Schlosser & Anderson, 1994). Over the past half decade, there has been explosive growth in distance learning, as access to relatively new technologies such as the Internet, fiber optics, and digital video has become common. According to the estimates in one recent study, the market for Web-based learning in the United States will grow from $2.1 billion in 2002 to $33.6 billion in 2005 (McLester, 2002). Other studies (Loupe, 2001; Institute for Higher Education Policy, 2000; Power of the Internet for Learning, 2000) document this rapid growth at the higher education level. Specifically, the number of courses offered through these new technologies by four-year colleges was over 6,000, and the number of students enrolled in those courses is expected to grow from 710,000 in 1998 to 2.2 million in 2002 (Power of the Internet for Learning, 2000). Loupe (2001) reports that 70% of universities are providing some form of online education. With 15 million students enrolled in higher education in the United States and an additional 84 million higher education students around the world, the growth potential for virtual learning is large (Power of the Internet for Learning, 2000).

Higher education has been the leader in online education, but K-12 schools are rapidly going online, and that potential market is also large. In the United States alone, there are approximately 50 million public school students in grades PreK-12 (United States Department of Education, 2001). Many school districts are starting to take advantage of courses offered through public organizations such as the Florida Online High School, or private organizations such as APEX Learning, which offers Advanced Placement courses.
online. A report from the fall of 2001 indicates that 14 states currently have virtual high schools in the planning or operational stage, and that 40,000 to 50,000 K-12 students will enroll in some kind of online course during the 2001-2002 school year (Clark, 2001). According to a report from one market research firm, 12% of the nation’s high schools are subscribing to some form of online curriculum (Manzo, 2002). Current K-12 spending on virtual schools in the U.S. is approximately $2.2 billion, and Merrill Lynch predicts this total will increase to $7 billion by 2003 (McLester, 2001).

Research About the Effectiveness of Distance Learning

Long-term research indicates distance learning students generally learn just as well as do students in face-to-face, traditional classrooms (Schlosser & Anderson, 1994). The No Significant Difference Phenomenon Report presents similar findings (Institute for Higher Education Policy, 1999). With virtual learning growing at such a rapid pace, it is easy to envision a future where most students are enjoying the benefits of a virtual education.

However, “a closer look at the evidence suggests a more cautious view of the effectiveness of distance education,” according to a recent review (Institute for Higher Education Policy, 1999, p. 1). That report notes several reservations about distance learning research, including a shortage of original research dedicated to explaining phenomena related to distance learning (including dropout rates that are much higher than in face-to-face classes). Also, according to this report, the overall quality of the research is questionable, and the findings are inconclusive. Much of the research does not use randomly selected subjects, and it does not control for extraneous variables or for the feelings and attitudes of
the subjects involved (Institute for Higher Education Policy, 1999). Gehring (2002) found that students taking a college-level virtual class in economics did not perform nearly as well as did the students in the regular, face-to-face classes.

Overall, the experience of the virtual learner (particularly the high school virtual learner) is not well understood. Because dropout rates for distance learning have historically been much higher than in face-to-face classes, it is in the best interest of all of the stakeholders (including schools, teachers, parents, and students) that a better understanding is developed of the student experience in virtual courses. This dissertation is designed to help fill in this gap in the research, and it culminates with the results of a descriptive study that attempts to expand our understanding of virtual learning from the high school student perspective.

Dissertation Organization

This dissertation is organized into three papers, each of which is to be submitted for publication. The first paper summarizes the literature related to virtual learning, and notes the lack of quality research about this subject, particularly at the high school level. The second paper describes a case study of two high school students taking a virtual class via the Iowa Communications Network. The purpose of the case study was to develop a richer understanding of the student experience in this type of class. The third paper presents a descriptive study in which high school students across the state of Iowa were surveyed in order to gain a deeper understanding of their experiences in the virtual classes they were taking in the fall of the 2001-2002 school year. The research in the first and second papers
provided the foundation for the descriptive study that is the focus of the third paper. The references and appendices for each paper are included immediately following their respective paper.

Following these three papers is a general conclusion that summarizes the results of the case study and the survey. Because the second and third papers contain detailed accounts of the methodology used and the results that were obtained, these papers may need to be shortened to meet publication requirements.

References Cited


VIRTUAL LEARNING IN THE UNITED STATES AT THE HIGH SCHOOL LEVEL:
EFFECTIVENESS, ISSUES, AND CONCERNS

A paper to be submitted to the American Journal of Distance Education

Lance Wilhelm

Abstract

Virtual learning is growing rapidly at the high school level, with an estimated 40,000 to 50,000 high school students enrolled in virtual courses in the United States during the 2001-2002 school year. A leading example of this growth is the Florida Online High School (the nation's largest with an enrollment of over 8,000), which has doubled its enrollment in each year of its existence. However, the high school student experience in virtual classes is not well understood, and this lack of understanding may contribute to an overall dropout rate that is estimated at 10% to 20% higher than face-to-face classes. The literature reveals concerns about virtual learning at the student, teacher, and institutional levels.

Introduction

Distance learning has existed in some form or another for over 150 years (Schlosser & Anderson, 1994). In the past half decade, an explosion in distance learning has occurred, fueled by widespread access to relatively new technologies such as the Internet, fiber optics,
and digital video. A 1999 report by the National Center for Education Statistics indicated that two-way interactive video, asynchronous Internet instruction, and one-way prerecorded video were used by more institutions of higher learning than any other distance education technologies. Some specific examples of the growth of these technologies in higher education follow.

According to a 2000 report from a Presidential commission, the number of distance education programs increased 72% from 1994-95 to 1997-98, with approximately 1.6 million students enrolled in distance education classes in 1997-98 (Institute for Higher Education Policy, 2000). In 1998, 62% of four-year colleges offered distance learning courses, and that number is expected to grow to 84% by 2002. The number of courses offered at a distance by four-year colleges was over 6,000, and the number of students enrolled in those courses was expected to grow from 710,000 in 1998 to 2.2 million in 2002 (Power of the Internet for Learning, 2000). A 2001 report indicates that 70% of universities are using some form of online education (Loupe, 2001). With 15 million students enrolled in higher education in the United States, the growth potential is large. Around the world, it is estimated that there are an additional 84 million higher education students (Power of the Internet for Learning, 2000).

While higher education has been the leader in online education, K-12 schools are rapidly going online, and the potential market is also large. In the United States alone, there are approximately 50 million students enrolled in public schools in grades PreK-12 (United States Department of Education, 2001). Many school districts are beginning to take advantage of courses offered through public organizations such as the Florida Online High School, or private organizations such as APEX Learning, which offers Advanced Placement (AP) courses online. A large variety of organizations, both public and private, offer virtual
classes to K-12 students. In some cases, the primary purpose of these organizations is to
serve secondary schools, but some organizations are primarily focused on higher education,
but offer their classes to K-12 students, as well. (A list of many of these organizations is
included in Appendix J.) This article will provide a review of the current scope of virtual
education in U.S. K-12 schools (with an emphasis on the high school level), as well as
summarize the research that has been conducted so far on this topic. (Note: the terms
"distance," "virtual," and "online" will be used to a large degree interchangeably throughout
this article, although it is recognized that their meanings are not exactly the same. More
precise definitions of "virtual learning" and "virtual high school" will be provided later in
this article.)

Current estimates placed the number of K-12 students taking online courses at 40,000
to 50,000 nationwide for the 2001-2002 school year (Clark, 2001). As of the fall of 2002, 32
states have some form of e-learning program, 12 states have virtual high schools in operation,
and five other states are developing virtual high schools (Vail, 2002). One market research
firm estimates that 12% of the nation’s high schools are subscribing to some form of online
curriculum (Manzo, 2002). Some of the more established virtual schools command a large
share of the market. The oldest is the Concord VHS, which was founded in 1995 by the
Concord Consortium, a non-profit educational research and development organization.
During the 2000-2001 school year, the Concord VHS enrolled approximately 4,000 students
from 30 states in a total of 94 courses (Kozma et al., 2000). Projected enrollment for the
Florida Online High School alone for the year 2001-2002 is 8,000, with students as far away
as Kentucky taking advantage of these classes. Debuting in 1996, the Florida Online High
School has doubled its enrollment every year (Semas, 2001). K-12 schools in the U.S.
currently spend approximately $2.2 billion for online education, according to online learning provider Jones Knowledge, which supplies the Florida Online High School with its course management system. Merrill Lynch predicts this figure will increase to $7 billion by 2003 (McLester, 2001). According to a survey done by the National School Boards Foundation, 28% of school leaders believe that at least one in five of their students will receive a substantial portion of their education via the Internet in the next three years (Vail, 2002).

Another rapidly growing segment in K-12 education is home schooling. According to Time magazine, at least 850,000 students were learning at home as of 1999, and some experts estimate the number to be twice that figure. Many of these students are taking all or part of their courses online (Cloud & Morse, 2001).

Long-term research about distance learning indicates students generally learn just as well as do students in face-to-face, traditional classrooms (Machtmes & Asher, 2000; Schlosser & Anderson, 1994). Neuhauser (2002) compared two classes taught by the same instructor, one face-to-face and the other online and asynchronous. This study indicated that student achievement was very similar between the two classes, with the online class performing at a slightly higher level. Ocker and Yaverbaum (1999) found that asynchronous collaboration was as effective as face-to-face collaboration in terms of student learning. Easterday (1997) cites numerous studies at the community college level that indicated that the students learned more at a distance that did the students that were meeting at the originating site for the class. Recently, the No Significant Difference Phenomenon Report presents similar findings (Institute for Higher Education Policy, 1999). With the strong growth in virtual learning that is occurring, and a huge worldwide educational market of
potential virtual learning students, it might be tempting to conclude that this recent growth will continue unabated until most students are enjoying the benefits of a virtual education.

However, according to a review done by the Institute for Higher Education Policy, "a closer look at the evidence suggests a more cautious view of the effectiveness of distance education" (Institute for Higher Education Policy, 1999, p. 1). That review expresses several reservations about distance learning research. Specifically, the review notes a shortage of original research dedicated to explaining phenomena related to distance learning, and that the overall quality of the research is questionable, rendering many of the findings inconclusive. Also, much of the research does not use randomly selected subjects, and does not control for extraneous variables or the feelings and attitudes of the subjects involved (Institute for Higher Education Policy, 1999).

Gaps in the Research

The same 1999 report by the Institute for Higher Education Policy notes many gaps in the research. The studies were faulted for an emphasis on student outcomes for individual courses, rather than evaluating the effectiveness of the total academic program. In addition, the research does not take into account differences among students, and it does not adequately explain the consistently higher dropout rate of distance learning courses. The research to this point does not adequately address the effect of multiple technologies, or the effectiveness of digital libraries. Also, the Institute also faults current research for a lack of a theoretical or conceptual framework. In their 2001 review of research in distance education, Berge and Mroczkowski voiced similar concerns with the literature, noting noncontrol for
extraneous variables, a lack of the use of randomly selected subjects, a lack of reliability and validity of the instruments used to measure student outcomes, and inadequate control for the attitudes and feelings of the faculty and students. In their meta-analysis of the effectiveness of telecourses, Machtimes and Asher (2000) indicated that most of those studies failed to include information about the student dropout rate, thereby casting a shadow on the results.

Obviously, there are some concerns and questions about the research in this particular area. In addition to the concerns about the research that has been conducted, there are also some major areas that have not been researched extensively. So far, most of the recent virtual learning research has focused on adult learners and postsecondary programs, because courses offered at a distance have deeper roots in those areas. Relatively little has been done with high school virtual learning programs, and of that, little has been done from the student perspective. There is a small, but growing body of research relating to teaching in a virtual environment, but little about learning in one. A focus on the student perspective may have the most potential to improve virtual education.

Identification of a problem is generally the first step in the research process, followed quickly by some definitions to clarify the concepts to be researched. This is another issue contributing to the lack of research in this area: even though there are dozens of “virtual high schools” offering courses in the United States, there is not a consensus about what is involved in a virtual high school.
Definition of a Virtual High School

With the rapid emergence of numerous virtual high schools, many colorful terms have been used to describe how they are different from traditional, face-to-face classroom learning. For example, "clicks and router" schools as opposed to "bricks and mortar" schools. However, this wordplay has not led to much clarity or understanding of how virtual schools are organized or operated. A brief examination of the concept of distance learning may be a good starting point for an explanation of virtual learning and virtual high schools.

There are many definitions of distance education, of course, but they all involve some sort of physical separation of the learners from the teachers. Over the past two centuries, the methods used to "connect" these groups have become more diverse and powerful. Many possibilities exist, some more "high tech" than others: the World Wide Web/Internet, two-way video, one-way video with two-way audio, desktop video conferencing, satellite, compressed video, courses via email, courses via chat, courses via audio (one way or two way), courses via conference call, courses on tape (audio or video), courses on television, courses on the radio, and correspondence courses.

Virtual learning does not mean that the students will constantly use current technology as they learn. They may, for example, read a book, do calculations by hand, or interview someone face-to-face. Picciano (2001) defines virtual learning as learning that can effectively occur in the absence of traditional classroom environments. Although there are many visions and definitions relating to virtual learning, Picciano's definition accommodates both the technological and non-technological aspects of learning, and serves well as the operational definition for this literature review.
Virtual high schools can be considered a subset of virtual learning. Most of the institutions that classify themselves as "virtual high schools" make use of two-way interactive video, Web-based courses, or a combination. With streaming video and desktop conferencing becoming widely available, it is likely that Web-based courses will increasingly utilize video technologies. So, perhaps a virtual high school can be defined in the following manner: an organization that offers an array of high school courses through the use of interactive technologies such as the World Wide Web or two-way video.

Purposes and Goals of Virtual Schools

There are many reasons why students are taking courses through virtual schools. There are also a large number of reasons why many "bricks and mortar" institutions are offering courses at a distance, and enrolling their students in "clicks and router" classes offered by other schools. This availability allows schools to increase the course offerings available for advanced students, often in a cost-effective manner. For example, only 60% of high schools in the U.S. offer Advanced Placement (AP) courses, with the average high school offering 5 AP courses out of 32 subject areas (Power of the Internet for Learning, 2000). Another example would be accelerated math students in a middle school; the middle school may not offer Algebra II, and instead of moving the students to the high school, a "virtual" course would be available in their building. By offering courses from a virtual school, the home district can deliver instruction in a more cost-effective manner. Although "virtual learning" is not as inexpensive as some had hoped, it might be more practical for a small, rural school to have their top students take physics on the Internet, rather than trying to
find a qualified teacher for a relative handful of students. Virtual schools also help to solve scheduling conflicts. Conflicts can be a problem in any size school, because students can fill up their schedules easily. In smaller districts, there may be only one section of a course offered, and perhaps that conflicts with another course that the student wants or needs to take.

Potentially, virtual schools can improve instruction for a wide range of students, particularly in core courses. A high quality course over the Internet may be better than what is available face-to-face in the student's own school. Virtual classes can also help to meet the educational needs of a variety of students with special needs. Students who need an alternative to traditional education can benefit from virtual schools. For example, one case study describes a virtual school "for middle-grade students (aged 11-14), who elected to receive their schooling at home, were physically or medically unable to attend school, or required flexible school schedules" (Litke, 1998, p. 35). Virtual schools can provide a quality education to students with disabilities or injuries/illnesses that prevent them from attending school. As noted before, home-schooled students are making wide use of virtual school offerings. This is a growing phenomenon: in 1994, it was estimated that 345,000 K-12 students were being home schooled in the United States; by 2000, that estimate had ballooned to between 700,000 and 1.5 million (Power of the Internet for Learning, 2000). Virtual schools also provide an option for students who have been suspended from school to continue their education.

All of the needs and problems listed above existed before anyone heard of virtual schools, which some say should be viewed as a solution, not a problem. As one public school official puts it, "This is a new school option aimed to fortify public education, not aimed to
bypass it” (Loupe, 2001, p. 47). Indeed, Quintana (2000) notes there are many benefits of virtual schools. Students can pursue education at times that are personally convenient, and they can progress through the material at their own pace. By enrolling in virtual schools, students are exposed to a broader range of students than in a face-to-face class, resulting in a wider range of opinions and views shared in class discussions. Also, virtual students do not need to spend time or money to travel to class. There are benefits to the institutions, as well, because they can reach a broader range of students across a larger geographic region, and they can save money by publishing and distributing information electronically. However, there is not a great deal of solid research to indicate whether virtual students are getting the same quality of education that they receive in traditional, face-to-face classes.

Evaluations of Effectiveness

In general, long-term research indicates that students can learn just as well at a distance as they can face-to-face. “The factors that determine learning are the same for distant students as they are for traditional students, including student characteristics such as motivation, intelligence, level of preparation, and instructor variables such as quality of teaching, organization, and structure of the course” (Schlosser & Anderson, 1994, p. 27). According to Loupe (2001), most studies indicate there is no significant difference in learning between virtual courses and traditional classes at the postsecondary level. Flickinger found similar results in a 1999 case study, noting that students who took a college level class through the Internet had similar grades and levels of comprehension to those who completed the class in a traditional setting.
It should be noted that most of the distance learning research has been directed toward postsecondary and adult learners, which is not the same audience as a typical high school. And, it is clear that most secondary students who are taking virtual classes are not typical, either. This group includes students who are taking college classes; middle schoolers taking high school classes; students whose schedule is full, but they still want to take another class; home schoolers; students who are away from home (actors, athletes, etc.); and students who have disabilities that keep them away from school. So, when determining the effectiveness of virtual schools, the audience and situation must be taken into consideration.

So far, the results for secondary learners are yielding similar conclusions to those commonly found at the post-secondary level. Virtual schooling works, at least for some students and curricula. “It is clear that virtual learning is a viable concept, at least for some types of students and curricula” (Roblyer, 1998, p. 61). It should be noted that because of the relatively short time that virtual schooling has been available to high school students, many of these reports are anecdotal (Loupe, 2001). A 1998 study by Litke found several benefits of virtual schools. The students involved cited a greater degree of freedom, more time flexibility, fewer distractions, better grades, increased individual attention from teachers, a higher degree of satisfaction, and fewer hassles with teachers and other students.

Consider also this example from the Concord VHS year two review: 12 courses were selected from the 37 or so courses offered by VHS, and reviewed thoroughly by a six-member panel. Of the 12, 11 were considered to be of satisfactory quality or better. Only one was rated “Of serious concern.” Half were considered of “High Quality,” the top rating available. “‘High Quality’ courses were likely to be consistently excellent and organized throughout most aspects of the course, and usually encompassed some combination of the
following: effective and appropriate use of the medium; effective use of teacher’s voice within the medium; diverse and multiple methods of instruction; quick, timely, regular feedback; and clear objectives and performance expectations” (Yamashiro & Zucker, 1999, p. iii). The evaluation of the third year of the Concord VHS described similar results. Kozma et al. (2000) found no significant differences in teacher scores between the face-to-face students and the VHS students. External graders were used to evaluate the student products, and they found no significant differences in the quality of the student work completed by the face-to-face students and the VHS students in two of the three courses. The exception was in the Photographic Vision course, where the face-to-face group was scored significantly higher than the VHS class.

Another potential benefit of virtual schooling is that it can help alleviate teacher shortages in certain subject areas and geographical regions (Loupe, 2001). “It is clear that, in general, technology enables VHS students to take high-quality courses, offered by high-quality teachers, that would not be available to them otherwise” (Kozma et al., 2000, p. vi). However, that same report lists some concerns. Kozma noted that there have been significant technology-based problems that have persisted over the initial years of the VHS project, and these problems limit the student-student and student-teacher interaction. This limited interaction has a negative impact on the type of feedback from teachers. Also negatively impacted are the quantity and quality of student input, as well as the sense of community in VHS courses. In the face of these concerns, virtual learning should not be considered to be a panacea. “What I’m afraid of is that it is being looked at as a broad solution to the problems of secondary education—there are terrible dangers lurking within [that belief],” said Alan Warhaftig (an English teacher in Los Angeles) (Trotter, 2001, p. 30).
Litke (1998) notes that online classes work well at the graduate student level, but that does not mean they will be successful for high school and middle school students. Concerns identified by students included a sense of isolation and a lack of personal contact with teachers and other students. They also noted that computer games could be a distraction. Litke (1998) summarized the high school student opinions this way:

Interestingly enough, despite their positive perceptions of online learning, the students did not feel that the virtual classroom was a viable option for most students. The student participants emphasized that the program was only appropriate for students who had social problems at school, had the proper motivation to succeed, or desired the opportunity to move at their own pace. The students were clear in conveying that online environments were not the answer to the educational needs of all students; rather, they saw it as the answer to their own unique needs. (p. 43)

Additional Research is Needed

Clearly, much more research about the effectiveness of virtual schools needs to be conducted, for the benefit of all of the stakeholders in the educational process. Beyond the overall societal viewpoint, there are three other major viewpoints from which to consider the effectiveness of virtual schools: the institutional/administrative viewpoint, the teacher viewpoint, and the student viewpoint. From each of these viewpoints, virtual schools have both significant benefits and areas of concern. It is important to note that many of these are the same concerns that are expressed about traditional, face-to-face education.
Institutional and Administrative Concerns

The list of concerns from the institutional/administrative standpoint is lengthy. Part of the reason this list is lengthier than those for the teachers and students is that much thought has been put into virtual learning from this viewpoint. Institutions have much to gain (or lose) through virtual learning.

Coordination of Academic Calendars

If a school is going to allow students to take courses delivered electronically by other institutions, it is important that the academic calendars and class schedules are very similar, and that accommodations can be made for any differences.

Accreditation and Certification

It is common for institutions to accept credits from other institutions if they are accredited. However, in the case of virtual learning, there are some concerns, particularly if the instruction is coming from another state. Also, there are many barriers to transferring teaching credentials across state lines (Power of the Internet for Learning, 2000).

Standards

When courses are taken from institutions in other states, there are concerns about which state’s standards will be used for the course. (All states other than Iowa have state standards.) Florida’s Online High School has spent time adapting the Florida standards to those of other states (Trotter, 2001).
Course Quality and Rigor

A common perception is that distance courses are easier than traditional classes, but in many cases, that would be a misperception. Overall, course quality seems to be high in the better known programs such as Concord's VHS and Florida's Online High School. The year two and year three evaluations of the Concord VHS by Yamashiro/Zucker and Kozma et al., respectively, noted that course quality was similar to that of the face-to-face equivalents. However, there were some notable differences. Kozma noted that VHS assignments were sometimes modified, and VHS students often spent less time on assignments than students in the face-to-face courses. In fairness, it should be noted that VHS students were more likely to be taking this class on top of a full class load. Overall, VHS students agreed that their VHS courses were of high quality and required hard work, but the face-to-face students in equivalent courses were more likely to agree strongly with those same statements (Kozma et al., 2000). Kroder's 1998 study of a virtual graduate level class indicated that the students said more time was required (20-40% more) due to the extensive reading and the frequent, required checking of the WebBoard postings.

Teacher Quality and Experience

For the virtual instructor, it is important to have some regular teaching experience, especially experience in teaching the traditional version of the course, before teaching it at a distance. Roblyer (1998) indicates that the behaviors that are viewed as important for teaching successfully online are the same as those required in the traditional classroom. "The success of virtual courses seems to hinge on the same major item that determines success in
any courses: the competence and hard work of the teachers involved” (Roblyer & Elbaum, 1999-2000, p. 61).

Cost of Development, Delivery, and Support

Teachers experienced at virtual learning will tell you there is more to it than just putting your lecture and notes on the Web, if you plan to develop a high-quality course. Quality online courses cost more to develop, deliver, and support; these additional costs must be borne to some degree by the institution. Kubala (1998) notes that for online courses to be effective, there need to be competent course designers and technical staff who are readily available to the instructor, especially if they are newcomers to this type of delivery. Without this support, teachers may not take on the additional workload that would be required. There is a lack of incentive for teachers to learn and use new technology (Quintana, 2000). Another factor to consider is the relatively high cost to set up reliable computer equipment, and to provide technical support for that equipment (Quintana, 2000). According to Loupe (2001), some institutions are outsourcing this support.

Class Size and Teaching Loads

A major issue to be considered is the impact of virtual learning on class sizes and teaching loads. Some administrators have viewed virtual learning as an opportunity to deliver courses in a very cost-effective way; by that, they meant a high student to teacher ratio. However, research is indicating that institutions can not generally deliver a high quality course using that approach. According to some experts, “you need an extraordinarily small student-teacher ratio” (Loupe, 2001, p. 43). One example to consider is Mrs. Vail, a Florida
Online High School physics teacher. A veteran classroom teacher before she began teaching online, she has 90 students in her physics class. She indicates this is a manageable load, and the students are getting a comparable course to the ones she taught face-to-face (Trotter, 2001).

Equity of Access

Virtual learning is often touted as a way to even the playing field, to make quality education available to all students. Quintana (2000) cites the emergence of "Open Learning," which has been defined as "a student centered approach to education which removes all barriers to access while providing a high degree of learner autonomy." That idealistic goal must be tempered somewhat by the reality expressed by Kirby and Roblyer (1999), who note that distance learning resources are often unavailable to those who need them most, including students in urban and rural areas. A major factor to consider in bridging this equity gap is access to the Internet. Public schools, thanks in part to the E-rate program, have made great strides in making the Internet available. By the fall of 2000, 98% of all public schools were connected to the Internet (National Center for Education Statistics, 2001). However, some schools have fiber optic connections to their buildings and Internet access in all classrooms, while some schools only have a handful of dialup connections.

These inequities are more pronounced at home. An August 2000 estimate places Internet connections in only 41.5% of American homes. "Access" can also mean different things, depending on where you live. In some places, Internet access is a local or toll-free number, whereas in others a long-distance call is required. In some places, high-speed cable modem service is available, whereas in others, the best connection available is dial-up.
Access to course materials is just one aspect of the equity concerns. Student access to on-campus reference materials and services (such as advisement) must also be considered.

**Accommodating Students with Disabilities**

For students with certain disabilities, fully accessible Web pages are critical to their success in a distance learning environment. There are new federal mandates relating to making Web pages fully accessible; however, at this time, these requirements do not apply to K-12 schools. The Internet is a double-edged sword for people with disabilities, putting many resources at their disposal, if the Web pages accommodate their disability (Power of the Internet for Learning, 2000). For example, many Web pages are often very graphics-oriented. That can make for an attractive page design, but it might also make it very difficult for a visually impaired person to navigate. One way to accommodate the needs of visually impaired users is to have a text-only version of the Web page. When in text format, the choices can be read aloud by voice-recognition software.

**Student Dropout Rates**

One of the top institutional concerns is the student dropout rate, which is historically higher in distance learning classes. This trend has continued with Internet-based courses, with many courses experiencing dropout rates of 50% or more (Trotter, 2001). In the case of Florida's Online High School (FHS), the dropout rate has averaged 25%. In the FHS, there is a 29-day no-fault withdrawal period (Trotter, 2001). In the case of the Concord VHS courses, Kozma et al., (2000) reports that dropout rates for both the face-to-face and online courses are low, but the online rate is higher.
Here are several examples from the Institute for Higher Education Policy's "What's the Difference?" study: in one case, only 40% completed the course; in another, one-third of the students in a videoconferencing class received incompletes, compared to only 15% in an on-campus class; in another study, 95% of resident students completed the course, as compared to 64% of the students who were taught by computer-mediated methods; and in one final case, there was a 32% dropout rate for the computer-mediated group, as opposed to 4% taking the same course on-campus.

Some additional examples from a variety of institutions: In California's AP program, there were 204 students enrolled statewide, and nearly a third dropped out (Carr, 2000). From 1989 to 1996, dropout rates in distance education courses at Boise State averaged 44% (Chyung, Winiecki, & Fenner, 2001). In a distance learning study that involved community college and high school students, dropout rates were approximately 40% in the high school group and 33% in the community college group (Roblyer, 1998). One school district has shown an 11 to 15 percentage-point difference between course-completion rates in the district's on-campus courses and those in its distance-education courses. That figure has stayed fairly consistent over the 18 years that the district has offered distance courses (Carr, 2000). One study of particular concern indicated a high dropout rate for students who were academically average or below average (Kirby & Roblyer, 1999).

Causes of the higher dropout rate. It is clear that the dropout rate is higher in virtual classes than in traditional ones, but the causes are not well-established. Most likely, many factors account for this difference, some of which relate to the student, and some of which relate to the course and how it is taught. Galusha (1997) attributes some of the causes to
insecurity on the part of the distance learner, relating to the financial costs, the disruption of family life, a perceived irrelevance about their classes, and a lack of support from employers. In her 1999 case study, Flickinger speculated that the higher dropout rate for the Internet version of the biology course was due in part to a lack of student-student interaction. Easterday (1997) cites Purdy's 1986 study that indicated that part of the higher dropout rate could be attributed to students who were too immature to handle the greater autonomy required of distance learners.

*Preventing dropouts by informing students what is involved.* In an attempt to prevent students from signing up for distance learning courses for which they are unprepared, many institutions offer screening tests online. These are generally short self-tests. Some examples are included in Appendix Q.

**Financial Arrangements**

One important issue in distance learning is financing. Schools are trying to decide how much to charge each other to provide classes at a distance, and whether making a profit on such courses is appropriate. One strategy is to form consortiums, making courses taught within the consortium free of charge to the members of the group. Florida's Online High School is funded by the state legislature, at a rate of approximately $6 million per year; classes are provided free to public (70% of those enrolled), private (9%), and home-schooled (21%) students within the state. Soon, private schools may have to pay for the courses, and FHS officials are marketing this to other states, which will generate additional revenue (Trotter, 2001). West Virginia will enroll 40 students in a “leased” FHS course, at a cost of
$35,000, which includes the cost of training a West Virginia teacher to conduct the course. Concord’s VHS, which has been non-profit up to this point, was heavily subsidized by a federal Technology Innovation Challenge Grant for its first four years. For the 2001-2002 school year, the VHS changed their financing structure to become more self-sustaining.

Policies that Need to be in Place

A wide variety of policies need to be in place before an institution offers virtual courses. Many of these policies are similar to those needed for traditional classes, but some are unique to the virtual learning environment.

Appeals. As is the case for face-to-face learning situations, it is important that an appeals policy or recourse policy is available. This is particularly true in virtual schools, where a student cannot easily drop by the principal’s office if they disagree with something that has occurred in class.

Drops. In many schools, if a student chooses to drop a distance learning course, they are responsible for the cost of the course. Considering the traditionally higher dropout rates associated with distance learning, institutions often need a policy of this type to protect their financial interests.

Copyright and intellectual property issues. One of the unresolved copyright issues relating to virtual learning is using copyrighted material over a network. As the law is written now, material that can be used spontaneously in a face-to-face classroom cannot be used in
the equivalent virtual learning course. Another controversial topic relates to the ownership of the course material that is developed. Some educators feel it belongs to the teacher, but others maintain it is owned by the institution. The law is unsettled in this area, but many colleges and universities have developed policies that address this situation. Any school offering virtual classes should do the same.

Student safety. Internet safety is obviously a concern in virtual learning courses. Some specific examples would be the need/ability to monitor chat rooms, email, and other student-to-student interactions. Of course, having this ability in writing is one thing, but having the resources to actually implement such monitoring is another issue.

Academic honesty. Because students in virtual classes generally are subject to a lesser degree of direct supervision, a concern is the verification of student participation and performance. A common example is the need for proctoring during testing, which sometimes requires student travel to a proctored site. However, monitoring all student homework and projects from a distance can be a logistical problem. (Again, the same concerns face teachers in traditional classrooms.)

Teacher Concerns

There is a lengthy list of concerns about virtual learning from the teacher perspective, as well. Again, many of these concerns are the same as they would be in a face-to-face classroom, but addressing them in virtual environments can present new facets.
Time Required to Develop Courses and Update Courses

The amount of time that it takes to develop an online course is generally considered to be much higher than developing a face-to-face class. This is particularly true if the teacher has to spend a great deal of time learning how to deliver their course content via new technologies. In her 1999 case study, Flickinger found that the instructors spent much more time preparing for Web-based classes than they did for traditional, face-to-face classes, particularly the first time they taught the class online. Most of this additional time was associated with technical issues. While the amount of time required for the online class decreased somewhat in subsequent semesters, it was still more than in traditional classes.

Addressing and Accommodating Different Learning Styles

Each learner has his or her own individual learning style. Virtual education has the potential to tailor instruction to better meet the needs of each learner. However, until very recent times, distance learning has often been delivered over one, or at best, two different media. In its 1999 “What’s the Difference?” report, the Institute for Higher Education Policy faulted the approach typically used by providers of distance learning:

Gathering samples of students and amalgamating them into averages produces an illusory “typical learner,” which masks the enormous variability of the student population. Stated more plainly, experimental studies in distance learning are using an “agricultural-botany paradigm – assuming that students react to different educational treatments as consistently as plants react to fertilizers.” Further research needs to focus on how individuals learn, rather than how groups learn. This is
particularly important because technology has the potential to individualize learning to a greater degree than previously known. (p. 24)

Quintana (2000) included several examples of how content can be delivered in a manner that is effective for each style of learner. Those who learn best through visual or spatial learning would be well-served by the World Wide Web and its images, or the use of 3D modeling languages such as VRML. Those who learn best through musical or sound would benefit from downloadable sound files and real-time audio. Intra-personal learners would benefit from interactive questionnaires and downloadable multimedia applications. Those who are inter-personal learners would be aided by the use of text, audio, and video conferencing; email; and newsgroups.

Difficulties of Lab-based or Hands-on Classes at a Distance

Some courses lend themselves more easily than others to presentation via the Internet. Classes that are traditionally "hands-on," or those with lab components can be particularly challenging to teach virtually. With some teacher training, and some additional "lead time" to send materials, some of these difficulties can be overcome. However, Kozma et al., (2000) found in the evaluation of the Concord VHS program that the content in three of the courses (Modern Classics, Photographic Vision, and Pre-Engineering) was only a subset of more substantial classes taught in the traditional manner. Kozma also noted that in some cases, the technology inhibited student-teacher interaction, and presented some serious liabilities in two classes that required the teachers to visually inspect the student products.
Teacher Training

In general, good teaching is good teaching. However, translating what you teach and how you teach into electronic form requires some additional training. Schlosser and Anderson (1994) noted several areas where additional training is necessary. Extensive preplanning is needed, and teachers needed to know how to use proven distance-learning strategies such as the use of visuals and structured note-taking. In addition, proper training in the use of the equipment was necessary. Landis (2002) found that students in virtual classes pointed toward the teacher as the major factor in determining the quality of the course.

Delivery of Materials

In distance learning environments, the tests, handouts, homework, and lab supplies need to be able to “flow” both ways as quickly as possible. Additional lead time is important, as is the judicious use of technologies such as email, attachments, and fax machines. This requires teachers to plan further ahead than they normally would in face-to-face classes. In some cases, they need to have all of the materials prepared and delivered at the beginning of the semester. For example, the Florida Online High School sends each student a box of “physics” equipment each semester; one teacher called the contents of the box “Wal-Mart” physics, because it included mostly common objects such as a ruler, a stopwatch, pulleys, and a Super Ball (Trotter, 2001).

Teacher-student Interaction and Feedback

The quality and frequency of the student-teacher interaction is critical in any course. Roblyer & Ekhaml (2000) found that student perceptions of the degree of interaction in a
Virtual course was a primary factor in determining course quality. In some respects, distance learning sets up barriers to communication, but in others, it can enhance interaction. In general, the response time in distance learning is not as rapid as in face-to-face classes. However, many students mentioned they interacted more with their distance teacher than in traditional classrooms. It is important to take into account class size when making comparisons of this type. Few students in large lecture classes contact their teacher, but the opportunities are there: in class, during office hours, or via email. Distance classes often force students to make contact. However, in many courses, that contact may never be face-to-face. The topic of teacher-student interaction is discussed in more detail in the following two sections.

Virtual learning's effect on student-teacher interaction. Some experts indicate that learning at a distance increases the amount of student-teacher interaction. Kubala (1998) noted that online instruction is in many ways a form of individualized instruction. For maximum learning to occur, regular contact between the student and the instructor needs to occur. Kubala also observed that 94% of the students said they felt adequately connected to the instructor; in fact, they felt more connected or at least similarly connected as students did in traditional face-to-face classes. Carr (2000) found that successful distance education professors make regular contact with their students, and use a variety of methods to develop a personal touch, even at a distance. These approaches include emailing their students frequently and promptly, holding regular office hours (either in person or online), and posting photographs of themselves on course Web pages. Flickinger (1999) observed that students actually felt more in touch with their Internet-based instructor than in traditional
classes. Both students and instructors voiced some concern that students in the class did not converse much on-line. However, according to the students, this was not seen to be a major detriment to the learning environment (Flickinger, 1999).

Other experts assert that distance learning decreases the amount of student-teacher interaction. Certainly never meeting in the same physical space creates some sort of distance that needs to be bridged. The teacher and student do not share much of a common frame of reference (the same room, the same town, etc.). Tiene (1997) notes that “physical distance tends to perpetuate social distance, which may affect academic performance” (p. 44). Wolcott (1996) refers to another aspect of this separation as “psychological distance.” Wolcott expands on this concept:

Combining both physical and psychological distance makes for a potentially troublesome mix. Both experience and research tell us that separating teacher from learners (and learners from one another) can hinder rapport building among participants. In turn, a lack of rapport can lessen interaction and lead to feelings of isolation for students learning out of the presence of the teacher and peers. (p. 23)

In the review of year three of the Concord VHS, Kozma et al. (2000) found that according to the teachers involved, the student-teacher interaction and the student-student interaction was less frequent in quantity and lower in quality in the VHS courses than in the face-to-face courses. In a study involving a course delivered via two-way video to several classrooms, technology limited their interaction with students, because they could see only one site at a time (Kirby & Roblyer, 1999). In discussing that same study, Kirby and Roblyer stated that the perceived amount of student-teacher and student-student interaction was a very
important factor in the success of video courses. Carr (2000) noted that to be successful in a
distance learning environment, students need to be confident and comfortable with their
work, because they do not have direct contact with the teacher, and feedback is not
immediate. Quintana (2000) states that the Web "limits the expression of the content to
current authoring forms," and that "one of the major problems with Internet-based learning is
the isolation that students feel from their instructors and ineffective methods for dialog."

Teacher accessibility. In many cases, teachers of virtual learning classes make
themselves widely available via electronic means (beepers, email, cell phones). This
availability is not generally 24/7, but is broader than typical for traditional classes (Trotter,
2001). This increased availability may or may not be viewed as a positive by all teachers who
become involved in virtual learning.

Student Concerns

Although the student perspective of virtual learning has not been studied to the extent
of the institutional or instructional standpoints, many areas of concern are emerging. These
include personal interaction, student-student interaction, course evaluation, minimum
technology competencies, reliability of the technology, and technical support.

Personal Interaction (the Human Factor)

While some experts maintain that a "personal touch" can be established and
maintained even if the teacher and student never actually meet, others are skeptical of that
notion. Loupe (2001) asserts that courses with some sort of face-to-face component tend to
have better retention rates. McLester (2001) cites many studies that indicate the importance of in-person interaction, including a Stanford University report that the most successful virtual learning usually features a combination of Web-based activities and some old-fashioned, in-person interaction. In addition, McLester cites the example of the Wichita eSchool, which uses parent-child collaborative activities to infuse a more human element into the electronic learning process.

McLester (2001) also lists numerous drawbacks to virtual learning. Among them: studies indicate that even adult students have a difficult time learning new concepts strictly online. Online courses need some in-person time with the instructor. Online courses are not inherently fun or motivating; even AP students find it hard to sustain interest. In general, virtual courses lack the emotional component that many experts believe is central to learning. Even in courses with two-way video, the students at the remote site often feel isolated. In Zarghami’s 1998 study of university courses held over the Iowa Communications Network (ICN), the students at the remote sites demanded more feedback from their instructors. Andrew Zucker, a Washington-based researcher, has studied and evaluated the Concord Virtual High School since 1996. One of his main findings is that there is less interaction between students and teachers in the online classes taught through the VHS, when compared to the comparable face-to-face classes. However, he considers this lower level of interaction to be a weakness of virtual learning, not a fatal flaw (Trotter, 2002).

**Student-student Interaction**

In many classes, some of the most effective learning occurs as part of student-student interaction, such as class discussion. As is the case with teacher-student interaction, some
educators believe learning at a distance decreases student-student interaction, while others
maintain it increases that type of interaction (via bulletin boards, chat rooms, email, etc.).
Kozma et al. (2000) noted that while face-to-face students tended to agree strongly that
discussion was a regular part of their class, and that their frequent communications with other
students were an important part of the learning that went on in the class, the Concord VHS
students were likely to disagree with each of those statements.

In a survey of over 2,300 students taking courses through the Florida Online High
School during the 2001-2002 school year, most students rated their student to student
interaction as fair or poor (Doherty, 2002). In Kirby and Roblyer's 1999 study of courses
delivered by two-way video, they noted a lack of interaction among the sites. If other
technologies such as email were available, communication among the students could be
enhanced. In the "What's the Difference?" report, it was noted that approximately 40% of the
students said they missed the face-to-face interactions and approximately 25% missed the
group dynamics. A key recommendation of the study was to "explore alternative ways to
meet students' interaction needs on a continuous basis" (Institute for Higher Education
Policy, 1999, p. 15).

Course Evaluation

A study reported by McKenzie and Roblyer (2000) indicates that, based on class
evaluations, there were clear differences between what students thought was important in
distance learning and what they actually observed. For example, students rated having
emergency phone numbers available at the distance learning site as very important; it ranked
first in importance out of a list of 41 behaviors of distance instructors. However, in terms of
how often it was observed by students, it only rated 27th. “Clarifies assessment methods and expectations to students” was ranked fourth in terms of importance, but only 18th in terms of how frequently it was observed.

Minimum Technology Competencies for Students

It is obviously important for the students to have the minimal skills necessary to complete a virtual learning class. One of the most effective methods mentioned in several case studies is to have students attend a “boot camp,” where their technology skills are assessed, and, where needed, improved. A week-long boot camp at Boise State was considered to be very helpful in cutting the dropout rate in online courses from 40% to 20% (Carnevale, 2000). Kubala (1998) noted the effectiveness of a face-to-face orientation session, which provided students with a clear understanding of course expectations. Through the use of the orientation session, students became competent with basic computer skills, allowing them to interact with the instructor and each other, to submit research papers, to access the course resources, and to search the World Wide Web.

However, that level of commitment of time and money may not be practical at the high school level. And without that training, many students will struggle in virtual environments. Kirby and Roblyer (1999) indicated that students received insufficient help in both how to learn and how to use the new technologies. Galusha (1997) observed that students in distance learning received a lack of training, particularly relating to technical issues. Quintana (2000) noted that some students may find the Internet-based methods of communication (such as email, bulletin boards, and chat rooms) to be awkward, and thus may not be able to express themselves well.
Reliability of Equipment and Technology

It is critical that equipment works consistently in virtual learning courses. However, anyone who works with technology knows things do not always work. This problem may be compounded by the lack of training described in the previous section. If a student has not been instructed in how something works, it can be difficult for them to troubleshoot problems.

In many cases, home access to the Internet is needed for students to meet the course demands. However, home Internet providers have a spotty record in terms of performance and support. And, as Roblyer (1998) puts it, “the technical design of course delivery seems at least as important as curriculum design, because technical problems can doom even the best designed curriculum” (p. 34). In Tiene’s 1997 study of high school students learning through two-way interactive video, 61% of the students indicated that technical difficulties interfered with the course. In Flickinger’s 1999 case study, numerous equipment failures led to frustration for some of the students. According to a survey of 200 professors in Illinois who teach online classes, a third of them experienced serious technical problems in those courses (Gehring, 2002). In the Florida Online High School survey noted above, 72% of the students indicated that they experienced technical difficulties that interfered with their ability to complete their virtual class (Doherty, 2002). In a study of virtual learning classes in Nebraska, Landis (2001) noted a high level of frustration with the technical difficulties encountered by classes that were taught online and those classes taught through two-way interactive video.
Technical Support

The availability of technical support is clearly a concern for students in virtual classes, because students are not always getting the technical training they need, and technology does not work all of the time. Students are rightfully worried about whether technical support will be supplied. Galusha (1997) observed that an area of concern for distance students is the lack of support and services, including such things as providing tutors, academic planners, and technical assistance. Quintana (2000) noted that inadequate technical support or tutorial help can lead to incorrect usage of the software tools necessary to do assignments.

Potential Areas for Further Research

There are many concerns relating to virtual learning at the high school level, all of which need additional research. Some of the most critical topics include the student attributes needed to succeed in virtual classes, whether or not virtual learning makes students more engaged or more isolated, and how to improve dropout rates in virtual classes.

What Student Attributes are Needed to Succeed in a Virtual Learning Environment?

Some of the preliminary research indicates the following attributes may be critical to the success of distance learners in general.
**Highly Motivated**

Shih’s 1998 study of students who enrolled in introductory college biology courses over the Web indicates the importance of motivation, which, along with learning strategies, accounted for one-third of the differences in student achievement as measured by the class grades. Flickinger’s 1999 case study noted the same thing: personal motivation to succeed was far more important to the success of the online students than for the students in the traditional class. Loupe (2001) attributes success in online learning to the qualities of being independent, self-directed, and mature, and to the ability to manage time and adapt to change. Flickinger (1999) indicated student satisfaction was influenced by the qualities of motivation, computer savvy, and personal self-confidence. Galusha (1997) noted that student motivation had a powerful effect on completion and attrition rates, and that the motivators for adult distance learners are often different from those of students in traditional classes. Oxford, Park-Oh, Ito, and Sumrall (1993) report that in a study of high school students learning Japanese via satellite TV, motivation was the best predictor of achievement. In a 1992 study of 181 secondary students taking distance learning classes in British Columbia, Laube found that the level of student effort and the level of student commitment toward academic goals were positively correlated with persistence in the distance classes.

According to Trotter (2001), approximately half of the learning activities in the Florida Online High School physics class occur off-line. Because so much of the burden for learning falls on the student, it should not be surprising that motivation plays such a major role. Viewing the issue from another direction, Quintana (2000) notes that a lack of motivation can cause students to drop out. Or as Kubala points out, “Since there are no
weekly classes to attend on campus with fellow students, out of sight can quickly turn into out of mind” (Kubala; 1998, p. 72).

**Study Habits and Time Management**

Litke (1998) reported that students in distance learning classes cited characteristics such as organization and independence (along with motivation) as being the most important factors that influenced their success. Flickinger (1999) observed that good study habits such as reading the assigned texts, reviewing lecture notes and course materials, making use of the supplemental materials, and reviewing past tests were all ranked by the students in the Internet class as important to their success.

**Other Factors**

Of course, there are factors other than motivation and organization that play a role in the success or failure of virtual students. The Institute for Higher Education Policy (1999) notes these factors could include gender, age, and educational experience.

In the “What’s the Difference?” report from the Institute for Higher Education Policy (1999), the following characteristics were correlated with student success:

1) students who rated themselves highly in terms of persisting on new projects;
2) married students;
3) students who felt the consequences of not passing were serious;
4) students who rated their chances of succeeding in their studies higher than non-completers;
5) students who did not need support from others to complete difficult tasks;
6) students with high literacy levels;

7) students who rated themselves as well organized in terms of time management skills and said they generally had the time to do what they intended to do;

8) students who rated their formal and informal learning as high in terms of preparing them for university studies;

9) female students. (p. 16)

Roblyer and Elbaum (1998) pose an interesting challenge for those designing virtual schools: “because there are indications that only students with a high need to control and structure their own learning may choose distance formats freely, we need to know more about the implications of this finding for serving those who most need additional learning opportunities” (p. 61).

One other demographic factor that needs significant research: Does the older demographic of distance learning help the dropout rate or hurt it? Are adult learners focused and goal-driven, or, as Carr (2000) postulates, are they pulled in too many directions by other commitments such as their job and/or their family?

**Does This Type of Learning Isolate Students? Or Make Them More Engaged?**

It is not clear at all if the nature of distance learning is inherently more or less engaging for the students. Does this depend on the teaching approach used? Closely related is the issue raised by Galusha (1997), who maintains that distance learning is student-centered learning. And how “isolating” virtual learning proves to be might partly be determined by how much of their education a student takes in that manner. A student taking one Web-based
class a day in a regular school setting would likely be less isolated than a home-schooled
student who takes all of her/his classes virtually.

It would seem no matter what the answers to the questions above, there is a need to
"humanize" the course, to make the focus on the students, not the technology. Or, as Wolcott
(1996) termed it, instructors need to identify strategies to reduce the "psychological
distance." One way that a school system could help bridge that distance, at least for students
who were taking virtual classes while they are on-site, would be to provide support by having
the student "virtual" work area clustered together and staffed by people who can answer
questions or offer advice.

*How to Improve Dropout Rates*

What strategies can help to reduce the relatively high dropout rates in distance
learning classes? Chyung et al. (2001) offer an extensive list, although most of these
suggestions are very similar to strategies that should work in traditional classes:

1) administering a preknowledge assessment that measured students’ previous

knowledge levels

2) breaking down the instruction into small weekly modules

3) informing students of the goals and objectives of the weekly instruction, and

   encouraging them to self-evaluate their weekly progress

4) providing students with clear criteria of expected performance levels

5) delivering instruction via multi media (when appropriate)

6) providing meaningful examples and analogies to help students learn new concepts

7) modifying instruction based on students’ background to help them see that the
instruction is relevant to their personal and professional interests

8) providing specific help and attention to the students with low preknowledge levels
9) monitoring individual students’ performance and providing immediate, frequent, and personalized feedback
10) encouraging students to monitor their own learning process
11) giving positive reinforcement to students as they make progress toward the course’s instructional objectives.

Providing effective guidance can be helpful, as well, in reducing dropout rates. Guidance counselors steer students away from Florida Online High School courses if they are poorly organized or weak independent learners (Trotter, 2001). Also, many online learning providers have prospective students take self-screening tests, to help the students determine if virtual education is appropriate for them. Some examples are listed in Appendix Q.

Conclusion

Virtual learning is growing rapidly, and the rate of growth seems to be accelerating. However, there are many concerns about virtual learning, and a large list of issues that need to be researched more thoroughly. Students who are very self-motivated can be successful at virtual learning, but for others, this style of learning could be much less effective. A better understanding of virtual schools, particularly from the student standpoint, will serve the educational community well as this new type of learning continues to expand.
References Cited


A CASE STUDY OF TWO HIGH SCHOOL STUDENTS AND THEIR STRUGGLES IN A VIRTUAL CLASSROOM

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Abstract

Virtual learning is growing much faster than our understanding of how it is different from traditional face-to-face learning. The literature related to how teaching needs to be different in a virtual environment is beginning to emerge, but there is very little research that illustrates the differences in the learning environment, particularly at the high school level. The high school student perspective of virtual learning is not well understood, and this lack of understanding has contributed to dropout rates in virtual courses that are much higher than in traditional courses. Before a high school offers a virtual course, before a teacher agrees to teach a virtual course, and before a student signs up for a virtual course, a better understanding of what the student is “getting themselves into” needs to be realized by all. The case study in this article details concerns in all of those aspects of virtual learning.
Virtual learning continues to expand rapidly in the United States at the high school level. It is estimated that between 40,000 and 50,000 high school students were enrolled in virtual classes during the 2001-2002 school year (Clark, 2001), and according to one market research firm, 12% of high schools in the U.S. are subscribing to some form of online curriculum (Manzo, 2002). A report from the fall of 2002 indicates that 32 states currently have some form of e-learning program, 12 states have virtual high schools in operation, and five additional states are developing them (Vail, 2002). According to online learning provider Jones Knowledge, which supplies the Florida Online High School with its course management system, K-12 schools in the U.S. currently spend approximately $2.2 billion for online education, and Merrill Lynch predicts this figure will increase to $7 billion by 2003 (McLester, 2001).

Despite this rapid growth in virtual learning at the high school level, the student perspective is not well understood. So far, most recent virtual learning research has focused on adult learners and postsecondary programs, because courses offered at a distance have deeper roots in those areas. Significant gaps exist in the research on this topic, according to a 1999 report by the Institute for Higher Education Policy. This report, which reviewed the contemporary research on the effectiveness of distance learning at the higher education level, finds many faults with that research. Specifically, the studies were faulted for an emphasis on student outcomes for individual courses, rather than evaluating the effectiveness of the total academic program. In addition, according to this report, the research does not take into account differences among students, and it does not adequately explain the consistently
higher dropout rate of distance learning courses. The Institute also faults current research for a lack of a theoretical or conceptual framework. In their review of research in distance education from 1990 to 1999, Berge and Mrozowski (2001) note similar methodological concerns. They cite numerous studies criticizing distance learning research, with the criticism focusing on a lack of control for extraneous variables, a lack of randomly selected subjects, a lack of reliability and validity of the instruments used to measure student outcomes, and failure to control for the attitudes and the feelings of the faculty and students involved.

Relatively little research has been conducted with K-12 virtual learning programs, and of that, little has been done from the student perspective. There is a small, but growing body of research relating to teaching in a virtual environment, but little about learning in one. A 2000 report from the Institute for Higher Education Policy entitled Quality on the Line: Benchmarks for Success in Internet-Based Distance Education lists a series of 24 benchmarks to help evaluate the quality of an online course. Those 24 benchmarks are divided into 7 categories: 1) Institutional Support Benchmarks, 2) Course Development Benchmarks, 3) Teaching/Learning Benchmarks, 4) Course Structure Benchmarks, 5) Student Support Benchmarks, 6) Faculty Support Benchmarks, and 7) Evaluation and Assessment Benchmarks. It should be noted that the word "student" is used only once in that list.

The student perspective has been studied to a degree. Allen, Bourhis, Burrell, and Mabry (2002) conducted a meta-analysis comparing student satisfaction in distance education with that of traditional higher education classrooms and found there was very little difference in student satisfaction, with the face-to-face classroom faring slightly better on this measure. In a study done at the secondary level, the students, teachers, and administrators of
the Concord Virtual High School (the nation's oldest, and one of the largest virtual schools) have expressed high levels of satisfaction in general (Kozma et al., 2000). However, Concord's VHS teachers have noted that they interact less often with students in virtual classes than in face-to-face classes, and while they are satisfied with the amount of learning in their VHS courses, they indicate the level of learning is lower than in the same classes taught in a traditional face-to-face format (Kozma et al., 2000). Students in VHS classes have also expressed some concerns, such as technical barriers in certain skill-based classes, and they were not as satisfied as face-to-face students with how quickly their assignments were returned. The VHS student dropout rate was higher than for students taking the same courses face-to-face (Kozma et al., 2000). The dropout rate in Florida's Online High School, the nation's largest with an enrollment of over 8,000, has averaged 25% (Trotter, 2001). National statistics are still sketchy, in part because institutions do not measure these rates in a uniform manner, but early indications are that retention rates are 10-20% lower in virtual classes, compared to traditional courses (Carr, 2000).

In sum, numerous studies (Neuhauser, 2002; Machtmes & Asher, 2000; Ocker & Yaverbaum, 1999; Schlosser & Anderson, 1994) indicate that distance or virtual learning is comparable in quality to face-to-face instruction. On the other hand, most of those same studies note that the dropout rate for virtual courses is higher than for face-to-face classes. In other words, for the students who "stick it out," the course has value. But why do more students drop out of virtual classes?

Engagement theory, as described by Kearsley and Shneiderman (1999), provides a framework in which to study the perspective of the high school virtual learner. Engagement theory is drawn indirectly from several other theories of learning, including constructivism.
Its fundamental idea is that students should be “meaningfully engaged in learning activities through interaction with others and worthwhile tasks” (Kearsley & Shneiderman, 1999). More specifically, engagement theory is based on the concept of creating teams that collaborate on projects that have an authentic focus or that are meaningful to people outside the classroom. For example, a class might divide into teams to create a CD-ROM that illustrates the history of their community. Each group could take a one-decade period of time and gather information through methods such as interviews of community members and trips to the local historical society. One additional group might be in charge of the technical aspects of the project. While this style of learning is not typical of most classrooms, virtual or face-to-face, the heart of engagement theory is collaboration and communication. Thus, a question worth considering is “How engaged are the high school students in virtual learning environments?” If the level of engagement is not very high, could that account, at least to some degree, for the high dropout rates that are typical in virtual learning? A qualitative approach, such as through the use of a case study, can be an effective way to approach this question. Qualitative research is “useful for exploring a complex research area about which little is known” (Gay & Airasian, 2000, p. 202).

This article describes a case study that was conducted to provide a deeper understanding of the high school student perspective in virtual classes. For the purposes of this article, virtual learning is defined as learning that can effectively occur in the absence of traditional classroom environments (Picciano, 2001). In this particular case study, the technology that was used to deliver the course was two-way interactive video running on a fiber optic network. This case focuses on a science class that was taught between two high schools in a Midwestern state.
Methodology

There are many different approaches to qualitative research. According to Kirk and Miller (1986), there are four phases of qualitative research: Invention, Discovery, Interpretation, and Explanation. "Interpretation denotes a phase of evaluation, or analysis; this phase produces understanding" (p. 60). One must be careful not to do too much packaging of the information, as that should occur in the Explanation phase. In other words, it is best to understand something in depth before attempting to explain it.

Maxwell (1996) describes a different, somewhat more complex approach: "The initial step in qualitative analysis is reading the interview transcripts, observational notes, or documents that are to be analyzed" (p. 78). "At this point, you have a number of analytic options. These fall into three main groups: memos, categorizing strategies (such as coding and thematic analysis), and contextualizing strategies (such as narrative analysis, individual case studies, and ethnographic microanalysis). These methods can, and generally should, be combined" (p. 78). Maxwell notes that in qualitative research, coding "fractures" the data and allows you to rearrange it into categories for analysis. The third main step, contextualizing strategies, takes an entirely different approach than coding strategies. An attempt is made to understand the data in context, "using various methods to identify the relationships among the different elements of the text" (p. 79).

The case study approach generally involves gathering data from a variety of sources to provide this context. A case is "the number of units--one--studied, whether the unit is a formal organization, a psychotic child, a community, or an encounter group" (LeCompte &
Preissle, 1993, p. 32). The data gathering for this particular case included multiple interviews and direct observation of students as they participated in their virtual class, and conversations with the high school principal and secretary at the remote site.

Data Collection for the Case Study

The case study was limited to a small rural high school in a county seat town in a Midwestern state. This particular school was an ideal candidate for this study in that its size and location lend itself to extensive use of virtual learning, and the researcher knew the principal well, which allowed easy access to the class and students. More specifically, the case study focused on two senior girls who took a science course via two-way interactive video during the spring of 2001. A similar-sized school in the same county was the originating site for the course. Several virtual classes were offered via two-way video during the spring semester, but this class was the easiest to observe for the researcher. Data were primarily collected during three observations of the virtual class and three interviews with the two students at the remote site. The first observation involved most of a school day, and it focused on gathering general information about the school itself. The first observation of the class on that particular day was relatively short, for reasons described below. The second of the three student interviews was only 10 minutes, because the subjects had to get to class, but the other two interviews were more in-depth, lasting approximately 30-40 minutes each. Transcripts of the two longer interviews are included in Appendix P. A detailed data gathering timeline follows.

February 20, 2001: permission to conduct the research was granted by the school
March 26, 2001: permission for the research was granted by the two students
March 31, 2001: permission for the research was granted by the teacher
April 2, 2001: first observation and student interview
April 2, 2001: brief interview with principal at remote site
April 2, 2001: brief interview with building secretary at remote site
April 27, 2001: second observation and student interview
April 27, 2001: interview with principal at remote site
April 30, 2001: third observation and student interview
May 1, 2001: phone interview with principal at remote site
May 4, 2001: member checking with students, principal, secretary

Data Analysis

The data were analyzed primarily by coding. The student interviews were transcribed and then shared with the students for the purposes of accuracy. The student responses in the interviews were coded and analyzed. The first level of analysis was focused on identifying themes that had been identified in the literature review. The second level of analysis was focused on identifying any additional trends or themes that might emerge. Several literature-based trends were evident in the very first interview. For example, there was a lack of a personal connection between the teacher and the students. Early in the first interview, one student said she wished the instructor knew "that we ARE people, that even though we’re not in his classroom, not there in the flesh, we’re across the TV screen, and it’s nice for him to include us." There were also technical difficulties, which are commonly mentioned in the literature; problems with the fax machine were mentioned in the first interview. However,
during that interview, a large number of other themes and concerns also emerged, and it was a surprise to this researcher how much these two students were struggling in this course. The students were both consistently failing the tests, and were in danger of failing the course. They indicated that they were not getting any individual help, and did not understand how they could get more help without embarrassing themselves in front of the students in the host classroom. Both students at the remote site indicated they were unsure about how the teacher wanted them to take notes, and they did not know how to prepare for the exams in this course. These trends and concerns helped to shape the questions for the subsequent interviews. For example, following transcription of the first interview, a note was made to ask about how they took notes and prepared for exams.

The observational notes served several purposes. First, they were used to describe the school environment in some depth. Second, these notes were used to describe the virtual class environment at the remote site. Finally, they were used to identify themes and to provide evidence of those themes. These notes were reviewed after each visit, and coded in a manner similar to the transcripts of the student interviews. Because the students did not feel personally involved in the class, care was taken during subsequent observations to note how often the teacher called on the students at the remote site and how he involved them in the learning process.

The interviews with the principal and the building secretary were not as in-depth as those done with the students. Most of these interviews were 10 minutes or less in length, and these conversations were recorded in the observational notes for that school visit. The phone interview with the principal on May 1 was 10 to 15 minutes in length, and the primary purpose of this interview was member checking (which is described in the following section).
Validity

In order to increase the validity of the case study, typical methods such as member checking and triangulation were used. Member checking is "systematically soliciting feedback about one's data and conclusions from the people you are studying" (Maxwell, 1996, p. 94). The participants were given transcripts of their interviews to check for accuracy, and were provided with a summary of the preliminary analysis of the data. Triangulation is "collecting information from a diverse range of individuals and settings, using a variety of methods" (Maxwell, 1996, p. 75). At the completion of the three interviews and observations, a summary was developed for review by the high school principal at the remote site. A concern about the validity of this research is that the experiences may be very different for students who take virtual courses through technology such as the World Wide Web, as opposed to those who take courses through two-way interactive video.

Results

The setting for this case study is Deer Valley Junior-Senior High School in Deer Valley, a rural town in a Midwestern state. (The names of all of the schools and individuals involved have been changed for the purposes of confidentiality.) The enrollment of the Deer Valley Community Schools during the 2000-2001 school year was approximately 600, and it was split evenly between the two buildings (the elementary building houses grades K-6, and the junior-senior high houses grades 7-12).
The 7-12 building is older, but well-maintained. Most parts of the building are two stories. The original part, which houses the junior high classrooms, the office, the media center, the auditorium and the vocal music room, was built in 1936 with help from the Work Projects Administration. The newer wing, which houses high school classes, plus the Family and Consumer Science rooms, the Industrial Technology shop, the art room, the band room, and the lunchroom, was constructed in 1960. Newer, more energy-efficient windows were added recently. The lockers and halls were painted two years ago. The floors are terrazzo. Ramps and a wheelchair lift have been added for handicap accessibility.

There is considerable technology available. There are four computer labs (two in each wing), plus a smaller lab in the media center. All of these computers are connected to the Internet, and each classroom also has at least one networked computer. There are two classrooms side by side that have two-way interactive video capability. These are in large rooms that were originally designed for kindergarten (which has since moved to the K-6 building constructed in 1985).

Students are casually dressed, wearing t-shirts, sweats, sweatshirts, and blue jeans. The halls are quiet, with a few students moving here and there, returning from doctor's appointments, etc. The high school and junior high are on separate schedules, with periods ending about 15-20 minutes apart. The staff is a mix of younger and older, but in general, older. Many teachers have been in the district for over 25 years.

The virtual learning class featured in this case study is a semester-long science elective. The origination site is Mount Zion High School, a similar-sized school located approximately 20 miles away in the southeast corner of Deer County. This course is scheduled for third period during the second semester of the 2000-2001 school year. Two
Deer Valley students are enrolled, both seniors, Andrea Johnson and Jennifer Carnegie. Jennifer plans to enroll in a community college next year. Andrea plans to go to cosmetology school. She had been planning to be an X-ray technician, which is why she took this class. She also took a Medical Terminology class from a community college via two-way interactive video last semester.

The room in which the science class is delivered is set up in a typical manner for rooms that use two-way interactive video. A front “teacher station” area with two large TVs, two cameras (one mounted, one a “document” camera), and two computers, one Macintosh and one Windows PC. An additional large TV is in the back of the room, easily seen from the front desk. The room seats approximately 16.

The technology coordinator’s office is in the other half of the large room. Originally designed for kindergarten classes, it was divided length-wise, creating two narrow rooms. The noise from the tech coordinator’s office sometimes “bleeds” into the classroom, particularly when he speaks on the phone.

Mount Zion has approximately 10 students in the science class, and it is predominantly sophomore and female, with just two boys and two seniors. The instructor is Mr. Dave Bauman, a veteran science teacher who is comfortable with the use of technology, having taught classes over two-way video for several years. The classroom at Mount Zion High looks to be a bit newer, with a more horizontal arrangement, and a seating capacity of 24. The teacher has a nice brick background behind him, and an iMac on his desk. The Deer Valley and Mount Zion schedules are close to the same, but the starting and ending times for each period are approximately 5 minutes different from school to school. At Deer Valley
High, third period begins at 9:58 and ends at 10:44. Mount Zion's schedule is about 5 minutes later.

**The Initial Interview**

The first observation and student interview were held on April 2nd, 2001, in the video classroom at Deer Valley High. There was very little class to observe, however, because the students in Mount Zion were taking a test. However, the Deer Valley students were not able to take the test, because it had not arrived. They were not sure when they would take the test, but assumed it would be the next day. Because the test had not arrived, Jennifer and Andrea had nearly two periods of time in which they could be interviewed. The main goal for this first interview was to gain an overall sense of how the class was going for them so far. Their responses to this general opening question focused on Mr. Bauman, and concerns they had about his teaching style, as indicated in Andrea's answer:

The teacher, well, he'd be a great classroom teacher, but he kind of leaves us out of a lot of stuff. We're not really a part of the class. I mean, once in a while, he'll talk to us, we'll check in, it'll be like attendance. It's just like it takes a special kind of a person or teacher, not necessarily a person, to teach over the TV or a long distance, and I don't think our teacher here has that.

When asked what feedback she would give to Mr. Bauman, if she were evaluating his teaching style, Jennifer said:

Let him know that we ARE people, that even though we're not in his classroom, not there in the flesh, we're across the TV screen, and it's nice for him to include us. I
mean, when they do labs, he has to understand what’s it doing to me and Andrea back here, because we don’t have a clue of what they’re doing up there, and so it would be kind of nice if they would do things that you could do over the TV, labs you could do over the TV. Like when they did the chicken bone experiment, they could pass it around the room, they get to look at it day by day, but here, Andrea and I are in here one hour a day. We can’t pop our heads in whenever we feel like it, so I think that’s the hardest thing.

Neither Andrea nor Jennifer has ever met Mr. Bauman or any of the other students in person. Their contact with Mr. Bauman was usually mediated through the high school secretary, Mrs. Linda Schroeder. All email correspondence went through Mrs. Schroeder, and all homework, tests, and quizzes that are sent between the two schools are sent through her, as well. In some cases, homework and study guides are sent back and forth using the fax machine in the video classroom, and both Jennifer and Andrea know how to operate it. On a regular basis, Mr. Bauman sends over outlines for the notes that will be taken in class. However, neither Deer Valley student was sure about how they are supposed to take notes. Jennifer’s comment is typical of many they make about the teacher’s expectations not being clear to them:

We don’t take a lot of notes, because he faxes over notes. We go down them as a class, well, he goes down them himself, and says what it is. Like, we’re doing the nervous system, what’s in the nervous system, things like that, it’s all written down for us. It’s kind of hard to keep up with it, because it’s not detailed, and he doesn’t
really tell us how he wants it detailed. So on the test, if he wants some parts labeled, we have no idea what’s going to be labeled, because he doesn’t explain that to us.

Later in the interview, Jennifer continues on the same theme:

It’s nice to have them in advance, so we’re not sitting here writing down notes. That part’s really nice, so we’re not running around not knowing what to do. But they’re just not detailed. They shouldn’t be detailed, because it’s our work, but he needs to tell us what to do. When we run down them, he needs to tell us “you need to write down the systems.” Let us know what he wants, or give us some ideas, because we’ve never had him before, we have no idea what he likes, what he wants. We don’t have a clue. Their grading scale is not even the same as ours.

This uncertainty about what was expected extended to tests, as well, as is noted in this excerpt:

Andrea: Like on our tests. We haven’t done that good on hardly any of our tests.
We’ll sit there and we’ll study, but it’s like when we get there . . .

Jennifer: It’s like nothing that we’ve studied.

Andrea: Because he always has these little nicknames for the stuff, but we didn’t hear that part of it. And sometimes it’s hard to hear, because either he will have his volume down, or sometimes we have problems with the video, it freezes, it goes all haywire.
Both Deer Valley students expressed a need for additional help, and they would like to have asked Mr. Bauman for that help, but they were unsure about how to get it. Jennifer’s comments are typical of their concerns:

And whenever they need help, they can just say, “I need help, teacher!” But when me and Andrea need help, we’re kind of on our own. We come in here once a day. He’s not on the TV screen all day. He’s on here one hour a day, and when the time’s up, he shuts the screen off, and that’s it.

It should be noted that Andrea has experience in a similar class, taken during the fall semester of 2000-2001. She describes her experiences in that course:

It was Medical Terminology. And that went a lot smoother than this, because she was used to teaching over video, she was used to having a class on TV. She would always be talking to you. She would carry on a conversation, she would just sit there and talk. I really feel like I knew who she was, but I never met her personally. It’s just that she was so involved with the outside centers. Because there were four other centers that were taking it over the TV, plus her classroom, and she involved everyone, all of us, every single day.

Andrea indicated that the Medical Terminology teacher was available by phone when she was needed, and she identified several other reasons why the Medical Terminology class went better for her, as she and Jennifer compared the two courses:

Andrea: She knew my name, for one. I mean, our teacher here, he knows our names, but . . .
Jennifer: He gets both of us mixed up. I've never been mixed up with you before, but there's a first time for everything. (Laughter)

Andrea: And whether we had a question or not, sometimes we'd feel like we're stupid, because we'll have to ask a question about something we don't understand but everyone else catches on to it, she goes over things a second time just to make sure that you know. And she, as you're going, she will write down notes about the main points and put them on the TV. We got all of these worksheets, and everything was sent out before the class even started. You had your books, you had every single one of your worksheets, she was very prepared. I just don't think he's that organized.

Technical difficulty with the two-way video network was another concern that was mentioned earlier. When asked how often these problems had occurred this semester, both students indicated that it had seriously malfunctioned about three times. When that happens, they shut off the system, inform Mrs. Schroeder (who emails Mr. Bauman), and they go to the art room (which is right across the hall from the video classroom) for the rest of the period.

Their grades in the science class were an area of high concern for both Jennifer and Andrea, because both said they were close to flunking. They both indicated that several other Deer Valley students who took this same science class in the fall semester also received low grades, but the students from Mount Zion seem to do very well. Andrea expressed her frustrations:

And a lot of it is we just really don't know what to expect. In his classroom, everyone is getting really good grades. I'm pretty sure of it. Because they always talk about
their grades. And you know, it should make him stop and think about it. How come those girls aren’t getting good grades?

The Deer Valley students approached their principal about the problems they were having, and he called Mr. Bauman to see if anything could be done. However, according to Jennifer, not much changed after the call:

He asked us what we’d like him to do, and we’ve tried to explain it, but we can’t really talk to him about our grades over here, but if we press this button, everybody hears it. We have no personal time with him. It would be nice to be able to talk with him as a teacher, and to get my grade, and maybe explain why I’m getting this grade, what’s bringing it down, instead of sending it to Mrs. Schroeder, and Mrs. Schroeder handing us a piece of paper saying, “this is your grade, take it or leave it.”

The Second Observation and Interview

The second classroom observation was held on April 27th, 2001. The main focus of this observation, and the brief interview that followed, was to look for additional examples relating to the concerns that were observed and expressed during the first interview.

Right before class started, Jennifer showed a letter that was faxed to her (and Andrea) from Mr. Bauman, expressing deep concerns about their grades. Some homework was missing, but of bigger concern was their poor performance on tests. As of that day, both of them were failing the class. Jennifer said that the plan was for them to dissect pig hearts today, but Mr. Bauman did not have enough pig hearts, so the Deer Valley students would not have one to dissect.
The start of the class was somewhat murky, at least from the perspective of the remote site. Mr. Bauman began the class by answering a few questions from the Mount Zion students, but because they did not push the button on their microphones, the Deer Valley students could not hear the questions. Mr. Bauman reminded the students at the originating site to push down their buttons when speaking. The less-than-smooth start continued when Mr. Bauman mentioned that he had left his note sheets for this lesson in his room upstairs (presumably his regular classroom), and also noted that he had started the day behind schedule, and it seemed to be getting worse.

The main topic of the day was the valves of the heart. On the previous day, they had discussed the general structure of the heart, and Mr. Bauman showed some heart diagrams on the TV screen by putting them under the document or ceiling-mounted camera, which is a standard feature in the two-way video classrooms. The diagrams were clearly drawn, and showed up well on the TV screens. The Deer Valley students generally looked at the TV in the back of the room, which was closer to them.

Not Paying Close Attention

During the class period, both Deer Valley students paid some attention to what was on the TV monitor, but also worked on their homework, completing worksheets. Now and then, they spoke to each other. Andrea mentioned to Jennifer that one day last week when Jennifer was gone, the teacher "freaked out" and got mad at a couple of the Mount Zion girls who were talking. In general, Andrea was more focused on the TV, and Jennifer more focused on her homework.
Mr. Bauman made effective use of several technologies during this class. After showing the heart diagrams and briefly reviewing what was covered yesterday, he then switched to the laserdisc player, which featured an animated sequence showing how blood flows from chamber to chamber in the heart. The video quality was good, and it demonstrated the process well. In addition to the use of the document camera and other video inputs, Mr. Bauman changed the video source (the picture that shows up on the TV screens) many times during the period. He regularly rotated through the Mount Zion student camera, the Deer Valley student camera, and the camera that was a closeup on him. For most of the rest of the period, the document camera was used to show a dissected heart. A pig's heart was used, as it is very similar to a human heart. Mr. Bauman carefully showed the parts of the heart, explained how they worked, and referred back to earlier diagrams in the process. This lesson was very effective; anyone who watched the demonstrations and listened to Mr. Bauman's clear explanations would have a basic understanding of how the heart works.

The teacher's original intention was to spend the last 15 minutes or so of the class dissecting hearts, but a class at Mount Zion Elementary needed them for a healthy living unit they were doing, so the high school science students did not get to do any dissecting that day. The last 15 minutes became work time. A few of the Mount Zion students went up to the front to look at the dissected heart, but most of them worked at their desk for the remainder of the period.

It is worth noting that after the quick question and answer session for the Mount Zion students at the beginning of the period, there was very little interaction with any of the students at either site during the class. The only time Mr. Bauman addressed the Deer Valley students was right before turning over the last 15 minutes for work time: "Andrea and
Jennifer, let me know if you want me to put up any part of the heart on the overhead camera.” They didn’t respond. It was the only time he mentioned their names or acknowledged them verbally during the entire class.

A Quick Debriefing

Jennifer and Andrea both had to go to physical education class right after their science class, so they only had a few minutes to visit. Their comments generally echoed concerns they had raised during the first interview: the lack of feedback they received, their continued poor performance on tests, and an overall feeling of being left out. They said they did not have the same opportunities for help or review as the Mount Zion students, and their grades were suffering because of it. In fact, they were fairly resigned to a very low grade in the class, and they were not sure if their principal was going to count this grade in their fourth quarter GPA’s. He had chosen to not include it during third quarter, in hopes that the class would go more smoothly during the second half of the semester.

Another concern was whether or not their homework was getting sent back and forth on a regular and timely basis. They said they regularly complete it and turn it in to Mrs. Schroeder, who is supposed to mail it or fax it to Mount Zion. The graded papers are returned in the same manner, but both girls questioned if the process was as quick as it could be. Andrea said Mrs. Schroeder told them “they had a bad attitude about the class,” and that it needed to improve.

As noted above, another concern was feedback. They felt they did not receive much feedback from the teacher, either via written comments, or during the class itself. Andrea mentioned that a couple of weeks ago, Deer Valley’s schedule was going to be disrupted by
several activities, so she had sent Mr. Bauman a schedule ahead of time so he knew about the potential problems, but he never mentioned anything about the schedule.

Tests were an important area of concern. The Deer Valley students had not fared well on the tests, which were given about every two weeks. They felt they were very different from the worksheets and homework, both in terms of style and content. They felt they understood the homework, and it matched the book and what was discussed in class, but they were really lost at test time. Jennifer said they feel left out when the class reviews for the tests: “He reviews with them.”

In general, the Deer Valley students said they felt “left out.” Earlier in the semester, they did dissect a cow’s eye, and someone drove the eye to Deer Valley High before the class. However, according to Andrea, Mr. Bauman did not preview or discuss in detail what they should do, or what to look for like he had done today with the heart. Instead, he walked around the room and told the Mount Zion students what to do. On the Deer Valley end, said Andrea, “it was like the blind leading the blind.”

Jennifer said she was getting all A’s and B’s in her other classes, and she was on the Honor Roll third quarter. However, no grade from the science class was figured into her GPA, or else she would not have made the Honor Roll. Andrea’s grades were not quite that good, but this was the only class she was failing, or even close to failing. She did not have a grade for this class on her third quarter report card, either. With approximately 10 class days remaining for these two seniors, they had pretty much resigned themselves to failing the class. They planned to complete all of their homework, do the best they could on any remaining tests and quizzes, and let the chips fall where they may.
The final class observation and interview were held three days later, on April 30th, 2001. The main purpose of this visit was to look for additional details about how the virtual class was conducted, and to gain some reflections from the two Deer Valley seniors as they closed out their experiences in this class. First, some observations from this class session.

The beginning of the class was smoother than the one three days earlier. Mr. Bauman seemed more focused, and the start of the class was much clearer at both sites. He quickly previewed the topic for the day (the cardiac system), and reminded the students about the quiz tomorrow. Several minutes were spent reviewing the format and content of the quiz. Mr. Bauman put up a heart diagram on the TV screen, and reminded the students that "there will be no word bank on this quiz." He involved both Jennifer and Andrea in the quiz review right away, calling on them by name.

After completing the review, Mr. Bauman launched into his lesson by putting an organizer on the overhead camera, and reminding the students about some upcoming due dates for homework. He explained concepts well, using good analogies and stories. He discussed his father-in-law's recent heart surgery, using the diagram of the heart to explain what went wrong and how it was repaired. He compared the flow of blood to a wave motion, as opposed to the steady flow of water through a faucet. He talked about how the regular rhythm of milking a cow is somewhat like the cardiac cycle. He explained that we can not really hear our heartbeat very easily, which is why doctors use stethoscopes to hear our heart at work; the valves do not close, they "slam shut," if they are working properly. He compared the sound of an improperly working cardiac system to another analogy: high winds making whistling noises through the cracks in windows and doors. He explained how athletes tend to
have lower heart rates, and mentioned that one of the Mount Zion students in the room, a girl cross country and long-distance runner, probably had a lower heart rate than the football player in the room.

Although Mr. Bauman largely operated in lecture mode, the Mount Zion students occasionally asked questions, and now and then he had to remind them to push their microphone button so the students at Deer Valley could hear the questions. As noted earlier, Mr. Bauman is comfortable using the technology that is available in his video classroom. During this class, for example, he used the laserdisc player to show an animation that demonstrates how the nerves stimulate the heart to beat properly (in cycle); this concept would be hard to demonstrate without technology. As was the case during the previous two observations, the Deer Valley students did not watch as closely as they should have; instead, they worked on their homework for the class. They looked up at what was on the screen now and then, but not often enough; Andrea looked up more than Jennifer did.

Some Reflection From the Deer Valley Students

On April 30th, the two Deer Valley seniors were within 10 days of the end of their high school careers. One of the purposes of this final interview was to gain some reflective thoughts about the virtual class. When asked, both Andrea and Jennifer said they would not take the class again, knowing what they know now. But if they did take the class again, there are some things they would do differently.

One thing they said they would change was that they would like to take more responsibility for contacting the teacher, and for making sure the homework got sent back and forth more regularly. Jennifer said that early in the semester, they were almost a week
ahead of the due dates for their homework, and during that time, the turnaround time was
good; their homework reached Mount Zion in time, and it came back quickly. Once they got
busier, and they did not finish the homework so far ahead of schedule, they said the process
took longer, and they were sometimes penalized for homework that was considered late.

Both Jennifer and Andrea pointed to some issues that they felt were largely out of
their control, particularly the weather and the school schedules. Jennifer described those
problems during this interview:

But they have a little bit different schedule. Because when we had those snow days,
we had to make them up. They wouldn’t have school on some days, so we wouldn’t
have this class. Our proms were on two different weekends, and they would have late
starts and we wouldn’t, or we would have late starts and they wouldn’t.

Both Deer Valley students felt Mr. Bauman did not do a good job of involving them
in the class, but that did mention that during today’s class that he involved them more than in
the past. When asked to compare, Jennifer said today’s involvement was more “than we’ve
ever had in this whole entire class. And it wasn’t very much, but it was nice to know he
thought we were alive.” They both wished this involvement had occurred more regularly
during the class. Jennifer said:

I think it would have made a difference, because at least now I remember what the
quiz is going to be over. Usually we walk up there, and go, “Oh, crap, what was the
quiz on?” And now I actually have a clue what he’s talking about. But if he’d just
involve us more like he did today. I mean he didn’t talk to us, but he asked us two
questions. Those were two questions I didn’t know before, but I know now. And that I’ll get right on the quiz.

Andrea also said the time spent reviewing for the quiz was unusual: “I guess today is the first time we actually ever reviewed for a quiz. I don’t think we’ve ever really gone over a diagram.” Andrea and Jennifer both stated that if they had been more involved by the teacher, they would have better understood the class’s expectations and concepts. Even with two weeks left in the class, it was clear from their comments that they did not understand the key concepts well enough:

Jennifer: They’re not hard if you know and understand them, but the whole thing is we don’t get them. The heart, yeah, I understand the veins go to the heart and the arteries go away, but I work in a nursing home, so of course I’m going to know that one. But there are just a lot of things that we have no idea what he’s talking about.

Andrea: I mean, the basic stuff, the general stuff that we learned in sixth grade health or eighth grade health, that’s the stuff that we get, but everything else it’s like . . .

Jennifer: What are you talking about? (Laughter).

It was clear to both of the Deer Valley seniors that they needed to ask for extra help, and on occasion, they did. However, they were both concerned about the lack of privacy involved in asking for help over the video system during class:

Jennifer: When we did talk to him, he would say, “Can anyone help her here in Mount Zion?” and it’s like, “Oh, God, I feel dumb now.” And they were pretty cool
about it, but they would chuckle at us. It's kind of embarrassing, two seniors over here . . .

Andrea: Looking kind of ditzy.

During this final interview, Jennifer and Andrea both said they would like to have established a more personal connection with Mr. Bauman and the other students in their class. Jennifer expresses it this way:

I'd love to just sit in the class for one day and get a feel for the subject. Get to know the teacher one-on-one. Just sit in the classroom with the rest of the students and let this teacher teach me what I'm supposed to know.

Andrea followed up on that sentiment: “Yeah. Maybe we should meet at least once a month. Take one day and meet them.” In seconding that idea, Jennifer provided a fitting ending for the interview: “Just so you feel like you know the guy, and at least he can tell us apart, finally. That would be nice if they could tell me and Andrea apart.”

Discussion

Based on the observations and interviews, it appears that a combination of factors caused the two Deer Valley seniors to perform poorly in the science class taken through the two-way video system. These factors include several that were within the control of the students, and several that were not. A lack of student engagement is at the root of many of these factors. Although the results of a case study are not generalizable to a larger population,
the suggestions included in this section are worth considering by any students, teachers, or administrators involved (or considering becoming involved) in virtual learning.

The students stated that they could have taken more responsibility for making sure their homework reached Mr. Bauman on time. However, they did not seem very cognizant of the fact that they did not pay close attention to the teaching that was available on the TV screen, but rather spent much of their class time working on homework, and on occasion, chatting when they should have been listening.

It would appear Mr. Bauman bears some of the responsibility for the poor performance of these two students, because he did not regularly involve the students at the remote site, and did not work to establish a personal connection with those students. Some educators would likely consider it to be the teacher's responsibility to address consistently poor performance in a high school class, while others would consider this to be primarily the responsibility of the students. While it can be more difficult to communicate at a distance, neither the students nor the teacher took advantage of the communication tools that were available to them to work through these problems. Also, neither the instructor nor the students made an effort to get together in person, until the last week of class.

Deer Valley High School also bears some of the responsibility for the poor performance of these two students. Specifically, it would appear the principal did not monitor the situation as closely as necessary, particularly after the students made him aware of their poor performance. Also, the school did not provide adult supervision in the video classroom; had an adult been in the room, the students may have paid closer attention.

Technical difficulties with the two-way video system, which apparently caused at least three classes to be canceled, also contributed to the students' poor performance, as did
the winter weather. Several days of school were lost at both the host site and the remote site due to an unusual number of severe snowstorms. It should be noted that if either school cancelled classes, or had a late start due to the weather, it caused the students at the remote site to miss class. Although little can be done to control the weather, frequent technical difficulties with the two-way video system can (and should be) addressed by the organization that is responsible for its maintenance.

The combination of these factors led to a lack of understanding by Jennifer and Andrea of many key concepts. This lack of understanding resulted in poor academic performances by both students, particularly on tests. Eventually, because none of the factors improved significantly during the semester, Andrea and Jennifer became resigned to receiving poor grades in their virtual class.

Conclusion

From the examples listed in the case study above, it should be clear that many processes and procedures relating to virtual learning were part of the problem for the Deer Valley students, not part of a solution. Students, teachers, and administrators need to have a clearer understanding of what is involved and required in virtual learning. If that understanding is not attained by all parties involved, some students will likely continue to struggle needlessly, teachers will become frustrated, and these particular schools may cut back on their virtual class offerings. Judging from the limited amount of scholarly work in this area, additional research is needed, and inservicing in sound teaching practice is necessary to improve the virtual learning experience for all involved.
References Cited


Abstract

This article details a descriptive study in which a survey was developed and distributed to students in virtual classes in over 100 high schools in the state of Iowa. Among the students returning surveys, the most common pattern was a senior female taking a class through the Iowa Communications Network (ICN) from a nearby community college. Two-thirds (67%) of the students responding to the survey were female, and 63% of the classes were taken from community colleges. Over 83% of these courses were taught through the ICN, and browser-based classes made up 15% of the total. Eighty-one percent of the classes were taken for college or dual (both college and high school) credit.

Three common reasons were given for taking the virtual classes: 1) their school did not offer this class, 2) this class gave them a head start on college and/or their career, and 3) they received free college credit. Lecture was listed by 69% of the students as the primary teaching method used in the virtual class. Most students indicated that the experience was a positive one, and 76% said that they would take the class again. Those who said they would not take the class again most frequently mentioned concerns about the teaching methods and
the lack of face-to-face contact with the teacher. Perceived learning was a strong predictor of course satisfaction. Of those who felt they learned more in the virtual class than in their face-to-face classes, 97% said they would take the class again. Among those who perceived they learned less, only 38% indicated they would take the class again.

Introduction

Distance learning has existed in some form or another for over 150 years (Schlosser & Anderson, 1994). In the past half decade, distance learning has expanded rapidly, fueled by widespread access to relatively new technologies such as the Internet, fiber optics, and digital video. One recent study estimates the market for Web-based learning will grow from $2.1 billion in 2002 to $33.6 billion in 2005 (McLester, 2002). Some examples from higher education: according to a 2000 report from a Presidential commission, the number of distance education programs increased 72% from 1994-95 to 1997-98, with approximately 1.6 million students enrolled in distance education classes in 1997-98 (Institute for Higher Education Policy, 2000). In 1998, 62% of four-year colleges offered distance learning courses. That number is expected to grow to 84% by 2002. The number of courses offered at a distance by four-year colleges was over 6,000, and the number of students enrolled in those courses is expected to grow from 710,000 in 1998 to 2.2 million in 2002 (Power of the Internet for Learning, 2000). A 2001 report indicates that 70% of universities are using some form of online education (Loupe, 2001). With 15 million students enrolled in higher education in the United States, the growth potential is large. From a worldwide perspective, it
is estimated that there are an additional 84 million higher education students (Power of the Internet for Learning, 2000).

While higher education has been the leader in online education, K-12 schools are also rapidly going online, and the potential market is large. In the United States alone, there are approximately 50 million students enrolled in public schools in grades PreK-12 (United States Department of Education, 2001). Many school districts are starting to take advantage of courses offered through public organizations such as the Florida Online High School, or private organizations such as APEX Learning, which offers Advanced Placement (AP) courses online. A large variety of organizations, both public and private, offer virtual classes to high school students. In some cases, the primary purpose of these organizations is to serve post-secondary schools, but in other cases, the courses are primarily designed for high school students.

A fall 2002 report notes that 32 states currently have some kind of e-learning operation, 15 states have virtual high schools in operation, and five additional states in the process of developing one (Vail, 2002). Another study indicates that 40,000 to 50,000 K-12 students were projected to enroll in some kind of online course during the 2001-2002 school year (Clark, 2001). According to one market research firm, 12% of the nation’s high schools are subscribing to some form of online curriculum (Manzo, 2002). Some of the more established virtual schools command a large share of the market. The oldest is the Concord VHS, which was founded in 1995 by the Concord Consortium, a non-profit educational research and development organization. During the 2000-2001 school year, they enrolled approximately 4,000 students from 30 states in a total of 94 courses (Kozma et al., 2000). Enrollment for the Florida Online High School alone for the year 2001-2002 was 8,200
Debuting in 1996, the Florida Online High School has doubled its enrollment every year (Semas, 2001). K-12 schools in the U.S. currently spend approximately $2.2 billion for online education, according to online learning provider Jones Knowledge, which supplies the Florida Online High School with its course management system. Merrill Lynch predicts this figure will increase to $7 billion by 2003 (McLester, 2001).

It should be noted that the terms “distance,” “virtual,” and “online” will be used to a large degree interchangeably throughout this article, although it is recognized that their meanings are not exactly the same. However, for the purposes of this article, more precise definitions of virtual learning and virtual high schools are needed. Picciano (2001) defines virtual learning as learning that can effectively occur in the absence of traditional classroom environments. This definition accommodates both the technological and non-technological aspects of learning, and serves well as the operational definition for this article. Virtual high schools can be considered a subset of virtual learning. Most of the institutions that classify themselves as “virtual high schools” make use of two-way interactive video, Web-based courses, or a combination. With streaming video and desktop conferencing becoming widely available, it is likely that Web-based courses will increasingly utilize video technologies. So, perhaps a virtual high school can be defined in the following manner: an organization that offers an array of high school courses through the use of interactive technologies such as the World Wide Web or two-way video.

Long-term research about distance learning indicates students generally learn just as well as do students in face-to-face, traditional classrooms (Neuhauser, 2002; Ocker & Yaverbaum, 1999; Machtmes & Asher, 2000; Schlosser & Anderson, 1994). Recently, the
No Significant Difference Phenomenon Report presents similar findings (Institute for Higher Education Policy, 1999). With the strong growth in distance learning that is occurring, and a huge worldwide educational market of potential distance education students, it might be tempting to conclude that this recent growth will continue unabated until most students are enjoying the benefits of a virtual education.

However, according to a review done by the Institute for Higher Education Policy, "a closer look at the evidence suggests a more cautious view of the effectiveness of distance education" (Institute for Higher Education Policy, 1999, p. 1). That review expresses several reservations about distance learning research. Specifically, the review notes a shortage of original research dedicated to explaining phenomena related to distance learning (including dropout rates that are much higher than in face-to-face classes), and that the overall quality of the research is questionable, rendering many of the findings inconclusive. Also, much of the research does not use randomly selected subjects, and does not control for extraneous variables or the feelings and attitudes of the subjects involved (Institute for Higher Education Policy, 1999). A review of the distance education research from 1990 to 1999 found similar widespread concerns about the methodology used in these studies (Berge & Mrozowski, 2001).

As noted above, the student dropout rate is historically higher in distance learning classes. This trend has continued with Internet-based courses, with many courses experiencing dropout rates of 50% or more (Trotter, 2001). In the case of Florida’s Online High School (FHS), the dropout rate has averaged 25%. In the FHS, there is a 29-day no-fault withdrawal period (Trotter, 2001). In the case of the Concord VHS courses, Kozma et
al. (2000) reports that dropout rates for both the face-to-face and online courses are low, but the online rate is higher.

Here are several examples from the Institute for Higher Education Policy’s “What’s the Difference?” study: in one case, only 40% completed the course; in another, one-third of the students in a videoconferencing class received incompletes, compared to only 15% in an on-campus class; in another study, 95% of resident students completed the course, as compared to 64% of the students who were taught by computer-mediated methods; and in one final case, there was a 32% dropout rate for the computer-mediated group, as opposed to 4% taking the same course on-campus.

Some additional examples from a variety of institutions, some of which are secondary and others of which are post-secondary: In California’s AP program, there were 204 students enrolled statewide, and nearly a third dropped out (Carr, 2000). From 1989 to 1996, dropout rates in distance education courses at Boise State averaged 44% (Chyung, Winiecki, & Fenner, 2001). In a distance learning study that involved community college and high school students, dropout rates were approximately 40% in the high school group and 33% in the community college group (Roblyer, 1999). One school district has shown an 11 to 15 percentage-point difference between course-completion rates in the district’s on-campus courses and those in its distance-education courses. That figure has stayed fairly consistent over the 18 years that the district has offered distance courses (Carr, 2000). One study of particular concern indicated a high dropout rate for students who were academically average or below average (Kirby & Roblyer, 1999).

Extensive data exists indicating that the dropout rate is higher in virtual classes than in traditional ones. However, the causes of these higher dropout rates are not well-
established. Most likely, many factors account for this difference, some of which relate to the student, and some of which relate to the course and how it is taught. Galusha (1997) attributes some of the causes to insecurity on the part of the distance learner, relating to the financial costs, the disruption of family life, a perceived irrelevance about their classes, and a lack of support from employers. In her 1999 case study, Flickinger speculated that the higher dropout rate for the Internet version of the college-level biology course was due in part to a lack of student-student interaction.

Clearly, distance learning, and the rapidly growing segment that can more precisely be defined as virtual learning, is a phenomenon that needs additional research. This article will describe a study that begins to fill in some of the gaps in the research relating to virtual learning at the high school level, with a particular emphasis on the student perspective. In its 1999 report, the Institute for Higher Education Policy faulted the virtual learning research for a lack of a theoretical framework. Engagement theory, which focuses on student involvement, can provide that framework. As described by Kearsley and Shneiderman (1999), technology can facilitate meaningful student engagement through the use of worthwhile tasks and interaction with others. Engagement theory is drawn indirectly from several other theories of learning, including constructivism. Its fundamental idea is that students should be “meaningfully engaged in learning activities through interaction with others and worthwhile tasks” (Kearsley & Shneiderman, 1999). More specifically, engagement theory is based on the concept of creating teams that collaborate on projects that have an authentic focus or that are meaningful to people outside the classroom. For example, a class might divide into teams to create a Web page that contains information about all of the businesses in their community. Each group could take one sector of business (such as
grocery stores) and could meet with each of the store owners to develop a Web page for each store. Although most classrooms (virtual or face-to-face) do not use authentic assessment to this degree, the collaboration and communication aspects of engagement theory can be used to better understand the learning that occurs, particularly from the student perspective. The question can be asked, "How engaged are the students, and what effect does that level of engagement have on the learning that occurs in the class?"

Statement of the Problem

The experience of the high school virtual learner is not well understood. Dropout rates for distance learning have historically been much higher than in face-to-face classes, and so far, that has also been true for courses offered through current technologies such as two-way video and the Internet. Interest and enrollment in virtual learning has been growing rapidly; before more educational resources are invested in this type of learning, it is in the best interest of all of the stakeholders (including schools, teachers, parents, and students) that a better understanding is developed of the student experience in these virtual courses.

Research Questions

In order to begin to fill in this gap in the literature, a descriptive study was conducted. The research questions that were addressed in this study included:

1) Who is taking these classes?
2) What classes are they taking?
3) From what institutions are they taking these classes?
4) Why are they taking the classes?
5) What is the virtual learning (VL) experience like for these students?
   a) How is it similar and dissimilar to traditional face-to-face classes?
   b) Would they take the class again? Why or why not?
   c) What role does teacher-student interaction play?
   d) Did students perceive that they learned as much as in face-to-face classes?
   e) Did students have enough technical training and support to succeed?
   f) Do students with higher grade point averages (GPA's) fare better in virtual
      courses than those students with lower GPA's?
   g) How do the students' perceptions about the amount of effort
      and learning involved in the class affect their satisfaction?

Methodology

A descriptive study design was chosen to answer these research questions. While
qualitative research also relies on description, a descriptive study is primarily a quantitative
approach that involves the collection of data to answer questions about the current status of
the topic of study. Descriptive data of this type are normally collected through self-
administered questionnaires (Gay & Airasian, 2000). In addition to the standard literature
review that is detailed in the first article in this dissertation, a case study was done in order to
provide a broader research base for the descriptive study. The case study is described briefly
below, and in detail in the preceding article in the dissertation.
Development of the Survey Instrument

This survey was developed throughout the entire year of 2001. After a review of the research, an informal case study of students enrolled in a virtual class was conducted in order to gain a sense of the questions that should be asked on the survey. Deer Valley High School, a small rural school in a Midwestern state, was the setting for the case study (the names of the schools and the individuals were changed for the purposes of confidentiality). Deer Valley was selected for several reasons. First, the researcher was familiar with the high school principal, making access to the students relatively easy. Second, like many small, rural schools, Deer Valley has a lengthy history (over 10 years) of providing their students with education at a distance, primarily through a two-way interactive fiber optic network. The case study provided the researcher with a better understanding of the student perspective of virtual learning, and it helped to clarify which questions should be asked in the survey, as discussed below.

Following the case study, an initial draft of the survey was created and shared with the researchers' major professor. After some revisions, the draft was shared with a graduate-level seminar class in the College of Education at Iowa State University during the 2001 fall semester, which provided valuable feedback. Based on that feedback, additional changes were made. At that point, the survey was piloted by six students who had taken virtual courses in the past two years. The cover letter and instructions were reviewed by several guidance counselors with whom the researcher had worked in the past. The research proposal and survey were both approved by the researcher's doctoral committee. After the committee's suggestions were incorporated, the study proceeded. The final version of the survey is included in Appendix C.
The survey condenses the original research questions, grouping those questions into these four categories:

1) What virtual courses are high school students in Iowa taking?
2) Who is taking these virtual courses?
3) Why are they taking these courses?
4) What is the virtual course experience like for these students?

The survey instrument addresses each of these four questions in the following ways:

Question #1: What virtual courses are high school students in Iowa taking?

This question was addressed directly early in the survey, which asked which virtual course was taken in the fall, and which educational institution provided that course. The survey specifically accommodated semester-length and year-long courses. Because this survey was distributed during the spring semester, students taking a spring semester-only course were not asked to complete a survey, as they would not have been very far into that course. However, by the time they received the survey, students in year-long virtual courses had been in those classes for approximately three-quarters of the school year, and so they should have had a good sense of what it was like. If students took more than one virtual class, they were asked to fill out separate surveys for each class. In addition to the name of the course and the institution offering the course, the survey asked about the primary technology used to deliver the course, allowing easy categorization between classes delivered via the Internet and those delivered via two-way interactive video (typically through the Iowa Communications Network).
Question #2: Who is taking these virtual courses?

Several questions in the survey were directed toward answering this question, specifically addressing key demographic categories such as gender, grade level, and post-graduation plans. In addition, guidance counselors were asked to provide information about the students' grade point averages, class rankings, and class sizes. (See Appendix I for this part of the survey packet.) While it is possible that students in Iowa in grades below the high school level were taking virtual classes at the time of this survey, it is likely that those numbers were very small, and so it made more sense to focus the survey at the high school level.

Question #3: Why are they taking these courses?

Only one survey item directly addressed this research question: "Why did you take this course?" On earlier drafts of the survey, several possible answers were listed as choices. However, based on feedback gathered from the graduate-level seminar class, this question was changed to an open-ended format. Instead of presenting students with a pre-set list of choices, it made more sense to allow the reasons to emerge from their answers. This open-ended question was more difficult to analyze, but the data were more reflective of the students' reasons for taking the courses. The survey item that asked about course credit is also related to this research question.
Question #4: What is the virtual course experience like for these students?

The majority of the items on the survey were directed toward answering this research question. The questions that fell into this category include those that address the teaching methods, the interactions between the students and teachers, the interactions among the students (if any), the technical difficulties they encountered (if any), how much time they spent on the class, and how this class compared with face-to-face classes in terms of effort required and learning that occurred.

The survey addressed all of the areas of concern identified in the literature review (personal interaction, student-to-student interaction, course evaluation, minimum technology competencies for students, reliability of the technology, and technical support). Many of those same areas of concern were noted in the case study done at Deer Valley High School. Beyond the motivation level and self-discipline level of the two students involved in the case study, there were clearly some factors that had a negative influence on their performance. The most prominent of these factors related to the lack of interaction between the teacher and the students (both in and out of class), and the lack of interaction between the Deer Valley students and those at the host site. Several questions in the survey addressed the level of interaction present in the course, including the interaction between the students and the teacher, and the interaction among the students themselves.

Some of the survey items that focused on the course experience were open-ended (some examples: "What was the most positive aspect of this course?" "What was the most negative aspect of this course?"), but these were essentially quantitative questions, not questions that were designed to yield detailed answers. To gain a deeper understanding of what this course was like for the students, the survey also asked if they would be willing to
In some cases, based on the survey responses, additional questions were developed to follow up on those responses. Examples of pre-determined questions that were individually tailored:

1) Several of you mentioned that there were technical problems with the ICN. How often did that occur? How much, if any, did these problems interfere with your learning?
2) There were several comments about the teaching style used in this class. Can you tell me more about that?
3) Some of you wrote that you didn’t like the time of day for the class – the early hours before school. If you could have taken this course through the Web, and worked on it during study hall during the day, would that have been an improvement?

And, of course, there were follow-up questions, as dictated by the flow of the interview. For most researchers, the easy part is asking the questions and getting answers. The real work comes in the analysis of the interview data; a variety of approaches are described in the next section, which focuses on analysis.

Analysis of Survey Data

Because relatively little is known about the high school student perspective of virtual learning, the purpose of this study is descriptive. The analysis of this student survey data is generally quantitative in its approach. The quantitative methods used in the analysis of the
survey data range from the simple (totals, percentages, etc.) to the more complex, such as chi-square analysis. Most of the data in the results are described, as opposed to statistically analyzed, because the results are fairly straightforward, and because this is a descriptive study. As Robson (1993) notes, researchers using simple research techniques can generally "eyeball" the data, and "claim that if statistical techniques were needed to tease out any effects, then the effects were not worth bothering about" (p. 367).

Descriptive statistics are used to present most of the survey results. These include measures of central tendency such as mean and median (Gay & Airasian, 2000), and figures such as bar graphs and pie charts (Sommer & Sommer, 2002), as appropriate to the data. In a limited number of cases, a chi-square analysis was used to determine what Robson (1993) describes as "goodness of fit:" how closely do the data fit with the expected or predicted results.

The responses to the open-ended questions in the survey were coded and analyzed for trends and common tendencies, as described in Sommer and Sommer (2002). These data are generally displayed in tabular form, and occasionally in graphical form. Many of the same trends that were noted in the literature review and the preceding case study were also evident in the survey results. For example, a common concern expressed in the survey responses was a lack of face-to-face contact with the teacher. However, other, unexpected trends became evident, as well. For example, from the very first set of surveys that were returned, there were many more female respondents than males. This early trend was noted, monitored during the data entry process, and reported in the findings.

The student responses to each survey question were entered into a Filemaker Pro database, then manipulated, as appropriate, for the purposes of analysis. Filemaker was
chosen because of its relatively simple and very flexible interface, and because data can easily be exported for analysis that requires different tools (such as a spreadsheet or statistical analysis program). For example, in order to determine the average GPA of the students in this survey, several of the key fields (including GPA, of course) were exported from Filemaker and imported into Excel, allowing for easy calculation of the mean. Another advantage of importing the data into a spreadsheet such as Excel is that charts and graphs are easily produced using the built-in Wizard feature.

Data were analyzed across several dimensions, among them demographic. A detailed description of the analysis is included in the Results section below. Demographic differences were noted related to gender, grade level, GPA, and class rank. Other areas of analysis involved differences among the various types of delivery systems, as well as the amounts and types of interactivity that were a part of the class.

The post-survey interviews were transcribed and coded. The data from these interviews were used for two main purposes: triangulation (as described above), and to provide more detailed comments that illustrate the themes that emerged from the survey data. Many of the interview questions were tailored to address issues that arose in the survey responses. For example, several questions were asked about how the students were able to communicate with the teacher outside of the regular class period, as that was a common source of concern. Quotes from these interviews help to put a clearer, more three-dimensional face on the survey data. For example, when asked what feedback she would give to her virtual teacher, one student said, “Stay on the subject. She tried to tie everything we did into her other job. That’s fine if that’s what the class was about, but it wasn’t. So it
seemed like we were there so she could gossip about her work. She would go off forever, and it was boring.”

Data Collection

To begin the actual survey process, a mailing was sent to all 400 accredited high schools in the state of Iowa, including public, private, and alternative schools. Of this total of 400, public schools made up the highest number (365), followed by private schools (31), and alternative schools (4). This initial mailing (see Appendix B) went to the high school principals, and it asked if they would be willing to participate in a survey of their students who were taking virtual learning classes in the fall of the 2001-2002 school year. (Iowa does not have a Virtual High School in the same sense as states such as Florida, but Iowa high school students are taking virtual courses from a variety of institutions. A listing of institutions that offer virtual courses is included in Appendix J.) A total of 257 schools responded to this initial mailing. Of those 257 schools, 116 (45%) had no students taking virtual classes during the fall semester. Of those 141 schools that did have students taking virtual classes in the fall, 106 (75%) were willing to participate in the full survey.

A second mailing was sent to the guidance counselors at those 106 schools, which consisted of several parts. (See Appendices B through I for an example of the mailing.) At its core, the mailing consisted of surveys for the students (Appendix C) and directions for administering the survey (Appendix G). A self-addressed, stamped envelope was included for the counselors to use to return the completed surveys. In Iowa, guidance counselors are the “gatekeepers” for virtual classes, and students generally cannot sign up for them without
the approval of their counselors. Thus, the counselors are familiar with who has signed up for virtual classes, and they were the ideal group through which to distribute the survey.

This second mailing produced 241 student surveys from 65 different schools, 61% of the original 106 that agreed to participate. This rate of return was achieved with minimal followup. No additional reminders were sent out, and no phone calls were made. In essence, the original sampling of 400 schools eventually produced returned surveys from 65 schools, or 16% of the possible total. This process is represented below in Figure 1. Of those 65 schools, 63 were public schools, two were private schools, and there were no alternative schools that returned surveys.

The 241 returned surveys represent data from all across the state, from a variety of school sizes and types. Specifically, all 15 Area Education Agencies (see Appendix K) were represented, as were 53 of Iowa’s 99 counties. Also, the high school sizes ranged from 1335 in the top three grades (Iowa’s 6th largest) to 75 (Iowa’s 33rd smallest). The average high school size of the schools that returned surveys was 250. This would rank 135th in size of the 400 high schools in Iowa. The average size of the high school that indicated they would be willing to participate in the survey was 240. This would rank 140th of 400 in size. The median school among the 65 that returned surveys had an enrollment of 180 students in high school. The median school among the 400 originally sampled had a high school enrollment of 183. These figures indicate that the group of 106 high schools that agreed to participate is very similar in average size to the group of 65 schools that actually returned them.
Of the 241 students who returned surveys, 117 (49%) indicated they would be willing to participate in a follow-up interview. Two follow-up interviews were conducted, one with a group of three students from the same high school who took a college class through the ICN, and the other was with one student from a different high school who took a community college class through the Internet.

Results

With nearly 250 returned surveys, this study has gathered a large amount of data about high school students in Iowa in virtual classes. Using the original research questions as an organizing framework, here are some of the key results of this survey:
1) *Who is Taking These Classes?*

The survey results reveal the most common pattern is a female senior taking a course through the ICN from a nearby community college for both high school and college credit. More specifically, the 241 students were made up of 161 females (67%) and 80 males (33%), which is displayed below in Figure 2.

![Figure 2. Gender of the survey respondents](image)

The group responding to the survey was strongly dominated by seniors, which numbered 159, or 66% of the respondents. Juniors numbered 59 (24%), sophomores totaled 21 (9%), and there were two freshmen (1%). These data are displayed in Figure 3.
There was a range in cumulative grade point averages (GPA's) from 4.132 to 1.72, and the average was 3.37. Of the 241 surveys returned, there were 119 with GPA's of 3.50 or better (49%), and just four had a cumulative GPA of 2.0 or less. Only 55 (23%) had a GPA below 3.0. In terms of class rank, the students responding to this survey were heavily skewed toward the top half of their class. In fact, 80% (or 193 of 241) were ranked in the top half of their class. Over half (55%) of the 241 students responding to this survey were in the top quarter of their class, and 26% of the responding students were in the top 10 percent of their class. Overall, the average student responding to the survey ranked 21st in a class of 74, putting them solidly in the top third.
All of the respondents except one planned to pursue post-secondary enrollment, and that one individual planned to enlist in the Army. Most (84%) intended to attend a four-year college or university, either right out of high school or after some time at a community college. Nearly a quarter of these students (24%) planned to attend a community college. Approximately 19% planned to eventually go on to graduate school. These data are displayed below in Figure 4.

![Figure 4](image_url)

Figure 4. College plans of the students responding to the survey, by percent

Most of these students (202, or 84%) have Internet access at home. In most of these cases, they did not use this access for the purposes of their virtual course; however, in some cases, they did the majority of their virtual work from home. More details are contained below in the Auxiliary Findings section.
2) What Classes Are They Taking?

A total of 90 unique courses were identified in this survey, and a complete list is contained in Appendix L. Of the 241 total courses, most (201, or 83%) were taken through the ICN, and only 37 (15%) were taken through the Internet. In a few cases, other delivery methods were indicated, and some students left this question blank. These 90 unique courses were spread out over a wide variety of curricular areas, as noted in Table 1 below. A complete list of the courses organized by vocational areas is included in Appendix M.

Table 1. Virtual courses taken by the students in the survey, arranged by curricular area

<table>
<thead>
<tr>
<th>Curricular Area</th>
<th>Number of Courses Taught (N = 241)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Studies</td>
<td>24</td>
</tr>
<tr>
<td>Vocational</td>
<td>22</td>
</tr>
<tr>
<td>Math</td>
<td>16</td>
</tr>
<tr>
<td>Language Arts</td>
<td>15</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>6</td>
</tr>
<tr>
<td>Business</td>
<td>3</td>
</tr>
<tr>
<td>Science</td>
<td>2</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

The most commonly taken courses were spread among several of these curricular areas. Similar courses often have different course titles, depending on the institution offering
the course, so the list in Table 2 was compiled by identifying the key words in the title. Table 2 lists the top 10 course subjects in terms of enrollment among the 241 total courses. On a related note, only 15 (or 6%) of the classes were Advanced Placement (AP). Seven of those classes were AP Composition, 4 were AP Calculus, and 4 were AP History.

A majority of these 241 courses (156, or 68%) were fall-semester only, and 69 (or 30%) were full-year classes. A small number fell under other schedules, such as trimesters, matching the system of the post-secondary institution offering the class. As noted in Table 2, the top courses in terms of enrollment were taken from a variety of institutions. More information about the number of institutions involved is provided in the next section.

A small number of students (19) took more than one virtual class during the fall semester, and a few students took most, if not, all of their classes virtually. One student took seven virtual courses during the fall semester. It is important to note that each returned survey was treated as a unique individual, although some students put comments about multiple courses on the same survey form. Most of the students taking multiple courses followed the directions carefully and filled out a separate survey for each course they took. It should be noted that a student who took three courses and filled out three surveys (for example) was treated as three individuals in the total of 241, for the purpose of data analysis. If a student filled out one survey that contained remarks about multiple courses, an effort was made during data analysis to determine which comments went with which course. If that determination could not be made, the comments were disregarded. As noted above, very few students did not follow the directions to fill out a separate survey for each course, and the impact of the data from those surveys on the overall results of this study is minimal.
Table 2. Top virtual classes in terms of enrollment

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Number of survey students</th>
<th>Number of different institutions involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 241)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>Composition / Writing</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>Medical Terminology</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Calculus</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Health Occupations / Careers</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Statistics</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Sociology</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Criminal Justice</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Nursing</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

3) From What Institutions Are They Taking These Classes?

A total of 29 different institutions were mentioned among the 241 responses (see Appendix N for the complete list). Community colleges (16) made up over half of this total. Two Regents institutions (Iowa State University and the University of Iowa) were included, as were three private four-year colleges or universities. There were 6 different high schools mentioned as originating sites for courses, and 4 other educational institutions were listed. All but 2 of these institutions are in the state of Iowa. The exceptions were Brigham Young University and APEX Learning.
Of the 241 responses, 153 (or 63%) were for classes taken from community colleges. In almost all cases, the students were taking the class from a community college that was within their Area Education Agency (AEA). In fact, of these 153, only 5 were taken from a community college outside of their school’s AEA, and those 5 were from a school that is right on the border of that particular AEA. As displayed in Table 3 below, this preponderance of community college classes matches ICN usage data, which indicates that community colleges are the biggest users of the ICN. According to a report from the 2000-2001 school year, community colleges offered 489 of the 881 courses taught over the ICN.

Table 3. Comparison of ICN usage data with institutional data from the survey

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Community college</td>
<td>489</td>
<td>56%</td>
<td>58</td>
<td>66%</td>
</tr>
<tr>
<td>K-12 District</td>
<td>83</td>
<td>9%</td>
<td>13</td>
<td>14%</td>
</tr>
<tr>
<td>Indep. College/Univ.</td>
<td>107</td>
<td>12%</td>
<td>8</td>
<td>9%</td>
</tr>
<tr>
<td>Regents University</td>
<td>190</td>
<td>22%</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>AEAs</td>
<td>12</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Eighty-three were sponsored by local K-12 school districts, 190 were sponsored by Regents institutions, 107 by independent colleges or universities, and 12 were sponsored by area education agencies (Eastern Iowa Community College District, 2001). It is important to note
that the numbers from this ICN report cover K-12, college/university, and adult education, whereas the numbers in the survey are from high school students only.

In looking at the unique set of 90 classes taken by the survey respondents, 59 (or 66%) were sponsored by community colleges. Nine were sponsored by high schools, 8 by private universities, 6 by Regents universities, 2 by vocational schools, and 2 by APEX Learning. In the case of five surveys, it was not possible to determine which institution sponsored the course. This information is represented graphically in Figure 5 below.

4) Why Are They Taking the Classes?

Three strong trends emerge from this question. Most students indicated that they took the class because their school did not offer a similar course, because it gave them a start on their college/work careers, and/or because they received free college credit. Specifically, 101 of the 241 respondents (42%) indicated they took the class because their high school did not offer a comparable course. In many schools, particularly small schools, students run out of classes to take in certain subject areas. A school might only have a handful of students who want to take Calculus or French IV in a given year, and in some cases, it is easier to meet these needs through virtual learning than it is to find a qualified teacher. Although college tuition is often involved, it can be more cost-effective, as well, to go the virtual route. As one senior male wrote about his virtual class: “I had taken all upper level math our school offers. Also, I plan on majoring in engineering and needed it anyway.”
Another common reason given for taking the class was that this allowed them to get a head start on courses related to their college career or their work career. This reason was mentioned by 74 students (31%). One senior female said she took a virtual college writing class “to get a head start before going to college next year and to get an idea of what college classes are like.” Another senior female wrote that she took Composition I “to meet a requirement so that I don’t have to take Rhetoric at the University of Iowa.”

The third most common reason listed was the free college credit. This choice was mentioned by 60 students (25%) as one of the main reasons that they took the course. In Iowa, the Post-Secondary Enrollment Options Act allows juniors or seniors who have taken all of the courses their high school offers in a particular subject area to take college courses
that are paid for by their school district. In some cases, the students travel to the college
campus for this opportunity, but in many other situations, the students take these courses via
some form of distance learning. Of the 241 responses, 195 (81%) indicated they were taking
the course for college credit, or dual (both college and high school) credit. The remaining
19% were taken for high school credit only. One senior male indicated that taking Western
Civilization was "an excellent opportunity to gain college credit free of charge through the
P.S.E.O."

Students often listed more than one reason for their decision to take these classes. One
junior female listed all three of the most common reasons in describing why she was taking
Medical Terminology: "1) so I didn't have to take it in college 2) didn't have to pay for it 3)
to learn medicine, which interests me."

The other reasons commonly mentioned are displayed below in Table 4. (The
percentages add up to more than 100%, because as previously noted, many students listed
multiple reasons.) In some cases, the students needed to merely fill their schedules, and the
ICN class was the best choice available. In other cases, the course credit was needed in order
for the student to graduate. Other students indicated that they did not want to take a similar
course at their high school, due to concerns about the teacher and/or the quality of the course.
One senior male explained his reasons for taking the virtual class: "I spoke with a person
who had taken the class, and he recommended that I take it. Another factor is the level of the
teacher and the class—many people take the course offered by the faculty here at school, and
I've never heard a positive comment."

A limited number of students took the courses to improve their skills, or for the
challenge involved. One female senior expressed her reason for taking the course this way:
"Our high school doesn't really have any challenging English or speech classes for seniors, so I felt this class would be a better challenge and learning experience for me."

5) What is the Virtual Learning Experience Like for These Students?

The analysis of this key question is divided among a number of more specific questions. Overall, the experience for the students in this survey was a positive one, but the answers to these specific questions provide some insights that indicate the need for possible changes, and certainly the need for additional research.

Table 4. Reasons given for why the students took virtual classes

<table>
<thead>
<tr>
<th>Reasons Why They Took the Virtual Course</th>
<th>Times Mentioned</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because my school didn’t offer it</td>
<td>101</td>
<td>42%</td>
</tr>
<tr>
<td>Gave me a start on my college/work career</td>
<td>74</td>
<td>31%</td>
</tr>
<tr>
<td>Free college credits</td>
<td>60</td>
<td>25%</td>
</tr>
<tr>
<td>Needed the credit for high school graduation</td>
<td>21</td>
<td>9%</td>
</tr>
<tr>
<td>For the challenge</td>
<td>11</td>
<td>5%</td>
</tr>
<tr>
<td>I couldn’t fit it into my schedule any other way</td>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>To fill a slot on my schedule</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>I didn’t want to take a similar class at my high school</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>To improve my skills</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>I was interesting in taking a class through the ICN</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>
5a) How is it Similar and Dissimilar to Traditional Face-to-face Classes?

Many of the characteristics or dimensions that make these courses similar to face-to-face classes are the same ones that make them dissimilar. Among these characteristics are teacher-student interaction, student-student interaction, and teaching methods used. These characteristics will be discussed in more detail in the following sections.

How the Class was Similar to their Face-to-face Classes

One similarity between virtual and face-to-face classes is the types of teaching methods used, particularly the traditional lecture. One question asked about the primary teaching method, listing four types, and providing a spot for “other.” “Lecture” was the most common response, listed in 166 of the 241 surveys (69%). The next most frequently mentioned choice was “class discussion,” which was listed 39 times (16%). “Self-paced instruction” was listed 33 times (14%), “group work” was listed 14 times (6%), and 7 “other” methods were listed. These percentages add up to slightly more than 100%, because some students listed more than one primary method. Figure 6 shows this question’s responses in graphical form.
The next question in the survey asked what other teaching methods were used, and in this case, “class discussion” was most frequently mentioned, appearing on 139 of the 241 surveys (58%). Following in frequency were “group work” (mentioned 75 times), “self-paced instruction” (62), “lecture” (45), and 44 other methods were mentioned. Among the other methods listed were projects, presentations, online tutorials, notes, job shadowing, tests, quizzes, videos, lab work, self-teaching, assignments, workbooks, and field trips. The responses to this question are displayed below in Figure 7.

It is worth noting that the browser-based classes were less lecture oriented than the ICN-based classes. Of the 37 students taking browser-based classes, 23 (or 62%) indicated that self-paced instruction was the primary method of instruction used, and only 12 (or 32%) indicated that lecture was the primary method.
How the Class was Dissimilar when Compared to their Face-to-face Classes

While much of this section will focus on the differences between the virtual classes and the face-to-faces classes the students were taking, it is important to note that these differences are not always perceived as negative ones. For example, the self-paced nature of browser-based classes was often seen as positive. A senior male taking Biology through the Internet commented, “It was a pleasant experience. Low stress. I was able to work at my own pace within limits. Information was presented in an easy-to-understand format.” A senior female wrote: “It was fun and I enjoyed the environment. The odd part was that it was more laid back than my other classes.” It should be noted that only 37 of the 241 students took classes through browsers, so any conclusions would be based on a small number of returns in that category.

However, in many cases, the differences between the face-to-face classes and the virtual classes were viewed in a negative context. A lack of face-to-face contact was the most frequently mentioned answer to the question regarding the most negative aspect of the class, listed 79 times among the 241 surveys; one-third of the students in this survey considered this lack of face-to-face contact to be the most negative aspect of the class. The fact that the second most common answer (concerns about the teacher) was listed only 41 times, and the third most common answer (the early morning start time for the class) was mentioned only 18 times makes that total of 79 even more noteworthy. As one junior female taking AP Calculus put it, “I really needed to talk face-to-face to understand what we were doing.”
Not much use of email. Email can be an effective way to communicate in the absence of face-to-face contact. However, a majority of the students in this survey never emailed their teacher, not even once, and those who did, did so only occasionally. Only 104 of the 241 (43%) emailed their instructor, even once. Of those who did email their teacher, only 19 emailed more than once a week. Sixteen of the students who emailed their teacher did not feel that they received a prompt reply. One of the students who was interviewed after the survey was not satisfied by the feedback she received via email in her Internet class, as is evident in her comments:

My teacher/instructor sent me my information and she told me she would email me back, telling me all of my priorities and that kind of thing. Well, I waited and waited for her to email me, she never did, so I started wondering, so I emailed my instructor back, and she said, “Oh, well, yeah, here’s your information.” And I
thought, "well, OK, we're off to a good start." Later in the same interview, she explained how the lack of feedback was a problem as she tried to work on the assignments for the class: "So I did the best I could, and I turned in my first assignment hoping that it was right. I wasn't real clear on how to do what she gave me, I didn't think it was very clear, so I just did my best, and turned it in. Well, not knowing very much about the class, I waited and waited for her to send me back my information, and probably about a month and a half later, I started wondering where my information was.

*Never met the teacher.* Another aspect of the lack of face-to-face contact was that only a slight majority (134 or 56%) met their teacher in person. In some cases, of course, it was not easy for the students and teachers to meet, due to the physical distance between teacher and student, or the busy schedules of the people involved. However, considering that most students were taking a class from a nearby community college, this physical separation might be overcome, at least on occasion. On a lighter note, one student said they did not meet their teacher formally, but did run into them in a restaurant; otherwise, they would not have met at all. More details about teacher-student interaction are included below in 5c.

*Student-student interaction.* Not only was the teacher-student interaction different in these virtual classes, but student-student interaction often takes on a different nature, as well. While most students (204, or 85%) said that there was some form of student to student interaction in the class, indications are that this interaction was very limited in nature in most classes. When asked about the purposes of the student-student interaction, the students did
not provide many details. This could be because of how the question was phrased, or it might mean there was little meaningful interaction. Among the commonly mentioned answers were group work, working on homework together, and social (several commented that they enjoyed meeting students from other schools). The lack of contact with other students was listed nine times as the “most negative” aspect of the class.

Adult supervision. Another difference between a typical face-to-face class and the virtual classes was the amount of adult supervision involved. This was a concern in the case study that preceded this survey, and it was apparent from student survey comments that many of the remote ICN sites had little, if any adult supervision. Students listed this concern 12 times in the “most negative aspect” section of the survey, and viewed this as a problem that interfered with their learning. One senior female described her concerns this way: “A few students goofed off . . . they didn’t like it so it ruined it for me. The communication—was hard to talk to her some times because everyone else wanted to talk.” A senior male wrote, “It wasn’t always easy to communicate with the other class or teacher. Our class wasn’t well supervised.” It is worth noting that some ICN classes had only one student at some of the remote sites, while others had 20 or more. In most cases, the more students present, the greater the need for adult supervision.

Two-thirds of the students were female. Another important difference was mentioned above in the results of research question 1, the fact that two-thirds of the students taking these courses were female. One possible explanation is that some of the courses might be heavily skewed toward girls, because that course’s related career path (such as nursing) is
generally followed by females. Indeed, of the 7 students in this survey who took nursing courses, 6 were female. However, as Table 5 shows, most of the commonly taken courses had more females than males, across several subject areas.

Table 5. Enrollment by gender in the most commonly-taken classes (N = 241)

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Total Enrollment</th>
<th>Female Enrollment</th>
<th>Male Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychology</td>
<td>38</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>Composition / Writing</td>
<td>30</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Medical Terminology</td>
<td>22</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Calculus</td>
<td>20</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Health Occupations</td>
<td>15</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>14</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Sociology</td>
<td>13</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>11</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Criminal Justice</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Nursing</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

Overall, the virtual classes had some substantive differences from the face-to-face classes that these students took. In some cases, these differences made the experience unsatisfying. One sophomore male taking AP History over the Internet wrote that one reason he would not take this class again was that it did not seem "tangible." In the "other comments" section, he elaborated on this point: "I think that this class would have been better had we had a more REAL sense of it. It just didn't seem like that we were actually
taking the class." However, concerns of this level were rare, and as the next section describes, most students were largely satisfied with their virtual class experience.

5b) Would They Take the Class Again? Why or Why Not?

Overall, the results of this question were both positive and encouraging. Over 76% (184 of 241) indicated that they would sign up for this course again. However, that means over 20% were not satisfied with the course. This level of satisfaction was fairly consistent across many categories of analysis, including gender, grade level, and GPA. The results for gender and grade level are displayed in Tables 6 and 7 respectively. The topic of GPA is covered extensively below under question 5f.

Table 6. Comparing levels of satisfaction between genders (N = 241)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Would take the class again</th>
<th>Wouldn't take the class again</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>124 (77%)</td>
<td>35 (22%)</td>
</tr>
<tr>
<td>Male</td>
<td>62 (78%)</td>
<td>16 (20%)</td>
</tr>
</tbody>
</table>

Table 7. Comparing levels of satisfaction across grade levels (N = 241)

<table>
<thead>
<tr>
<th>Grade level</th>
<th>Would take the class again</th>
<th>Wouldn't take the class again</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior</td>
<td>125 (79%)</td>
<td>32 (20%)</td>
</tr>
<tr>
<td>Junior</td>
<td>44 (75%)</td>
<td>14 (24%)</td>
</tr>
<tr>
<td>Sophomore</td>
<td>15 (71%)</td>
<td>5 (24%)</td>
</tr>
<tr>
<td>Freshman</td>
<td>2 (100%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
There was a notable difference in satisfaction across the two primary technologies (browsers and two-way video) used to deliver the classes, as is indicated in Table 8. (The percentages in some of these categories do not total to 100, because a few students answered “maybe,” and a few others left that question blank.) A chi square analysis does not reveal these differences to be statistically significant, however. Table 8 lists the expected frequency (EF) for the chi square analysis in each cell.

Table 8. Comparing levels of satisfaction between ICN and browser-based classes (N = 241)

<table>
<thead>
<tr>
<th>Type of Technology</th>
<th>Would take the class again</th>
<th>Wouldn’t take the class again</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICN (201)</td>
<td>160 (80%)</td>
<td>37 (18%)</td>
</tr>
<tr>
<td></td>
<td>EF = 156</td>
<td>EF = 41</td>
</tr>
<tr>
<td>Browser (37)</td>
<td>24 (65%)</td>
<td>12 (32%)</td>
</tr>
<tr>
<td></td>
<td>EF = 28</td>
<td>EF = 8</td>
</tr>
</tbody>
</table>

Reasons for Taking (or Not Taking) the Class Again

The students listed a variety of reasons why they would and would not take the class again, knowing what they know now. The most commonly mentioned reasons why they would take the class are listed below in Table 9, and the commonly mentioned reasons why they would not take the class are listed in Table 10. It should be noted that the numbers in the first table (9) are much higher than the numbers in the second table (10), because most students (184 or 76%) indicated that they would take the class again, and only 21% (or 51) said they would not. It should also be noted that many students listed multiple reasons.
Table 9. Reasons listed for why students would take the virtual course again

<table>
<thead>
<tr>
<th>Reasons Listed for Why They Would Take the Course Again</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learned a lot / class has prepared me for college</td>
<td>74</td>
</tr>
<tr>
<td>Received college credit / free college credit</td>
<td>45</td>
</tr>
<tr>
<td>New experience / good experience</td>
<td>20</td>
</tr>
<tr>
<td>Interesting</td>
<td>16</td>
</tr>
<tr>
<td>Fun / cool / neat</td>
<td>16</td>
</tr>
<tr>
<td>Enjoyed the teacher / good teacher</td>
<td>10</td>
</tr>
<tr>
<td>Met new people</td>
<td>7</td>
</tr>
<tr>
<td>Made me a better student / made me more disciplined</td>
<td>7</td>
</tr>
<tr>
<td>Learned what I wanted to learn</td>
<td>6</td>
</tr>
<tr>
<td>Challenging</td>
<td>6</td>
</tr>
<tr>
<td>It was easy</td>
<td>6</td>
</tr>
<tr>
<td>Was able to work at my own pace</td>
<td>6</td>
</tr>
<tr>
<td>It was more relaxed</td>
<td>5</td>
</tr>
<tr>
<td>It helped me decide what to do with my career</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 10. Reasons listed for why students would not take the virtual course again

<table>
<thead>
<tr>
<th>Reasons Listed for Why They Would Not Take the Course Again</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher / teaching style</td>
<td>15</td>
</tr>
<tr>
<td>Prefer face-to-face classes</td>
<td>14</td>
</tr>
<tr>
<td>Didn’t learn much / didn’t learn anything</td>
<td>9</td>
</tr>
<tr>
<td>Too much work</td>
<td>5</td>
</tr>
<tr>
<td>Didn’t like the course content</td>
<td>4</td>
</tr>
<tr>
<td>Didn’t like the text / lack of text</td>
<td>2</td>
</tr>
<tr>
<td>Time constraints / stress</td>
<td>2</td>
</tr>
<tr>
<td>No supervisor in the room / too easy to get off task</td>
<td>2</td>
</tr>
</tbody>
</table>

Quality of the teaching was important. One trend that clearly emerged from the data was that the quality of the teaching seems to be very important to the students’ satisfaction with the course. Based on the results displayed in Tables 9 and 10 above, how much the students learned, and how well they enjoyed the teacher (and their teaching style) are clearly important to the students in these virtual classes. One senior female summed up her experience this way: “I liked the ICN because it was a different way of learning. I got to understand Anatomy a lot better with the use of his great visual aids.” One junior female who was interviewed in depth indicated that the teaching style of the teacher was one of the main reasons why she would not take the Internet-based course again: “I just didn’t think the whole thing was clear. That could just very well be me, but I just didn’t really understand what I was doing. She wrote every assignment out – reads pages this through this, look for
this, look for this. But I didn’t think what I was reading in the book was what she was trying to teach. The instructor and the book didn’t seem to match. It was like she was looking for something else.” A junior student from another school expressed these teaching style concerns in one of the post-survey interviews: “Stay on the subject. She tried to tie everything we did into her other job. That’s fine if that’s what the class was about, but it wasn’t. So it seemed like we were there so she could gossip about her work. She would go off forever, and it was boring.”

5c) What Role Does Teacher-student Interaction Play?

As noted above, the relationship between the student and the teacher can make or break the student’s experience in a given class. While overall satisfaction with the virtual classes was high, students made numerous comments about problems in communicating with their teacher. As Table 11 below shows, this lack of face-to-face contact was the most frequently mentioned answer to the question asking about the most negative aspect of the class. The following are typical examples of the specific concerns and comments that were compiled into Table 11. A junior female commenting on the lack of supervision: “You really become to not worry about homework and not studying because they wouldn’t know.” A senior female had a concern about the time lag in terms of feedback: “The teachers took a long time to respond to your homework, because sometimes you couldn’t move on until they checked it.” A senior male commented: “Sometimes it was like the professor was focusing more on the home site, we were left out.” A junior female expressed the most frequently mentioned concern: “You couldn’t ask the teacher 1 on 1 questions. Tests were harder to take because if you had a question everyone would hear it.” One junior male who was
interviewed in depth had this to say about his virtual class: "Mostly it was the ICN that was different. Just having to watch the teacher up on the screen. It kind of feels like they don't even know that you're there and don't have to be involved if you don't want to. You don't have to pay attention if you don't want to." In that interview, another student commented about the lack of interaction: "Encourage more class participation. It was basically about the same three people, one person from each school, answering the questions every time."

### Table 11. Most negative aspects of the virtual classes

<table>
<thead>
<tr>
<th>What was the most negative aspect of this class?</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of face-to-face contact / hard to contact the teacher</td>
<td>79</td>
</tr>
<tr>
<td>Concerns about the teacher / teaching methods used in the class</td>
<td>41</td>
</tr>
<tr>
<td>Early morning hours</td>
<td>18</td>
</tr>
<tr>
<td>Technical problems (including problems submitting homework)</td>
<td>16</td>
</tr>
<tr>
<td>Finding the self-discipline / focus / motivation to do the work</td>
<td>14</td>
</tr>
<tr>
<td>Boring</td>
<td>13</td>
</tr>
<tr>
<td>Noise in the room due to lack of supervision</td>
<td>12</td>
</tr>
<tr>
<td>Feedback on homework and tests was slow</td>
<td>10</td>
</tr>
<tr>
<td>Lack of contact and interaction with other students and sites</td>
<td>9</td>
</tr>
<tr>
<td>Difficult class / too much homework</td>
<td>8</td>
</tr>
<tr>
<td>Class period was too long</td>
<td>6</td>
</tr>
<tr>
<td>Lack of hands-on activities / labs</td>
<td>6</td>
</tr>
<tr>
<td>The teacher favored their site over the remote sites</td>
<td>6</td>
</tr>
</tbody>
</table>
5d) Did Students Perceive that They Learned as Much as in Face-to-face Classes?

Overall, students indicated that they learned about the same amount in their virtual classes as they did in their face-to-face classes. The data in Table 12 resemble a bell curve-like distribution, with similar amounts of “more” and “less” clustered around a large group that indicated the “same” amount of learning.

Table 12. Student perceptions about the amount of learning in their virtual classes

<table>
<thead>
<tr>
<th>How much did you learn?</th>
<th>Number of responses</th>
<th>Percent of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than in my regular classes</td>
<td>66</td>
<td>28%</td>
</tr>
<tr>
<td>The same as in my regular classes</td>
<td>109</td>
<td>46%</td>
</tr>
<tr>
<td>Less than in my regular classes</td>
<td>63</td>
<td>26%</td>
</tr>
</tbody>
</table>

Related to the question about how much they learned was the question about how much effort their virtual class required compared to their face-to-face classes. As Table 13 below shows, overall, the students perceived the workload in the virtual classes to be somewhat higher than in their other classes. It should be pointed out that 81% of these classes were being taken for either college credit or dual credit (both high school and college credit).
Table 13. Student perceptions about the amount of effort required in their virtual classes

<table>
<thead>
<tr>
<th>How much effort was this class?</th>
<th>Number of responses</th>
<th>Percent of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than my regular classes</td>
<td>98</td>
<td>41%</td>
</tr>
<tr>
<td>The same as my regular classes</td>
<td>107</td>
<td>45%</td>
</tr>
<tr>
<td>Less than my regular classes</td>
<td>33</td>
<td>14%</td>
</tr>
</tbody>
</table>

These two key student perceptions (how much they learned, and how much work was required) appear to play a major role in whether or not the students would take this virtual course again. This topic is discussed in detail under question 5g below.

5e) Did Students Have Enough Technical Training and Support to Succeed?

Technical problems, particularly problems with the ICN, were listed frequently as a source of concern. Overall, 68% (or 165 students) indicated that they had some sort of technical problem during the course, and many of them mentioned more than one. The ICN was mentioned 134 times, which means it was a problem for 67% of the students taking ICN classes. It is not clear how many times there were problems with the ICN system during the course of the semester, but in some of the cases, based on the student comments, it was more than once or twice.

The second most commonly mentioned problem was with the fax machine, which was listed on 53 student surveys, or 22% of the total. The third most commonly mentioned technical problem was with browsers. This was only mentioned 19 times overall, but of those 19, 12 were taking the class primarily through the browser, and there were only 37 of those
in the responses, so browsers were a problem for a third of the students taking the virtual course in that manner. Technical problems with email were listed by 18 students, or 7% of the total.

The students in the survey almost always listed a way that their problems were addressed. School employees were mentioned 91 times, and the institution offering the virtual course provided the solution in 69 cases. Many of the students (32) indicated that they solved the problem themselves. Although technical problems were listed by 16 students as the most negative aspect of the class, overall, these technical problems seemed to be more nuisances than major barriers. When asked, not many students (31, or 13%) indicated that they needed additional training to use the technology (although it should be noted that 18 of those 31 wished they had additional training in using the ICN equipment). As one student commented, “We’re a pretty tech-savvy group.”

5f) Do Students with Higher GPA’s Fare Better in Virtual Courses than Those Students with Lower GPA’s?

One category where this researcher expected to find a difference, but did not, was in GPA. It was hypothesized that the students with the top GPA’s would find greater success in these classes than those with lower GPA’s, not necessarily because of any differences in intelligence, but due to other factors such as study habits and the desire to get a good grade. However, as Table 14 shows, there is not a major difference between these groups. The students with the top 25 GPA’s (GPA’s of 3.96 or higher) in this study were largely satisfied with their experience, and 20 of the 25 (80%) would take the class again. For the students with the bottom 25% of GPA’s in this study (2.5 and lower), the comparable percentage is
68%. While the difference between 80% and 68% would seem to be large, that may not be the case here, because there were three students in the lower GPA group who either listed "maybe" or did not answer. In each of these two GPA categories, only 5 people indicated that they would not take the class again.

Table 14. Comparing rates of satisfaction across GPA’s

<table>
<thead>
<tr>
<th>GPA</th>
<th>Would take again</th>
<th>Wouldn’t take again</th>
<th>Unsure / no answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 25</td>
<td>20</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Bottom 25</td>
<td>17</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

5g) How Do the Students’ Perceptions about the Amount of Effort and Learning Involved in the Class Affect Their Satisfaction?

Toward the end of the survey, students were asked how much they learned in their virtual class (compared to their face-to-face classes), how much work was involved in their virtual class (again, compared to their regular classes), and, knowing what they know now, would they take the virtual class again. These three questions were purposefully grouped together, in order to see if a relationship existed among them. The results revealed strong, statistically significant relationships among the answers to these questions. As displayed below in Table 15, the amount of learning played a large role in the students’ level of satisfaction. If they perceived that they learned more than in their regular classes, they would be very likely to take the virtual class again. If they perceived that they learned less, they were much less likely to indicate that they would take that virtual class again. The perceived
effort that was required for the virtual class also appears to have an influence on their level of satisfaction, but less so than the perceived amount of learning.

As is displayed in Table 15, there were 37 students who indicated that their virtual class required more work, but they learned less. Of these 37, only 12 (or 32%) would take the class again. Recall that the overall satisfaction rate is 76%, as described above in section 5b. At the other extreme, among those who felt they learned more, but did not have to work as hard as in their regular classes, the satisfaction rate was much higher. Seven students fell into that category, and all seven would take the class again.

Table 15 has three main pieces of information in each cell: 1) the percentage of the students who would take the class again, 2) the expected frequency (EF, calculated as part of the chi square analysis), and 3) the number of students who fell into that particular category. Because this chart contains a lot of information, some explanation is in order. The top left cell, the one containing 94%, is the cell for the students who perceived they learned more, and also perceived the class was more work than their regular face-to-face classes. There were 32 students (out of 241) who fell into that category, and 94% indicated that they would take the class again.

It should be noted in Table 15 below that 3 of the 241 students in the survey are not accounted for, because they did not answer the question. There are three others who answered "Maybe," despite the fact they were asked to limit their choices to "Yes" or "No," and those three "Maybe's" are not in Table 15, either. However, the three "Maybe" students are included in Tables 16 and 17 below.)
Table 15. Percent of students who indicate they would take the class again (N = 241)

<table>
<thead>
<tr>
<th>Amount of perceived effort</th>
<th>More</th>
<th>Same</th>
<th>Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>94%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>EF = 87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same</td>
<td>79%</td>
<td>92%</td>
<td>93%</td>
</tr>
<tr>
<td>EF = 78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>33%</td>
<td>29%</td>
<td>73%</td>
</tr>
<tr>
<td>EF = 40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 36</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the columns and rows in Table 15 are totaled, some interesting trends emerge, as well. Students who felt they learned more in their virtual class were almost unanimous in their level of satisfaction, with 64 of 66 (97%) indicating that they would take the class again. On the other hand, those students who felt they learned less were also less enthusiastic about
the prospect of taking the class again, with only 38% (24 of 63) indicating that they would take the class again. This information is displayed below in Table 16.

The perceived amount of work also played a role in the level of satisfaction. As shown in Table 17 below, 66% of those who felt the virtual class was more work than their regular classes would take the virtual class again. For those who felt the virtual class required less work than their regular classes, the satisfaction rate was much higher (88%).

Table 16. Comparing levels of satisfaction across categories of perceived learning (N = 241)

<table>
<thead>
<tr>
<th>Perceived learning in the VL class, compared to regular classes</th>
<th>Would take the VL class again</th>
<th>Wouldn't take the VL class again</th>
<th>Unsure if they would take the VL class again</th>
<th>Percent who would take the VL class again</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>64</td>
<td>2</td>
<td>0</td>
<td>97%</td>
</tr>
<tr>
<td>Same</td>
<td>96</td>
<td>12</td>
<td>1</td>
<td>88%</td>
</tr>
<tr>
<td>Less</td>
<td>24</td>
<td>37</td>
<td>2</td>
<td>38%</td>
</tr>
</tbody>
</table>
Table 17. Comparing levels of satisfaction across categories of perceived effort (N = 241)

<table>
<thead>
<tr>
<th>Perceived effort in the VL class, compared to regular classes</th>
<th>Would take the VL class again</th>
<th>Wouldn't take the VL class again</th>
<th>Unsure if they would take the VL class again</th>
<th>Percent who would take the VL class again</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>65</td>
<td>32</td>
<td>1</td>
<td>66%</td>
</tr>
<tr>
<td>Same</td>
<td>90</td>
<td>15</td>
<td>2</td>
<td>84%</td>
</tr>
<tr>
<td>Less</td>
<td>29</td>
<td>4</td>
<td>0</td>
<td>85%</td>
</tr>
</tbody>
</table>

Even a cursory analysis of this data would seem to indicate that the perceived levels of learning and effort have a significant relationship to the students' satisfaction with their virtual classes. A chi-square analysis of the data in Table 15 reinforces this interpretation. This analysis, using methods described in Sommer & Sommer (2002) produced a chi square of 18.30, which is significant beyond the .01 level of probability. For a chi square with a degree of freedom equal to 4 (such as the data contained in Table 15), a chi square of at least 9.49 is needed for a .05 level of probability, and a chi square of 13.01 is required for a .01 level of probability (Sommer & Sommer, 2002, p. 322).

_A Positive Picture Overall_

With all of these numbers, it would be easy to lose track of the larger picture: overall, this was a positive experience for most of the students involved. As noted above, 76% would take the course again, knowing what they know now. Table 18 lists the most commonly mentioned answers to the question that asked about the most _positive_ aspect of the course.
Table 18. The most commonly mentioned positive aspects of the virtual classes

<table>
<thead>
<tr>
<th>What was the most positive aspect of this class?</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learned what I wanted to learn</td>
<td>52</td>
</tr>
<tr>
<td>Received college credits / met college requirements</td>
<td>48</td>
</tr>
<tr>
<td>Getting to meet new people from other schools</td>
<td>20</td>
</tr>
<tr>
<td>Working at my own pace</td>
<td>19</td>
</tr>
<tr>
<td>The teacher</td>
<td>19</td>
</tr>
<tr>
<td>Prepared me for college</td>
<td>18</td>
</tr>
<tr>
<td>Taking a class that wasn’t offered at my school</td>
<td>12</td>
</tr>
<tr>
<td>It was a different / new experience</td>
<td>9</td>
</tr>
<tr>
<td>I became a better student / I learned to face my weaknesses</td>
<td>8</td>
</tr>
<tr>
<td>It was fun</td>
<td>7</td>
</tr>
<tr>
<td>My classmates / my friends</td>
<td>6</td>
</tr>
</tbody>
</table>

These comments from two students taking AP classes express many of the positive aspects of the virtual learning experience. A sophomore female wrote: "It was a big challenge and I learned some good time management skills. Another nice thing was that we got to talk to other students about the things we were studying." A sophomore male wrote: "This class has challenged me to think beyond the normal classroom bounds. This class has especially allowed me to work at my own pace, which is often times ahead of my fellow classmates."
As noted earlier, there were some unexpected results and trends that emerged from the data. These trends (and some of the questions they raise) are listed in the next section.

Auxiliary Findings

In addition to the answers to the original questions, the survey yielded data that both answered and raised some other questions. Only two students mentioned anything about the grade they received. There would perhaps have been more discussion about their grades if that subject had been raised by the survey.

Another interesting finding was that several students were essentially taking their virtual course at home. Twenty-four students indicated that they spent 3 or more hours online at home working on their virtual class, and of those 24, 16 were taking a browser-based class. The question about use of the Internet at home was included to explore the subject of “supplemental” time spent online, but it revealed that some students did most, if not all, of their virtual work there. In some cases, they noted that it was too loud at school to concentrate on their class, and in others, they indicated that the school’s equipment was not working, so they worked at home instead.

Scheduling is commonly a complicating factor for ICN classes, because school schedules in Iowa are not uniform. Because of this, many schools choose to offer ICN classes that begin before the typical school day, to avoid schedule conflicts. As noted above, many high school students did not like the early starting time. However, other scheduling issues arose, including one related to block scheduling. Because block classes are usually longer than ICN classes, some students had to take multiple ICN classes to fill up the entire block. This was only mentioned a couple of times, but as block scheduling becomes more widely
adopted, its effect on virtual classes (particularly ICN classes) should be taken into account.

One other scheduling issue was the fact that while most high schools are on a four-quarter, two-semester schedule, some institutions of higher learning are on trimester schedules. Although this schedule difference did not seem to cause any major problems among the students in this survey, it likely has the potential to do so.

Discussion and Recommendations

This study has yielded a fair amount of data relating to the virtual learning experiences of the students who responded to the survey, but what does this data add to our knowledge about virtual learning? What aspects of virtual learning can we do better, based on these findings?

Two-thirds of the Students Were Female

The fact that 67% of the students were female was surprising, as there is little in the literature would indicate anything other than the roughly 50/50 male-female split that makes up high school enrollment. However, a report that was released after this survey was mailed indicated that during the 2001-2002 school year, 57% of the students in the Florida Online High School were female (Trotter, 2002). There is also some evidence that females have historically been more involved in distance learning. Roblyer (1999) cites several studies that indicate that, in the past, most distance learners have been primarily working adults females. Although the high school population is different from the adult population, this is an aspect of virtual learning that requires further study.
There are several possible reasons why the females outnumbered the males in this survey. One possibility is that female students were more likely to return the survey than their male counterparts. That is not likely the cause in this case, as most schools had a high rate of return among the students who were taking virtual classes. Also, this trend was evident right from the very first completed surveys and was a consistent pattern throughout. The male/female ratio in this study is not skewed by one or two schools that returned a disproportionately high number of female surveys. Another possible reason is that guidance counselors may be more trusting of girls to take a class in a relatively unsupervised setting.

Most Students Received College Credit

A high percentage, much higher than this research expected, were receiving college credit for these classes. From the student comments, it is clear that the fact that the costs of tuition and books are covered by Iowa’s Post-Secondary Enrollment Options Act is a major factor in the student’s decision to take this class. Free college credit was among the most commonly mentioned positive aspects of the course, and among the reasons that they listed for taking the course in the first place.

Home Internet Access was Common

Of the students responding to this survey, 84% had home Internet access. According to a recent survey published in the *Des Moines Register*, about 60% of all Iowa households are connected to the Internet (Woo, 2002), so the students who responded to the survey were more likely than the typical Iowan to have Internet access at home.
Fewer Than Half Emailed Their Teacher

In some research studies, there has been an indication that there is actually more teacher-student interaction in a virtual class than in, say, a large lecture class, because technologies such as email and electronic bulletin boards can increase this interaction. However, in this study, only 43% of the students who returned surveys ever emailed their teacher for their virtual class. Many of those emailed only once. While there are restrictions on email use in some schools, this form of communication is widely available, and by not taking advantage of this technology, many of the teachers and students in this survey missed out on an opportunity to develop a deeper connection. One of the tenets of engagement theory is that the students should interact with others as part of their learning. Kearsley & Shneiderman (1999) consider email to be the "backbone" of the communication involved in collaborative projects conducted at a distance. However, regular email communication was the exception rather than the rule for the students responding to this survey. It is important to note that the lack of teacher-student interaction was among the most commonly mentioned concerns by the students in this survey.

The use of email for virtual classes does raises some equity issues. It should be noted that while most of the students in this survey had Internet access at home, that was not the case for all of them. Some schools allow students to use email at school, but others do not, so it is certainly possible that a student could be taking a virtual class, but have no access to email.
The Quality of the Teaching Was Important

In this survey, the perceived quality of the teacher was a very important factor in the students' level of satisfaction. As is noted in numerous studies regarding distance education, good teaching is good teaching. "The success of virtual courses seems to hinge on the same major item that determines success in any courses: the competence and hard work of the teachers involved" (Roblyer & Elbaum, 1999-2000, p. 61). In a virtual learning study done in Nebraska, Landis (2001) found that students pointed to the teacher as the major factor in determining the quality of the course.

Students Missed the Face-to-Face Contact

Even if the course was a positive experience overall, students in this survey indicated that they missed the face-to-face contact with the teacher and other students in the class. This concern was mentioned by a third of the students as the most negative aspect of the class. This aspect of the survey data is similar to the "What's the Difference?" report, in which 40% of the students said they missed the face-to-face contact (Institute for Higher Education Policy, 1999). As noted above, engagement theory stresses the importance of involvement with others as part of the learning process. If regular face-to-face contact is not possible, perhaps this concern can be addressed through the use of technologies such as email, browser-based discussion boards, fax machines, and the telephone.

Technical Difficulties

Sixty-eight percent of the students in this survey said they experienced technical difficulty at least once during the semester. These data are similar to the results of a study
that was published after this survey was distributed. In a survey of over 2,300 students taking courses through the Florida Online High School during the 2001-2002 school year, 72% indicated that they experienced technical difficulties that interfered with their ability to complete their virtual class (Doherty, 2002). In a 1997 study of high school classes offered over a fiber optic network (very similar to the ICN), Tiene found that 61% of the students agreed that technical problems interfered with the course.

More Effort Required

In the Florida survey, 39% felt their virtual classes were harder or much harder than their regular classes (Doherty, 2002), and in the Iowa survey, the corresponding figure was 41%. The figures for the other end of the effort scale were not as close, with 23% of the Florida students indicating their virtual class was easier than their regular classes, and 14% of the students in the Iowa survey indicating that their virtual class was easier than their other classes. It should be pointed out that most of the students in the Florida Online High School took their classes for high school credit only, whereas 81% of the students in the Iowa survey took their classes for college credit or dual credit.

Recommendations for Establishing a Personal Connection

Based on the results of this survey, the lack of face-to-face contact in virtual classes is an important factor to consider. The following are some recommendations for teachers of virtual classes. If followed, a deeper personal connection between teacher and student will likely result. If increased connections are made among the students in the class, according to
the collaboration and communication aspects of engagement theory, more meaningful
learning will result.

Wherever possible, email should be made available to the students, and training in its
use should be provided. Teachers of virtual classes should require students to email on a
regular basis, at least at the beginning of the class, so that they have confidence in using it if
the need arises. Also, teachers should be reminded of the importance of timely responses to
student email. When appropriate, teachers should make students aware of a phone number
where they can be reached. Each ICN room is equipped with a phone that runs through the
fiber network, so students could use that to contact teachers, at least during class time, when
they do not want the entire audience to hear their question. Clifford, as cited in Kubota
(1999), found that the regular use of email or a toll-free phone number was one the five key
factors for success in high school foreign language classes taught via satellite TV.

Teachers should be reminded of the importance of involving all of the sites, and all of
the students at each site. Most institutions that offer ICN-type classes have caps on the
number of sites and the number of students. If these numbers are too high to enable regular
involvement of each site and student, the caps should be revisited.

Where possible, the teacher should go to the remote sites at least once or twice per
term, in order to actually meet the students. Or the students should be encouraged to visit the
originating site. As noted above, in the Iowa study, most of these virtual classes were being
taken from an institution that was not that many miles away. Following his 1997 study, Tiene
recommended that teachers occasionally travel to the remote sites, in order to establish direct
personal contact.
The personal connection issue is probably the biggest hurdle faced by virtual learning. Andrew Zucker, a Washington-based researcher, has studied the Concord Virtual High School since 1996. One of his main findings is that there is less interaction between students and teachers in online courses. However, he considers this to be a weakness of virtual learning, not a fatal flaw (Trotter, 2002). As noted above and below, there are many strategies available that can alleviate this problem, at least to a degree.

In order to increase the amount of student-student interaction in virtual classes, some of the same strategies can be used, including getting the students together. In Iowa, it is not unusual to transport dozens of students for athletic competitions twice a week, so it should not be a major problem to transport them on occasion for academic purposes. From the teacher standpoint in an ICN class, each remote site should be shown to all sites on a regular basis, and students should be identified by name and school. Whether the course is browser-based, or uses two-way interactive video, the use of email from student to student should be encouraged.

Recommendations for Further Study

The original design of this study included a large number of in-depth interviews. As mentioned above, only two interviews were done. Additional in-depth interviews, using this research as a basis for the questions, could yield useful data. It should not be difficult to find students to interview, as 117 of 241 (49%) of the students in this survey said they would be willing to be interviewed. In-depth interviews could be used to explore the nature of the limited interaction in these classes, both teacher-student and student-student. Many of the students in this survey indicated that they missed the interaction (particularly with the
that occurred? In the Florida Online High School study noted earlier, most students rated their student to student interaction as fair or poor (Doherty, 2002).

A high percentage of students in the Iowa survey noted that they experienced problems with the ICN. Some indicated this was only once or twice a semester, others more often. In some cases, it meant the end of the class for that day. Interviews would help to gain a better idea of how often this occurred, and how much of an interruption it represented in the learning process. Another question to be addressed: Could a class session be salvaged, even after a technical glitch? If so, did the students know how to proceed?

Another topic that would be worth examining would be the rigor of the virtual courses offered. Specifically, there is a need to determine if these courses are as rigorous as their face-to-face counterparts. In this survey, most (59%) did not think the class they took was any more difficult than the high school classes they were taking. One junior male noted that the Intro to Economics class he was taking from a community college “was no harder than a high school class.” On a related note, it would be worth examining how much time is spent on the class outside of the time that it meets.

The difference in satisfaction levels between those students who took the classes via the ICN as opposed to those who took browser-based classes is worth exploring in more depth, as well. The data from this survey indicate that some of the difference may be related to the limited face-to-face contact with the teacher. In ICN classes, you can at least see the teacher, even if you have never met them in person. But in a browser-based class, that personal connection may be even more difficult to establish, and this topic is worth further study.
An area of concern expressed by several of the students was the lack of adult supervision in the room, and how that contributed to a less-than-ideal learning environment. How much supervision IS present in these virtual learning environments? For example, do schools require proctors or other adult supervision in remote site ICN classrooms? What difference, if any, does the presence or absence of adult supervision have on the amount of student learning that occurs? In studies on teaching foreign language at a distance, Kubota (1999) and Glisan, Dudt, and Howe (1998) cited numerous studies about the important role played by the adult facilitator at the remote sites.

Although the numbers are too small in many cases to make any sound conclusions, it appears that some institutions appear to be satisfying their virtual customers more than others. Are there significant differences from institution to institution, and if so, why? For example, Iowa State University’s satisfaction rate among the students in this survey was 71%, as 12 of the 17 students who took classes through ISU would take them again. Indian Hills Community College had an overall satisfaction rate of 87% (41 of 47 students would take their virtual classes again). Other community colleges had satisfaction rates in the 54-55% range. These differences in satisfaction rates among institutions are worth exploring in greater depth.

One important group of students that was not addressed by this survey was those students who signed up for a virtual class but chose to drop it. Because dropout rates in virtual classes are generally much higher than in traditional classes, this group should not be ignored; their experiences need to be considered, as well. Individual interviews, as opposed to focus groups, would perhaps be best used in this situation. Preferably these interviews can be done face-to-face. A tentative list of questions for this group of students includes:
1) What led you to sign up for the virtual course?

2) How far did you get into the course before making the decision to drop?

3) Once you started to encounter difficulties in the class, what did you do?

4) How was the decision to drop the class reached?

5) What factors did you consider in making that decision?

6) Is there anything the school could have done to help you complete the course?

7) Would you consider taking another virtual course at some point in the future?

8) If a friend of yours was considering taking a virtual class, what advice would you give them?

Conclusion

Virtual learning is expanding rapidly at the high school level. It is important that we better understand the perspective of the high school students who are taking these courses, and that we use this enhanced understanding to improve current and future virtual classes. The literature review and the case study both indicated that there were numerous areas of concern about virtual learning. The descriptive data from the student surveys provide a more detailed understanding of what the virtual learning experience is like for the high school student. Some of this data can be used to improve the virtual classes themselves, and the support provided for these classes by the institutions involved. Other aspects of the data can help guidance counselors decide if virtual learning would be a good choice for individual students. More important, these data all confirm that the student perspective is a vital aspect
of virtual learning at the high school level, and that further research is necessary in order to more fully understand this perspective.

References Cited


GENERAL CONCLUSION

As virtual learning continues to expand across all levels of education, it is important that our understanding of this phenomenon also continues to grow. Virtual learning can be viewed from many different angles, including those of the teacher, the student, and the educational institution. Further research is needed across all of these viewpoints, but the student perspective of virtual learning is perhaps the most under-researched of the lot.

Improving our understanding of the virtual student perspective (particularly the high school student perspective) was the purpose of the case study and the descriptive study included in this dissertation. The case study provides a richer understanding of this virtual learning experience, and it also provided key parts of the research foundation for the descriptive study that followed.

The descriptive study is, in essence, a snapshot of virtual learning at the high school level in the state of Iowa. Its purpose was to broaden our understanding of virtual learning in Iowa, and to identify trends and issues that merit additional study. These findings, trends, and issues are discussed in the following sections.

Key Findings from the Descriptive Study

Perhaps the most important finding was that, overall, virtual learning was a positive experience for the students who participated in the survey, as 76% would take the class again. It should also be noted, however, that nearly a quarter of the students would not take the virtual class again.
More is known about the students taking these virtual classes in Iowa, and what classes they are taking. The students were generally juniors and seniors, which was not surprising, but they were generally female (67%), which was unexpected. A recent survey of the students in Florida's Online High School indicates that 57% of those students are female (Trotter, 2002), so perhaps this preponderance of females is not limited to the Iowa survey. The students in the descriptive study tended to rank toward the top of their class, with an average GPA of 3.37, and an average class rank of 21st out of 74 students. Eighty-four percent of the students plan to attend a 4-year college or university, either directly out of high school, or after some time at a community college.

The survey revealed these students were taking a wide range of classes across almost every area of the high school curriculum. Most of these classes (81%) were being taken for either college credit or dual (both college and high school) credit. Almost all of the classes were taken from educational institutions in the state of Iowa, generally from nearby community colleges. Of the 241 total classes listed in the descriptive survey, 153 (or 63%) were taken from community colleges.

Most (83%) of these classes were taken through the Iowa Communications Network (ICN), a state-wide two-way interactive video system, and only 15% were primarily Internet browser-based. In general, students in the ICN classes were more satisfied with their overall experience, with 80% indicating they would take the course again, as opposed to 65% in the browser-based classes.

The overall quality of the teaching was a major factor in determining the level of student satisfaction in the virtual courses. This matches earlier findings about the importance of the teacher, even in virtual learning. As Roblyer and Elbaum (1999, p. 61) note, "The
success of virtual courses seems to hinge on the same major item that determines success in any courses: the competence and hard work of the teachers involved.”

The technologies used to deliver the classes influenced them in several ways, especially when they did not work properly. Of the students in the Iowa survey, 68% indicated that they experienced problems with the technology at least once during the course. Based on student comments, however, these technical problems are best categorized as nuisances, rather than major barriers, except in a few cases where the students were definitely inconvenienced by the technology-related problems.

In many cases, the technology used to deliver the class was viewed as a barrier to success. A lack of face-to-face contact with the teacher was listed by 79 students (33%) as the most negative aspect of the class. They missed seeing the teacher in person, and the other students in the class (particularly in browser-based classes). Based on the student comments, they did not like missing out on the social aspects of schooling, and they were often stymied and frustrated by the lack of feedback and individualized help they received. In other cases, the feedback and help were provided, but not as quickly as they are accustomed to in face-to-face classes. While it can be more difficult to provide this individualized and personal attention in virtual classes, this problem can be alleviated to a degree through more extensive use of common technologies such as email, fax, and telephone. Also, in many cases, face-to-face meetings with the teacher and other students could be arranged a few times during the semester, giving the class a more “personal” face. This also matches some recent data from the Concord VHS: Trotter (2002) cites Zucker’s finding that there is less interaction between students and teachers in the Concord VHS classrooms (although Zucker characterizes this as a weakness of virtual learning, not a fatal flaw).
As noted above, the virtual learning experience was mostly a positive one for the students in the descriptive study. To a large degree, this satisfaction was due to the fact that the students perceived that they learned something in the course. Seventy-four percent said they learned as much or more in their virtual class compared to their regular face-to-face classes. It should be noted that the higher the degree of perceived learning, the more satisfied the students were. If they felt they learned more than in their typical face-to-face classes, they were very likely (97%) to indicate that they would take the class again. Of those who felt they learned less, only 38% would take the class again.

Issues for Further Study

Although the descriptive study has provided a more detailed understanding of the high school student perspective, it also raises some questions that merit further study. Why were there considerably more females than males taking courses? The recent study from the Florida Online High School indicates this might be a trend that is broader than just this Iowa survey.

The rigor of virtual classes needs to be explored, as well. Only 41% of the students in the Iowa study indicated that the virtual course was more difficult than the other classes they were taking, and that number is particularly low when one considers that 81% of the classes were being taken for college credit.

The descriptive study also suggests that students were somewhat less satisfied with the browser-based classes, when compared to the classes taken through the ICN. However, the number of students who were taking browser-based classes was relatively low, and a
broader sampling should be used to explore this question. In general, more study needs to be
devoted to the students who indicated why they would not take the virtual class again, and
the reasons behind their decision. Another group that merits additional study would be high
school students who decide to drop virtual classes.

Virtual learning is clearly a phenomenon that will continue to grow, and considerable
research needs to be done in order to better understand the student perspective.

References Cited


Trotter, A. (2002). E-Defining education: How virtual schools and online instruction are
transforming teaching and learning. *Education Week on the Web*. Retrieved May 12,
APPENDIX A: HUMAN SUBJECTS FORM FOR VIRTUAL LEARNING SURVEY
DATE: March 13, 2002

TO: Lance Wilhelm

FROM: Janell Meldrem, IRB Administrator

RE: "Virtual Learning from the K-12 Student Perspective" IRB ID 02-280

TYPE OF APPLICATION: ☒ New Project  ☐ Continuing Review

The project, "Virtual Learning from the K-12 Student Perspective" has been approved for one year from its IRB approval date March 29, 2002. Submission of all school approvals must be made before contacting the subjects of that school. University policy and Federal regulations (45 CFR 46) require that all research involving human subjects be reviewed by the Institutional Review Board (IRB) on a continuing basis at intervals appropriate to the degree of risk, but at least once per year.

Any modification of this research project must be submitted to the IRB for prior review and approval. Modifications include but are not limited to: changing the protocol or study procedures, changing investigators or sponsors (funding sources), including additional key personnel, changing the Informed Consent Document, an increase in the total number of subjects anticipated, or adding new materials (e.g., letters, advertisements, questionnaires).

You must promptly report any of the following to the IRB: (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

The PI must retain the signed consent documents for at least three years past completion of the research activity. If the principal investigator terminates association with the University before that time, the signed informed consent documents should go to the DEO to be maintained.

You are expected to make sure that additional key personnel who are involved in human subjects research complete training prior to their interactions with human subjects. Web based training is available from our web site.

Upon completion of data collection, a Project Closure Form will need to be submitted to the Human Subjects Research Office to officially close the project. If data collection will continue beyond the approval date, you will receive a letter notifying you a month in advance that the expiration date is approaching. At that time, you will need to fill out a Continuing Review/and or Modification Form.

Both of these forms are on the Human Subjects Research Office web site at: http://grants-svr.admin.iastate.edu/VPR/humansubjects.html.
PI Last Name: Lance Wilhelm
Title of Project: Virtual Learning from the K-12 Student Perspective

Checklist for Attachments

The following are attached (please check):

13. ☒ Letter or written statement to subjects indicating clearly:
   a) the purpose of the research
   b) the use of any identifier codes (names, #'s), how they will be used, and when they will be removed (see item 18)
   c) an estimate of time needed for participation in the research
   d) if applicable, the location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, when and how you will contact subjects later
   g) that participation is voluntary: nonparticipation will not affect evaluations of the subject

14. ☐ A copy of the consent form (if applicable)
15. ☐ Letter of approval for research from cooperating organizations or institutions (if applicable)
16. ☒ Data-gathering instruments

17. Anticipated dates for contact with subjects:
   First contact: 2/1/02
   Last contact: 6/1/02
   Month/Day/Year
   Month/Day/Year

18. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:
   12/31/02
   Month/Day/Year

19. Signature of Departmental/Executive Officer: [Signature]
    Date: 11/22/02
    Department or Administrative Unit: C81

   If the PI or co-PI is also the DEO, a Dean signature authority must sign here.

20. Initial action by the Institutional Review Board (IRB):
   ☐ Project approved
   ☒ Pending Further Review: 3/1/02
   Date
   ☐ Project not approved
   Date
   ☐ No action required
   Date

21. Follow-up action by the IRB:
   ☒ Project approved: 3/14/02
   Date
   Project not approved: Date
   Project not resubmitted: Date

   Rick Sharp
   Name of IRB Chairperson
   Signature of IRB Chairperson: [Signature]
   Date: 3/14/02
APPENDIX B: INITIAL MAILING TO HIGH SCHOOL PRINCIPALS
Dear High School Principal:

The number of students taking classes via virtual learning is growing rapidly in the United States. However, we don't have a good understanding of how widespread this practice is here in Iowa. Also, little is known about the experiences of the students taking these classes, particularly at the K-12 level. The purpose of my doctoral dissertation at Iowa State University is to develop a better understanding of what is occurring in virtual learning across the K-12 schools here in Iowa.

Are there any students in your school taking classes through the Internet or through the Iowa Communications Network (ICN)? If so, would you be willing to participate in a study that will provide us with a better understanding of virtual learning from the perspective of the K-12 student? Participation would involve a survey that would be distributed to students in your school who took a virtual learning class in the fall semester of this school year. The survey will take approximately 20 minutes to complete. Students will not be identified by name, and school/district names will not be used in the writeup of the results. Each school that agrees to participate will be mailed a summary of the results of this survey.

Please let me know if you have any students who took classes at a distance last semester, and if so, are you willing to participate in this survey? If you have students who took classes this fall, but you would prefer not to participate in the study, please let me know that, as well, because that information will be helpful in gaining an understanding of how many Iowa students are taking virtual classes. Please contact me even if you had no students taking virtual classes last semester. The form at the bottom of this page lists all of these options. Please take a moment to fill it out and return it to me in the enclosed envelope.

Also, if you are willing to participate in this study, please give the enclosed letter to your guidance department, because the surveys will be distributed to the students by that department.

If you have any questions about this survey, please contact me. The easiest way would be to email me at lwilhelm@iastate.edu. If you do not have access to email, you could call me at work (515-965-9600) or at home (515-965-9330). I'm looking forward to hearing from you.

Sincerely,

Lance Wilhelm, Ph. D. candidate – Iowa State University

______ We are willing to participate in this survey.

______ We did not have any students taking virtual classes during the fall semester.

______ We are not willing to participate in this survey.

Signature: ___________________________ Date: ______________________

Name of High School: ____________________________________________

Name of School District: __________________________________________
APPENDIX C: VIRTUAL LEARNING SURVEY
26) What was the most negative aspect of this class?

27) Any other comments you would like to make about your experience in this class?

Thank you for participating in this survey. If you would be willing to participate in an interview relating to your experiences in taking this class, please let your guidance counselor know of your interest.

Virtual Learning Survey

Lance Wilhelm
Ph.D. Candidate
College of Education
Iowa State University
Virtual Learning Survey

You have been selected to take this survey because you are among the first groups of high school students to take virtual classes. Your experiences, opinions, and insights are of great value to this study, which will provide guidance for schools that offer virtual classes, as well as for students who are interested in taking virtual classes.

Demographic Information - this section asks you to supply basic information about yourself.
1) Your gender: Female Male (Please circle your choice)
2) What grade are you in? Freshman Sophomore Junior Senior
3) Do you plan to attend college? Yes No (Please circle your choice)
   If yes, which type of college? (Please check all that apply)
   ______ 2-year
   ______ 4-year
   ______ Graduate school
   ______ Other

Class Information - this section asks you to provide basic information about the class.
4) What is the name of the virtual class you took last semester?
5) What was the length of this class? (Please check one only)
   ______ Fall semester only
   ______ Year-long class
6) From what institution did you take this class?
7) Did you take this class for: (Please check the one answer that best applies)
   ______ High school credit only?
   ______ College credit only?
   ______ Both high school and college credit?

Class evaluation - this section asks you to evaluate the class you took.

22) How does this virtual class compare to the face-to-face classes you've taken this year? (Please select one)
   ______ The virtual class required more work than most of my other classes.
   ______ The virtual class required less work than most of my other classes.
   ______ The virtual class required about the same amount of work as my other classes.

23) How much did you learn in this virtual class compared to the face-to-face classes that you've taken this year? (Please select one)
   ______ I learned more in this virtual class than in any of my other classes.
   ______ I learned less in this virtual class than in any of my other classes.
   ______ I learned about the same amount of work as my other classes.

24) Pretend it's last year, when you signed up for this class. Knowing what you know now, would you choose to take this class? Yes No (Please circle your choice)
   If yes, why?
   If no, why not?

25) What was the most positive aspect of this class?
Teacher and student interaction — this section asks you to provide information about how you interacted with the teacher and other students in this class.

18) Did you email your teacher? Yes No (Please circle your choice)
   If yes, approximately how many times per week? ______
   Did he/she respond promptly to your emails? Yes No

19) Did you ever meet your teacher in person? Yes No

20) Did you interact with other students in this class? Yes No
   If yes, how? (Please check all that apply)
   ______ In person
   ______ Through the Iowa Communications Network (ICN)
   ______ By email
   ______ In chat rooms
   ______ Using electronic bulletin boards
   ______ Written notes or letters
   ______ Fax
   ______ Telephone
   ______ Other ___________________________ (Please specify)

21) If you interacted with other students in this class, what was the purpose of this interaction?

8) Why did you take this class?

9) What was the primary method of teaching used in this class?
   ______ Lecture
   ______ Class Discussion
   ______ Group work
   ______ Self-paced instruction (reading information at your own pace)
   ______ Other ______________________________________________________________________ (Please specify)

10) What other teaching methods were used in this class? (Please check all that apply)
    ______ Lecture
    ______ Class Discussion
    ______ Group work
    ______ Self-paced instruction (reading information at your own pace)
    ______ Other ______________________________________________________________________ (Please specify)

Class technology — this section asks you to provide information about the various technologies that were used in this class.

11) What was the primary technology used to teach this class? (Please check only one)
    ______ Internet browsers like Netscape or Internet Explorer
    ______ The Iowa Communications Network (ICN)
    ______ Other __________________________________________ (Please specify)
12) What other technologies were used in this class? (Please check all that apply)

- Internet browsers like Netscape or Internet Explorer
- The Iowa Communications Network (ICN)
- Application software such as Word, PowerPoint, or Excel
- Email
- Videotape
- CD
- DVD
- Videodisc
- Scanner
- Fax
- Telephone
- Other ________________________________ (Please specify)

13) Did you experience any technical difficulties during this class? Yes No (Please circle)

If yes, check all of the areas below where you experienced difficulty:

- Internet browsers like Netscape or Internet Explorer
- The Iowa Communications Network (ICN)
- Application software such as Word, PowerPoint, or Excel
- Email
- Videotape
- Fax
- Telephone
- Other ________________________________ (Please specify)

14) If you experienced technical difficulties, how did you solve the problem? (Check all that apply)

- I troubleshooted the problem myself.
- I received technical support from a school employee.
- I received technical support from another high school student.
- I received technical support from the institution offering the class.
- I used the "help" section built into the software.
- I used a manual.
- I used online support.
- Other ________________________________ (Please specify)

15) How many hours per week did you spend on this virtual class? ______

Of these hours per week, how many were typically spent on the Internet? ______

Of these hours per week, how much time was spent connected via the ICN? ______

16) Do you have Internet access at home? Yes No (Please circle your choice)

If yes, did you work on this class by using the Internet at home? Yes No

If yes, how many hours per week did you use the Internet at home for this class? ______

17) Beyond any technical difficulties, were there any technologies where you needed additional training or help in order to use them properly? (Please check all that apply)

- Internet browsers like Netscape or Internet Explorer
- The Iowa Communications Network (ICN)
- Application software such as Word, PowerPoint, or Excel
- Email
- Videotape
- Fax
- Telephone
- Other ________________________________ (Please specify)
APPENDIX D: LETTER TO GUIDANCE COUNSELORS
March 10, 2002

Dear Guidance Counselor:

Your building principal has agreed to have your school participate in a survey related to my doctoral research about virtual learning from the K-12 student perspective. I appreciate your help in administering this survey – as a veteran teacher, I know how busy school counselors are. Please distribute the enclosed survey to the students who took classes through the Internet or through the Iowa Communications Network (ICN) during the fall semester of this school year. The survey will take approximately 20 minutes to complete. Students will not be identified by name, and school/district names will not be used in the writeup of the results. Because your school is participating in this study, you will be mailed a summary of the results of this survey. Included in this packet, you will find:

- instructions on administering and returning the surveys
- letters for the participants and their parents
- copies of the survey itself
- cover sheets for each survey
- a school information sheet to be returned with the surveys
- an envelope in which to return the surveys.

If you have any questions about these surveys, or if you need additional copies of the surveys, there are a number of ways to contact me. Probably the easiest would be to email me at lwilhelm@iastate.edu. If you do not have access to email, you could call me at work (515-965-9600) or at home (515-965-9330).

Thanks again for your help in distributing and collecting this survey. I believe this research will provide an improved understanding of virtual learning from the student perspective, and this understanding will help schools make decisions about their use of this style of learning.

Sincerely,

Lance Wilhelm
Ph. D. candidate – Iowa State University
APPENDIX E: LETTER TO STUDENT PARTICIPANTS
March 10, 2002

Dear Survey Participant:

The number of students taking classes via virtual learning is growing rapidly in the United States, and you are a part of this growing trend. However, we don't have a good understanding of how widespread this practice is here in Iowa. Also, we know little about the experiences of high school students such as yourself -- students who are taking these virtual classes. As part of my doctoral research at Iowa State University, I have designed a survey that will help us gain a better understanding of what is occurring in virtual learning across the K-12 schools here in Iowa.

By participating in this survey, you will be adding to this understanding, and helping students and schools make decisions about virtual learning. The survey will take approximately 20 minutes to complete. You will not be identified by name, and actual school/district names will not be used in the writeup of the results. Pseudonyms will be used instead, and all school names will be removed from the returned surveys by the end of this calendar year. Each school that agrees to participate will be mailed a summary of the results of this survey.

Of course, participation in this survey is completely optional on your part. One of the final questions on the survey asks if you would be willing to participate in a follow-up interview. If you are willing, additional information will be provided at a later date. Of course, the names and school names of those students who are willing to participate in interviews will also be kept confidential. If you have questions about your participation in this survey, please visit with your guidance counselor, or with Dr. Ann Thompson, professor of curriculum and instruction at Iowa State University. She can be reached by email (eat@iastate.edu) or by phone (515-294-5287).

If you are willing to participate in this survey, please sign on the line provided at the bottom of this letter, and give this letter to your counselor when you take the survey. I hope you will participate in this survey, because it will provide valuable information about virtual learning to students and schools alike.

Sincerely,

Lance Wilhelm -- Ph. D. candidate -- Iowa State University

Signature: ___________________________ Date: ____________________
APPENDIX F: LETTER TO THE PARENTS OF THE PARTICIPATING STUDENTS
March 10, 2002

Dear Parent:

The number of students taking classes via virtual learning is growing rapidly in the United States, and your son or daughter is a part of this growing trend. However, we don’t have a good understanding of how widespread this practice is here in Iowa. Also, we know little about the experiences of high school students who are taking these virtual classes. As part of my doctoral research at Iowa State University, I have designed a survey that will help us gain a better understanding of what is occurring in virtual learning across the K-12 schools here in Iowa.

If you have received this letter, it indicates that your local high school has agreed to participate in this survey, and that your daughter or son took a class through the Iowa Communications Network (ICN) or via the Internet during the past fall semester. By participating in this survey, they will be adding to our understanding of virtual learning. The survey will take approximately 20 minutes for your child to complete. They will not be identified by name, and school/district names will not be used in the writeup of the results. Pseudonyms will be used instead, and all school names will be removed from the returned surveys by the end of this calendar year. Each participating school will be mailed a summary of the results of this survey.

Of course, participation in this survey is completely optional. If you do not want your daughter or son participating in this survey, please contact their school’s guidance department, because that department will be administering these surveys. If you have questions about your son or daughter’s participation in this survey, please visit with your school’s guidance counselor, or with Dr. Ann Thompson, professor of curriculum and instruction at Iowa State University. She can be reached by email (eat@iastate.edu) or by phone (515-294-5287).

Sincerely,

[Signature]

Lance Wilhelm
Ph. D. candidate – Iowa State University
APPENDIX G: DIRECTIONS FOR ADMINISTERING THE SURVEY
Instructions for Administering the Virtual Learning Survey

1) Before students fill out the Virtual Learning Survey, it is important that their consent is informed. Please distribute two letters to each potential survey-taker -- those students who took a course via the ICN or the Internet during the fall semester of this school year. (Please do not survey students in ICN courses that you originate from your site.) The first letter is for the student, and the second is for their parents. All students who complete this survey need to sign the letter to give their consent. Parents do not need to sign anything, but they have the option to decline their child's participation by contacting you after they have received the informational letter.

Please give the students a day or two to take the parent letter home before administering the survey. I am hopeful that most students will be willing to fill out this survey, and that few, if any, parents will object, but it's important that we follow Iowa State University's rules and procedures. If a parent does contact you and objects to their child's participation, but the student has already filled out the survey, please destroy that copy of the survey.

2) After you have received a signed letter from the student, please give them a copy of the survey. (Retain the signed student letters for your records, but please do not send them back with the surveys -- we want to keep the student names anonymous.) Exactly how and when they fill out this survey is up to you, but I would anticipate that it will take them approximately 20 minutes to complete it. If a student took more than one virtual class during the fall semester, please ask them to fill out a separate survey for each class.

3) When the student completes the survey and returns it to you, please fill out and attach one of the Virtual Learning Survey Cover Sheets (these are blue in color). It's probably best to staple them to the student survey, so they do not get separated. This information about the student will be important in assessing which students are taking these classes, and if GPA/class rank is a factor in their success. Note also that this cover sheet asks if the student would be willing to participate in a follow-up interview. If the answer is "yes," I will contact you later with additional information about setting up an interview. Please make a note if a student is willing to participate in these interviews, because I will not have their name, only their grade in school, their class rank, and their GPA.

4) This packet also includes a School Information Page (on green paper). This information will be critical in analyzing the results. It is important to note that all student and school information will be kept confidential. Pseudonyms will be used in place of actual school names in any writeup of the results. All information containing school names will be removed from the returned surveys by December 31, 2002.

5) After all of the completed surveys have been collected, and the cover sheets have been attached, please return them in the envelope or box provided. Also, please remember to include the School Information Page in the envelope. As previously noted, school/district names will not be used in the writeup of the results.

If you have any questions about these surveys, or if you need additional copies of the surveys, there are a number of ways to contact me. Probably the easiest would be to email me at lwilhelm@iastate.edu. If you do not have access to email, you could call me at work (515-965-9600) or at home (515-965-9330). Again, thanks for your help.

Hopefully, these surveys can be completed and returned to me by late March. A summary of the results will be mailed to your school sometime this summer.
APPENDIX H: SCHOOL INFORMATION PAGE FOR VIRTUAL LEARNING SURVEY
School Information Page for Virtual Learning Survey

Instructions for the guidance counselor: please fill out this sheet and return it with the completed surveys.

Name of School District: _____________________________________________________________

Name of High School: ______________________________________________________________

Name of Guidance Counselor: _______________________________________________________

Number of students who took classes through the ICN during fall semester: __________

Number of students who took classes via the Internet during fall semester: __________

Number of students who completed the survey: __________

All student and school information will be kept confidential. Pseudonyms will be used in place of actual school names in any writeup of the results. All information containing school names will be removed from the returned surveys by December 31, 2002.

If you have any questions about this survey, please contact me by email (lwilhelm@iastate.edu) or phone (515-965-9330). Thanks!

Lance Wilhelm
Ph. D. Candidate – Iowa State University
APPENDIX I: VIRTUAL LEARNING SURVEY COVER SHEET
Virtual Learning Survey Cover Sheet

Instructions for the guidance counselor: when a student returns one of the Virtual Learning Surveys, please fill out and staple one of these cover sheets to the survey.

Current overall GPA of this student: ____________

Current class rank of this student: _________ out of _________ students in the class.

Is this student willing to participate in a follow-up interview? Yes No
(If the answer is Yes, you will be contacted with additional information.)

All student and school information will be kept confidential. Pseudonyms will be used in place of actual school names in any writeup of the results. All information containing school names will be removed from the returned surveys by December 31, 2002.

If you have any questions about this survey, please contact me by email (lwilhelm@iastate.edu) or phone (515-965-9330). Thanks!

Lance Wilhelm
Ph. D. Candidate – Iowa State University
APPENDIX J: ONLINE LIST OF VIRTUAL HIGH SCHOOLS
We are working on a second edition of Virtual High Schools: State of the States that will provide a wider view of the
field. The first edition, published in Spring 2000, can be found online at:

As part of this effort, we are compiling a list of virtual schools. Your assistance is requested in identifying existing and
emerging virtual schools not in our initial list.

For the purposes of this list, we define a "virtual school" as "an educational organization offering courses designed for K-12
learners through distance learning methods that include Web-based delivery."

Below is the hyperlinked version of our current list.

After reviewing the list, you may wish to go to the Virtual School List Survey web site, a site where you can suggest a
school NOT YET LISTED or submit a comment, idea or lead about virtual schools.

Please examine the listings below, BEFORE suggesting a virtual school through the Virtual School List Survey web site.

WHAT'S NOT INCLUDED IN THE LIST...

The Virtual School List includes only those entities which offer courses DESIGNED FOR K-12 LEARNERS and which
offer at least some WEB-BASED COURSES. Using email, chat or support web sites (like many conventional college
courses these days) isn't considered to constitute a "web-based course" in the context of this Virtual School List.

Computer-based courses using CD-ROMs or software loaded on the student's computer for the main course delivery,
another common method, is also not considered a "web-based course" application in this context.

To suggest a NEW listing, open the Virtual School List Survey web site in a NEW WINDOW by clicking on the link below:
http://ife7.formsite.com/star/vschool/list/index.html

NOTE ON VALIDATING AGENCIES

We are creating two sub-listings for privately operated virtual schools: those that are state-approved or licensed, and/or hold
regionally accreditation through one of the six regional accrediting agencies (North Central Association and others), and those
that do not have this kind of state approval or regional accreditation. The latter listing includes home schooling organizations
generally ineligible for this kind of approval, and private schools which have chosen not to pursue it. Updated information on
state approval or regional accreditation status is welcome. Entities that are formal candidates for regional accreditation, but not
state-approved, will be listed in the "state approved or regionally accredited" list if they provide evidence of candidacy for
regional accreditation.

And other schools operated by state education agencies

Current listing:
Alabama Online High School
Arkansas Virtual High School
Florida Virtual School (formerly Florida Online High School)
Hawaii E-School (see Hawaii E-Charters)
Illinois Virtual High School
Kentucky Virtual High School
Louisiana Virtual Classroom
Michigan Virtual High School
New Mexico Virtual School
North Dakota Division of Independent Study
Utah Electronic High School
West Virginia Virtual School

Offering at least a partial K-12 curriculum through web-based courses

Current listing:
Brigham Young University Independent Study
Indiana University HS
Oklahoma State University Extension K12 Distance Learning Academy
Southeast Missouri State University eHigh School
Stanford University, Education Program for Gifted Youth
University of Missouri-Columbia HS
University of Nebraska Independent Study HS (Class.com was earlier spinoff; ISHS now offers its own web courses)
University of California UC College Prep Initiative (UC-Santa Cruz)
University of Texas High School

and other local education agencies
Operated by state-chartered entities

Current listing:

Basehor-Linwood Virtual Charter School (Basehor-Linwood Schools, Linwood KS)
Choice 2000 On-Line School (Perris Union Schools, Perris, CA)
Delta Cyber school (Delta/Greely Schools, Delta Junction, AK)
E*COT Electronic Classroom of Tomorrow (Columbus, OH)
Electronic Charter School (Elkhart, KS)
Hawaii E-Charter (Honolulu, HI) (prev. Hawaii E-School)
Odyssey Charter School (Clark County Schools, Las Vegas, NV)
T.E.A.C.H. - The Einstein Academy Charter School (Jenkintown, PA)
Western Pennsylvania Cyber Charter School (Midland Schools, Midland, PA)

State licensed or regionally accredited

Current listing:

Christa McAuliffe Academy (Yakima, WA)
Laurel Springs School (Olga, California)
Keystone Virtual High School (Bloomsburg, PA)
WISE Internet High School, Richard Milburn HS (Woodbridge, VA)

Operated by educational entities, non-profit and for-profit organizations

Current listing:

AP Nexus (SREB. States of GA, SC, TM, funded via AP1P)
Colorado Online School Consortium (Leadville, CO)
ECO 2000 Cyberschool Project (Anchorage Cty, Wasilla, AK)
Francis Virtual School (New York)
Lancaster-Lebanon Intermediate Unit 13 (Apex courses only: Lancaster, PA)
Minnesota Distance Learning Academy (SWW Service Cooperatives)
Texas Virtual School (ESC 4)
Virtual Greenbush (Southeast Kansas Education Service Center, Girard, KS)
Virtual High School (Hudson Public Schools, Concord Consortium, Hudson, MA)
Western Consortium for Accelerated Learning Opportunities (WICHE states, Denver CO)

Including virtual home schools, other private schools
Current listing:
Abington Hill School (Bricktown, NJ)
Alpha-Omega Academy On-Line (Chandler, AZ)
ChildU (Weston, FL)
Compuhigh Online High School (Clarksalv School, Fairmont, WV)
Denison On-Line Internet School (Los Angeles, CA)
Eldorado Academy (Nederland, CO)
Garden Schools (Branson, MO)
International High School (San Diego, CA)
Internet Home School Com (Prescott, AZ)
Oak Meadow Online School (Putney, VT)
The Potter's School (Ledyard, CT)
Regina Coeli Academy (Tucson, AZ)
Scholars' Online Academy (Tucson, AZ)
Sycamore Tree Online (Costa Mesa, CA)
The Trent Schools (Bloomington, IN)
Willoway CyberSchool (Reading, PA)

Offering curriculum, content, brokering services, virtual school infrastructures for customers nationally

Current listing:
Academic Systems
Apex Learning (Bellevue, WA)
Blackboard (Washington, DC)
ChildU
Class.com (Lincoln, NE)
Classroom (cCollege, Denver, CO)
eEducation (JonesKnowledge.com, Englewood, CO)
Intelligent Education, Inc.
Lena (LearningSpace)
Macromedia University
NCS Learn (prev. Novanet, now part of Pearson Education) (Tucson, AZ)
Northeast Cyberschool
Scholar Classical Tutorials
WebCT (Lynnfield, MA)
APPENDIX K: MAP OF IOWA'S AREA EDUCATION AGENCIES
IOWA'S AREA EDUCATION AGENCIES

Boundaries shown are not exact.
APPENDIX L: LIST OF VIRTUAL COURSES TAKEN BY THE PARTICIPANTS
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Institution Offering Course</th>
<th>Institution Type</th>
<th>ICN/Web</th>
<th>Curricular Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+ Certification</td>
<td>Des Moines Area Community College</td>
<td>Community College</td>
<td>ICN</td>
<td>Vocational</td>
</tr>
<tr>
<td>Anatomy</td>
<td>Odebolt-Arthur High School</td>
<td>High School</td>
<td>ICN</td>
<td>Science</td>
</tr>
<tr>
<td>AP Calculus</td>
<td>Hinton High School</td>
<td>High School</td>
<td>ICN</td>
<td>Math</td>
</tr>
<tr>
<td>AP Calculus</td>
<td>Dubuque Wahlert High School</td>
<td>High School</td>
<td>ICN</td>
<td>Math</td>
</tr>
<tr>
<td>AP Calculus</td>
<td>University of Iowa / AP Academy</td>
<td>University (Public)</td>
<td>Web</td>
<td>Math</td>
</tr>
<tr>
<td>AP Composition</td>
<td>Indian Hills Community College</td>
<td>Community College</td>
<td>ICN</td>
<td>Language Arts</td>
</tr>
<tr>
<td>AP English Literature and Composition</td>
<td>APEX Learning</td>
<td>Other</td>
<td>Web</td>
<td>Language Arts</td>
</tr>
<tr>
<td>AP U.S. History</td>
<td>APEX Learning and Iowa's Belin-Blank Center for G</td>
<td>Web</td>
<td></td>
<td>Social Studies</td>
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<tr>
<td>Biology 109</td>
<td>Iowa State University</td>
<td>University (Public)</td>
<td>Web</td>
<td>Science</td>
</tr>
<tr>
<td>Business Law</td>
<td>Iowa Central Community College</td>
<td>Community College</td>
<td>Web</td>
<td>Business</td>
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<td>Math</td>
</tr>
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<td>Math</td>
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<td>Calculus</td>
<td>University of Iowa</td>
<td>University (Public)</td>
<td>ICN</td>
<td>Math</td>
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<td>Calculus I</td>
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<td>Community College</td>
<td>ICN</td>
<td>Math</td>
</tr>
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<td>Community College</td>
<td>ICN</td>
<td>Math</td>
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<td>North Iowa Area Community College</td>
<td>Community College</td>
<td>Web</td>
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<td>Classical Music History</td>
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<td>ICN</td>
<td>Fine Arts</td>
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<td>College Algebra</td>
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<td>ICN</td>
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<td>William Penn University</td>
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<td>ICN</td>
<td>Language Arts</td>
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<td>Math</td>
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<td>Community College</td>
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<td>Web</td>
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<td>Vocational</td>
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<td>University (Public)</td>
<td>Web</td>
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<td>English</td>
<td>Graceland University</td>
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<td>English 101</td>
<td>Iowa Central Community College</td>
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<td>Web</td>
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<td>Southwestern Community College</td>
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<td>ICN</td>
<td>Language Arts</td>
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<td>English Composition I</td>
<td>William Penn University</td>
<td>University (Private)</td>
<td>ICN</td>
<td>Language Arts</td>
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<tr>
<td>English Composition II</td>
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<td>ICN</td>
<td>Social Studies</td>
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<td>Europe in the Age of Nationalism</td>
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<td>Community College</td>
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<td>Course</td>
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<td>First Responder</td>
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<td>Food Safety &amp; Sanitation/Culinary Arts</td>
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<td>French I</td>
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<td>French II</td>
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<td>Fundamentals of Statistics</td>
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**Notes:**
- **ICN** indicates the institution code.
- **Math** refers to mathematics.
- **Science** refers to science.
- **Social Studies** refers to social studies.
- **Vocational** refers to vocational studies.
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<td>Pharmacology</td>
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<td>Principles of Web Design</td>
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<td>World Wide Web Mod I</td>
<td>Kirkwood Community College</td>
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APPENDIX N: INSTITUTIONS OFFERING THE VIRTUAL CLASSES TAKEN BY THE SURVEY PARTICIPANTS
Regents Institutions

Iowa State University
University of Iowa

Private Universities and Colleges

Brigham Young University
Graceland University
William Penn University

Community Colleges

Clinton Community College
Des Moines Area Community College
Hawkeye Community College
Indian Hills Community College
Iowa Central Community College
Iowa Lakes Community College
Iowa Western Community College
Kirkwood Community College
Marshalltown Community College
North Iowa Area Community College
Northeast Iowa Community College
Northwest Iowa Community College
Southeastern Community College
Southwestern Community College
Western Iowa Tech

High Schools

Dubuque Wahlert High School
Grundy Center High School
Hinton High School
Manning High School
Muscatine High School
Northeast High School

Other Educational Institutions

American Institute of Business
APEX Learning
Belin-Blank Center for Gifted Education
APPENDIX O: HUMAN SUBJECT APPROVAL FOR THE CASE STUDY
DATE: March 15, 2001

TO: Lance William

FROM: Janell Meldrem, IRB Administrator

RE: “Distance learning from the student perspective” IRB ID 01-442

TYPE OF APPLICATION: ☒ New Project  ☐ Continuing Review  ☐ Modification

The project, “Distance learning from the student perspective” has been approved for one year from its IRB approval date March 13, 2001. University policy and Federal regulations (45 CFR 46) require that all research involving human subjects be reviewed by the Institutional Review Board (IRB) on a continuing basis at intervals appropriate to the degree of risk, but at least once per year.

Any modification of this research project must be submitted to the IRB for prior review and approval. Modifications include but are not limited to: changing the protocol or study procedures, changing investigators or sponsors (funding sources), changing the Informed Consent Document, an increase in the total number of subjects anticipated, or adding new materials (e.g., letters, advertisements, questionnaires).

You must promptly report any of the following to the IRB: (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

You are expected to make sure that all key personnel who are involved in human subjects research complete training prior to their interactions with human subjects. Web based training is available from our web site.

Ten months from the IRB approval, you will receive a letter notifying you that the expiration date is approaching. At that time, you will need to fill out a Continuing Review Form and return it to the Human Subjects Research Office. If the project is, or will be finished in one year, you will need to fill out a Project Closure Form to officially end the project.

Both of these forms are on the Human Subjects Research Office web site at: http://grants-svr.admin.iastate.edu/VPR/humansubjects.html.
Iowa State University Human Subjects Review Form

PI Name Lance Wilhelm Title Doctoral student

Checklist for Attachments

The following are attached (please check):

13. ☒ Letter or written statement to subjects indicating clearly:
   a) the purpose of the research
   b) the use of any identifier codes (names, #’s), how they will be used, and when they will be removed (see item 18)
   c) an estimate of time needed for participation in the research
   d) if applicable, the location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, when and how you will contact subjects later
   g) that participation is voluntary; nonparticipation will not affect evaluations of the subject

14. ☒ A copy of the consent form (if applicable)

15. ☒ Letter of approval for research from cooperating organizations or institutions (if applicable)

16. ☒ Data-gathering instruments

17. Anticipated dates for contact with subjects:
   First contact March 15, 2001
   Last contact October 31, 2001

18. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:
   January 1, 2003

19. Signature of Departmental Executive Officer
   Date 2/26/01

20. Initial action by the Institutional Review Board (IRB):
   □ Project approved
   □ Pending Further Review
   □ No action required
   Project not approved
   Date

21. Follow-up action by the IRB:
   Project approved
   Project not approved
   Project not resubmitted
   Date

Patricia M. Keith
Name of IRB Chairperson 3-13-01
Approval Date
Signature of IRB Chairperson
DATE: February 19, 2002

TO: Lance Wilhelm

FROM: Janell Meldrem, IRB Administrator

RE: "Distance Learning From the Student Perspective" IRB ID 01-442

TYPE OF APPLICATION: □ New Project ☒ Continuing Review

The project, "Distance Learning From the Student Perspective" has been approved for one year from its IRB approval date March 13, 2002. University policy and Federal regulations (45 CFR 46) require that all research involving human subjects be reviewed by the Institutional Review Board (IRB) on a continuing basis at intervals appropriate to the degree of risk, but at least once per year.

Any modification of this research project must be submitted to the IRB for prior review and approval. Modifications include but are not limited to: changing the protocol or study procedures, changing investigators or sponsors (funding sources), including additional key personnel, changing the Informed Consent Document, an increase in the total number of subjects anticipated, or adding new materials (e.g., letters, advertisements, questionnaires).

You must promptly report any of the following to the IRB: (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

The PI must retain the signed consent documents for at least three years past completion of the research activity. If the principal investigator terminates association with the University before that time, the signed informed consent documents should go to the DEO to be maintained.

You are expected to make sure that additional key personnel who are involved in human subjects research complete training prior to their interactions with human subjects. Web based training is available from our web site.

Upon completion of data collection, a Project Closure Form will need to be submitted to the Human Subjects Research Office to officially close the project. If data collection will continue beyond the approval date, you will receive a letter notifying you a month in advance that the expiration date is approaching. At that time, you will need to fill out a Continuing Review/and or Modification Form.

Both of these forms are on the Human Subjects Research Office web site at: http://grants-svr.admin.iastate.edu/VPR/humansubjects.html.
Iowa State University

Continuing Review and/or Modification of Research Involving Human Subjects

(Please type the information on this form)

One copy of this form and changed documents should be submitted to the Human Subjects Research Office, 15 Pearson

http://grants-svr.admin.iastate.edu/VPR/humansubjects.html

SECTION I: PI/Project Information

1. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the committee. Additions to or changes in research procedures after the project has been approved will be submitted to the committee for review. I agree that all key personnel involved in conducting human subjects research will receive training in the protection of human subjects. I agree to request renewal of approval for any project continuing more than one year.

2. Type of Submission: ☑ Continuing Review (fill in sections I & II) □ Modification (fill in sections I & III) □ Continuing Review & Modification (fill in sections I, II, & III)

3. Date of Last IRB Approval: 2-5-2003

4. IRB ID #: 01-442

5. Title of Project (if title has changed since original approval, please provide both titles): Distance Learning from the Student Perspective

6. Funding Source: N/A

7. Have key personnel been added since last approval? ☑ No □ Yes If yes, please list. (see part III for signature requirements)

Lance Wilhelm
Typed name of principal investigator

Curriculum and Instruction
Department

515-965-9330 lwilhelm@iastate.edu
Phone number and email

If student project:

Typed name of major professor or supervisor
Dr. Ann Thompson

2-11-2002
Date
Signature

IRB Approval:

Rick Sharp
IRB Chair

Signature of IRB Chair

FEB 14 2002
APPENDIX P: TRANSCRIPTS OF INTERVIEWS USED IN CASE STUDY
Transcript of Interview on April 2nd, 2001

Video classroom, Deer Valley High School

Participants: Andrea Johnson and Jennifer Carnegie, seniors enrolled in a science class taught over the two-way interactive video network during second semester of the 2000-2001 school year.

Lance Wilhelm: This is our first session talking about your science class. It is April 2nd, the day after April Fool’s Day, around 10:15 in the morning. This is our first meeting, so we’re going to start with a pretty general question. I’d like the two people, Andrea and Jennifer, to tell me a little bit about their experience in this class so far. What’s it been like.

Andrea: The teacher, well, he’d be a great classroom teacher, but he kind of leaves us out of a lot of stuff. We’re not really a part of the class. I mean, once in a while, he’ll talk to us, we’ll check in, it’ll be like attendance. It’s just like it takes a special kind of a person or teacher, not necessarily a person, to teach over the TV or a long distance, and I don’t think our teacher here has that.

Lance: If you were going to give him some advice, some feedback on what would make it easier for you, what would be some of the things you would tell him?

Jennifer: Let him know that we ARE people, that even though we’re not in his classroom, not there in the flesh, we’re across the TV screen, and it’s nice for him to include us. I mean, when they do labs, he has to understand what’s it doing to me and Andrea back here, because we don’t have a clue of what they’re doing up there, and so it would be kind of nice if they would do things that you could do over the TV, labs you could do over the TV. Like when they did the chicken bone experiment, they could pass it around the room, they get to look at it day by day, but here, Andrea and I are in here one hour a day. We can’t pop our heads in whenever we feel like it, so I think that’s the hardest thing.

Andrea: And then their class runs longer than what ours does, because we get in here before them, because our times are different. And then they get all the extra help.

Jennifer: And whenever they need help, they can just say, “I need help, teacher!” But when me and Andrea need help, we’re kind of on our own. We come in here once a day. He’s not on the TV screen all day. He’s on here one hour a day, and when the time’s up, he shuts the screen off, and that’s it.

Lance: Actually, I think the system shuts itself off. It’s an automatic kind of thing, so he couldn’t keep it on if he had ten minutes extra and said, “Hey, they’re doing fine, let me talk to you.” He couldn’t do that because of the way it’s set up. Have you ever met this teacher, or any of these students in person?

Jennifer: No.
Andrea: No.

Lance: There are some people who suggest that would be helpful. I've always tried to do that when I could, but it's hard when you're at a distance. I did something with my college students and students in Grovers Corner, which is all the way in the southwest corner of the state. Well, we weren't going to be able to physically get them together. But the teacher and I knew each other, and that helped to make that more personal connection.

OK, so you've mentioned several things here. Let follow up on one of those. Obviously you can't just pop in and see him like you could Mr. Billings if you had a question, whereas students on that end can much more easily, and probably do. If you have to reach this teacher outside of class, how do you do that?

Jennifer: We go through our secretary, and our secretary and him email each other once a day. Or twice, or however often they email each other. We have no connection with him outside of class.

Lance: So the secretary, Mrs. Schroeder, does that. All right, that makes some sense. So if you had to get ahold of him, you could, but there's kind of a second step in there.

Jennifer: Yeah. How do I say this? Sometimes we don't get our papers until later. I guess we can't really get ahold of him when we want to, no one's really reliable. When we want to get ahold of him, we have to do it ourselves.

Andrea: Kind of like today with our test. He said that he was going to send it over last week, like Tuesday or Wednesday, but we never got it.

Jennifer: Yeah, we still haven't got it.

Lance: OK. So that was the reason you're taking the test on a different day. Because it hasn't gotten here. And you knew last week, though, that today could be a test day, in other words, but the test just didn't arrive.

Andrea: We didn't have any review, we didn't have anything. That's what we were waiting for, so that we could study.

Lance: How do the tests normally arrive? Does he usually send them to Mrs. Schroeder?

Jennifer: Once in awhile he'll send them there, or he'll send them here.

Lance: He'll fax them?

Andrea: Yeah. And then we'll go to the office to take the test.
Lance: So that’s how you’re observed. So tomorrow, in theory, you may be doing that. This course is just a one-semester class, is that all it is?

Jennifer: Yes.

Lance: How many students are in the class on the other end?

Andrea: Maybe 10.

Lance: And are they all juniors and seniors?

Andrea: There’s two seniors, and the rest are sophomores.

Lance: And you’re both . . .

Jennifer and Andrea: Seniors.

Lance: I’ll come back to some other things here, but Andrea, you’ve mentioned that you’ve taken a distance class before. You took it next door, in the other video classroom. And what was that class again?

Andrea: It was Medical Terminology. And that went a lot smoother than this, because she was used to teaching over video, she was used to having a class on TV. She would always be talking to you. She would carry on a conversation, she would just sit there and talk. I really feel like I knew who she was, but I never met her personally. It’s just that she was so involved with the outside centers. Because there were four other centers that were taking it over the TV, plus her classroom, and she involved everyone, all of us, every single day.

Lance: And was this a high school teacher?

Andrea: College.

Lance: College teacher from the community college. Was she teaching it from there?

Andrea: Yes.

Lance: So you were really taking it with college students, then?

Andrea: Right.

Lance: And three or four other high schools.

Andrea: Right.

Lance: And that went well.
Andrea: Yeah, very well.

Lance: So, let’s compare and contrast. One of the things that you said was a little different is that you said the teacher at the community college made you feel like a person. How did she do that?

Andrea: She knew my name, for one. I mean, our teacher here, he knows our names, but . . .

Jennifer: He gets both of us mixed up. I’ve never been mixed up with you before, but there’s a first time for everything. (Laughter)

Andrea: And whether we had a question or not, sometimes we’d feel like we’re stupid, because we’ll have to ask a question about something we don’t understand but everyone else catches on to it, she goes over things a second time just to make sure that you know. And she, as you’re going, she will write down notes about the main points and put them on the TV. We got all of these worksheets, and everything was sent out before the class even started. You had your books, you had every single one of your worksheets, she was very prepared. I just don’t think he’s that organized.

Lance: Or maybe not organized to teach over the video network. Because it is different. And like I said, when we were talking before we started recording, that we are getting better at showing people how to teach at a distance. There are some differences. You have to have that test out there ahead of time, you have to put more things on the overhead, and you don’t use the chalk board. I assume the community college teacher used the overhead camera to zoom in on the text.

Andrea: Yes.

Lance: But what we’re trying to figure out is what it’s like from your end, and as you can see, we should be able to learn a lot about what it’s like to take a class at a distance by talking to you and later on, by surveying some others. Jennifer, you have not taken any other classes at a distance like this?

Jennifer: No.

Lance: Andrea, were you the only one taking it from here at the time?

Andrea: Yes.

Lance: And how many people were at those other sites? Small groups at each one, I suppose?

Andrea: Four or five at each. It was Mill Lake, Pine Grove, Angus City, a couple more. Maybe Milan City.
Lance: And that was an every day class?

Andrea: Just Mondays. From quarter to one to 3:05.

Lance: So it was your whole afternoon. What kind of effect did that have on the rest of your schedule? Did that goof anything up?

Andrea: Yeah. I missed a study hall, and I missed a Home Ec class. She let me go for Mondays. I can't remember what else I had, but we rearranged it. I had Econ, and I'd only be 15 or 20 minutes late for that.

Lance: But missing that first 20 minutes can be tough. In a 40 minute class. OK, let's go back to focusing more on this science class. In general, what's up on the screen? Is it views of the class? Is it the teacher? What do you normally see of that other classroom?


Lance: It's the same book you have?

Jennifer: Yeah. He shows us pictures of whatever we're studying, like the muscle system or the skeletal system, and he just runs down it, pretty much. I guess, we know what page he's on, he'll say turn to page 243 or something, but I wish we could see his face. It's kind of easier like when we're talking to you like this. If you were over there, and I'm sitting here looking at a book, it would bore me real, real easily.

Andrea: He's so monotone.

Jennifer: And when he tells stories, you know, it's fine, but it's stories about their school, and it like he's talking to THEM. And he forgets that we're hanging back here, slowly but surely.

Lance: Now, is this the only other remote site taking this?

Jennifer: Yes.

Lance: What's it like then as you're looking at the screen, probably looking at your book, and then trying to take notes, what's that like? Is that difficult?

Jennifer: We don't take a lot of notes, because he faxes over notes. We go down them as a class, well, he goes down them himself, and says what it is. Like, we're doing the nervous system, what's in the nervous system, things like that, it's all written down for us. It's kind of hard to keep up with it, because it's not detailed, and he doesn't really tell us how he wants it detailed. So on the test, if he wants some parts labeled, we have no idea what's going to be labeled, because he doesn't explain that to us.

Lance: So you usually have the notes ahead of time. That should be helpful.
(Laughter from both.)

Jennifer: It's nice to have them in advance, so we're not sitting here writing down notes. That part's really nice, so we're not running around not knowing what to do. But they're just not detailed. They shouldn't be detailed, because it's our work, but he needs to tell us what to do. When we run down them, he needs to tell us "you need to write down the systems." Let us know what he wants, or give us some ideas, because we've never had him before, we have no idea what he likes, what he wants. We don't have a clue. Their grading scale is not even the same as ours.

Andrea: Like on our tests. We haven't done that good on hardly any of our tests. We'll sit there and we'll study, but it's like when we get there . . .

Jennifer: It's like nothing that we've studied.

Andrea: Because he always has these little nicknames for the stuff, but we didn't hear that part of it. And sometimes it's hard to hear, because either he will have his volume down, or sometimes we have problems with our video, it freezes, it goes all haywire.

Lance: How often does that happen? How often have you had technical difficulties?

Andrea: Probably three times.

Lance: About three times this semester. Was it like the whole period it was out?

Andrea: No, it just gets really loud.

Lance: And what do you do when that happens?

Jennifer: We tell Mrs. Schroeder, and she says shut it off, and she emails them, and that's it, that's our class for the day, and we go to the art room.

Lance: Hopefully that won't happen too many times. I've not ever experienced that failure, but I've heard some reports that it's happening more often, and I'm not so sure if it's the equipment, state-wide that's getting old, we don't know why exactly. Three times in a semester is an awful lot, and we're not through the whole semester yet.

Let's go back and talk a little bit about the tests, and in general what teachers would call assessments. In other words, how do we find or assess how you're doing, and then how does that translate into a grade later on? You mention that on the test, sometimes the terminology there doesn't match what you're expecting. What kind of tests are they normally, what's the format? Are they multiple choice?

Jennifer: Multiple choice. And then we get . . .
Andrea: Diagrams. And the diagrams aren’t hard. That’s the only thing we do really good on.

Lance: And that makes some sense, because there’s less ambiguity there. The heart is the heart, for example.

Jennifer: And you can’t change that.

Lance: And it matches pretty well with what’s in the book. What kind of problems are you having? Obviously, a test is something that’s going to be hard now and then, but you’re saying the biggest difficulty you’re having is that sometimes, as you understand it, it’s not the same words. You may understand the phrase or the concept well, but maybe it’s a terminology thing.

Andrea: And a lot of it is we just really don’t know what to expect. In his classroom, everyone is getting really good grades. I’m pretty sure of it. Because they always talk about their grades. And you know, it should make him stop and think about it. How come those girls aren’t getting good grades?

Jennifer: Because I do get good grades. That’s the whole thing. Except in this class.

Lance: So you aren’t getting as good a grade in here as you are used to?

Jennifer: No, my report card is all A’s and B’s, and in this class, I get a D. Well, I got one in Research, too, but that was my stupidity there. But, if I’m doing well in my other classes, I should be doing well in here.

Lance: You’ve obviously thought about that.

Jennifer: I don’t know if it’s me or if it’s him. It’s kind of hard to tell, when I don’t feel like we have a teacher over there some times.

Andrea: And there were like four or five other people who took this class last semester . . .

Lance: From the same teacher?

Andrea: Yes. And those kids have good grades. Jana Odgaard, she’s like the top of her class, and I think she maybe ended up with a C- or a D. And so I don’t think it’s just us.

Lance: Have you thought about what’s the best way to address this? You know, because you’re seniors, you know that if you’re having trouble in a class, or you’re not getting as good a grade as you’re used to or as you think you should be getting, you know what to do.

Andrea: We talked to Mr. Waterhouse already, and he called down there, but . . .
Jennifer: He asked us what we’d like him to do, and we’ve tried to explain it, but we can’t really talk to him about our grades over here, but if we press this button, everybody hears it. We have no personal time with him. It would be nice to be able to talk with him as a teacher, and to get my grade, and maybe explain why I’m getting this grade, what’s bringing it down, instead of sending it to Mrs. Schroeder, and Mrs. Schroeder handing us a piece of paper saying, “this is your grade, take it or leave it.”

Lance: Now, do you two use email at all yourselves? Do you have an account at home or here at school?

Andrea: I don’t ever get on the computer, though.

Jennifer: I don’t really email a whole lot, but I have it.

Andrea: I do, too.

Lance: I just wondered, and maybe there’s a rule against that, but if you wanted to email to the teacher directly, would that be OK?

Andrea: My teacher from the community college, we did that. There’s a computer in the back of the room over there, and you have an account through the community college, and the supervisor in there, she’ll check your account every day. That way, your teacher tells you your grade, or if she has any questions, or even if she’s concerned... like, I missed a Monday, and I needed some stuff, and she gave me her phone number and said “give me a call.” So I called her, and we got to talk on the phone, and if she has a concern about something, she’ll call you about it.

Lance: So the supervisor checks the email and gets it to you, and if you needed to reply back, you’d tell her what to reply back.

Andrea: Yeah.

Lance: That’s one of the areas where people are thinking that connection can be made, is by email. Or the phone, if need be, now and then.

What else? Let’s come back to assessments, and then we’ll finish for today. Now, your grade is based just on tests, or is it based on anything else?

Jennifer: Tests and quizzes. And then the worksheets are 20 percent, I’m not for sure, but around there.

Lance: And how do you turn the worksheets in?

Andrea: Fax them back and forth.

Lance: And do you do that then? How does that work? Fax technology is pretty reliable?
Both: Yeah. (Laughter)

Lance: That isn’t always the case, I can tell you. People have a lot of trouble with fax machines, because the line is busy, or the paper runs out, there can be problems. It’s good to hear that’s working well.

OK, tests, quizzes, and worksheets. Did you get anything that tells you that? You were saying, “I think it’s 20 percent.” Did you have anything in writing that says that?

Jennifer: We had something on one of our papers that says tests and quizzes are the main part of your grade, but worksheets are, I forgot the percent, but it’s around that area.

Lance: So you know ahead of time what it is. Anything else in the general comments that you’d like to make about the class? We’ve covered a lot of ground, certainly, and like I said, what I’ll do is I’ll go and listen to the tape, and see what other questions I have for you. It probably will be a couple of weeks before I’m back. Partly so you can go through some more learning. Because, who knows, in a couple of weeks, your grades may have turned around, and you’ll be really happy.

Jennifer: Yeah. (Laughter)

Lance: Or, on the other hand, it may have gotten worse. I don’t know. We’ll find out in a couple of weeks. But when I come back, my guess is I’ll have this transcribed by then, and I’ll give it to you so you can read through it, discuss it, and then we’ll do another thing like this during study hall time.
Transcript of Interview on April 30th, 2001

Video classroom, Deer Valley High School

Participants: Jennifer Carnegie and Andrea Johnson, seniors enrolled in a science class taught over a two-way interactive video network during second semester of the 2000-2001 school year.

Lance Wilhelm: This is April 30\textsuperscript{th}, almost a month after the first interview. It’s about 11:00 in the morning, and we’re going to go no more than half an hour, because I’ve got to eat lunch at 11:30, or I’m going to be late.

Lance: Some questions for Andrea and Jennifer. It doesn’t matter who answers these. Knowing what you know about this class now, you’ve gone through almost the whole semester, and there have been some high points and some low points . . . if you knew at the beginning of the semester what you know now, what would you have done differently?

Jennifer: Not taken it.

Andrea: I probably wouldn’t have taken it.

Lance: I figured that was probably going to be your answer, but let’s just say that your guidance counselor or Mr. Waterhouse says, “No, we’re not letting you out of this. You have to stay in it.” Knowing that, and knowing some of the things you’ve learned, what would you do differently, if anything?

Jennifer: Maybe send more papers down myself. When I want them to go down. I’d pretty much do everything myself because I can’t rely on anyone else to do it.

Lance: Would you agree with that?

Andrea: I’d agree with that, yeah.

Lance: I noticed today that you faxed some things down there, so obviously you know how to do that.

Jennifer: No, I made a copy.

Lance: Oh, is that what you did, you made a copy . . .

Jennifer: She didn’t get one of the worksheets, and I made a couple of copies.

Andrea: Usually, we do fax down most of our worksheets when we get them all done. It’s just like for our notes he wants the original papers that we get graded on. We’ll give that to Mrs. Schroeder, and sometimes that doesn’t get sent down, and we’ll get docked for not
having that stuff in. I totally agree with Jennifer about how it should be just our
responsibility. I mean, you can't even really rely on the teacher, because he doesn't even
send us our information up to us when we're supposed to get it.

Lance: So a lot of this has been ... I guess I would use the word "logistics" ... getting
things here and there on time has been a real ...

Andrea and Jennifer: Pain. (Laughter)

Lance: You'll probably experience this in college a little bit. People are starting to send more
things electronically, not just fax kinds of things, but they type it up on the computer and
send that. For example, that transcript I gave you was typed up in Word, and so I can just
attach that to an email message and send it. Now, we can still run into problems. Say your
computer isn't working. That happens. Say the Internet is working very well or is down. That
happens. Or, let's say I write it up in Microsoft Word, and you have Word Perfect, or some
other word processor, and then you can't open it. But I think you will see information
moving back and forth a little more easily. But I think there are times when paper has to
move back and forth, and that's just all there is to it.

So, it sounds like one piece of advice you would give to people would be "Do more
of it yourself." Or, if you were going to say something to Mr. Waterhouse about the class,
you would say, "We need to get this process smoothed out a little bit." Would that be right?

Jennifer: Because it makes us look really bad.

Lance: Well, there are times we do have stuff that's late, but you feel bad when you get
things done on time and it's late because of other reasons.

Jennifer: And that's the reason it is. We do have it in a couple days early, and then it doesn't
get there.

Andrea: Yeah. At the beginning of the year it wasn't that bad for sending our papers in,
because we'd be done with our papers almost a week or so in front of everyone else, and
they'd go down there just fine. But now I think everyone is slacking ...

Jennifer: Because of the end of the school year. I think that has a lot to do with it.

Lance: Well, and you had a disrupted semester with weather, too. Maybe you didn't have
school, and they did. Or vice versa.

Jennifer: But they have a little bit different schedule. Because when we had those snow days,
we had to make them up. They wouldn't have school on some days, so we wouldn't have this
class. Our proms were on two different weekends, and they would have late starts and we
wouldn't, or we would have late starts and they wouldn't.
Lance: And late starts would be an easy thing to have on different days, and that throws you off.

Jennifer: Because we can’t get hooked up with them at all. We can’t just walk in here.

Lance: Right. So, you’d be kind about leery taking distance learning classes in the future, is that what I’m getting?

Andrea: Yeah.


Lance: Let’s say two or three years pass, and all of your friends are taking distance learning classes. You’re saying, “I didn’t have a very good experience the last time, but I’m willing to think about it again.” What questions would you want to have answered before you took a class again? What would you need to know about the class before you commit to it?

Andrea: I think I would try and talk to the professor before, and ask him questions about “How is your class run, what things do I need to know, what things do I need to expect from you?”

Jennifer: I’d tell him my experience I had before with it, and try to make it easier on him, with him teaching long distance, so he’d have some sort of idea about what I like.

Lance: Turning more to today’s class, was today typical of what class would be like? It was different from what I saw on Friday. Would you describe today as typical?

Andrea: He actually involved us in a review for a quiz. It was like our first time we’ve ever been involved in the class. And Jennifer and I only had like one question apiece. I know it wasn’t very big, but . . .

Jennifer: It is kind of nice when he does involve us. We’re not as dumb as we look, I guess. (Laughter)

Lance: So you’re saying that’s more involvement than usual.

Jennifer: Than we’ve ever had in this whole entire class. And it wasn’t very much, but it was nice to know he thought we were alive.

Lance: Would that have made a difference for you if you had more of that during the semester?

Jennifer: I think it would have made a difference, because at least now I remember what the quiz is going to be over. Usually we walk up there, and go, “Oh, crap, what was the quiz on?” And now I actually have a clue what he’s talking about. But if he’d just involve us more
like he did today. I mean he didn’t talk to us, but he asked us two questions. Those were two questions I didn’t know before, but I know now. And that I’ll get right on the quiz.

Andrea: I guess today is the first time we actually ever reviewed for a quiz. I don’t think we’ve ever really gone over a diagram.

Lance: So, it would appear to me that you’ll do OK on the quiz. Do you think you’ll do OK on that quiz tomorrow?

Andrea and Jennifer: Oh, yeah.

Lance: It would appear the people on the other end will do OK, as well. They pretty much knew most of the answers.

Jennifer: They ALWAYS do well. That’s the thing that irritates me. (Laughter)

Lance: Now, how will the tests be different from the quiz? The quiz was a diagram. How about the test?

Andrea: They are true/false questions, fill in the blank, multiple choice.

Lance: You indicated last time that the tests have been your downfall.

Andrea: Oh, yeah.

Jennifer: Yes.

Lance: Let’s look at the subject material we had today. I wrote some notes about what was covered. Today was mostly about the heart, the cardio system. What would be an example of a test question over some of what we went over today?

Andrea: I don’t know if he would quiz us or test us about the ventricles or the veins.

Jennifer: And if the veins go to or away from the heart.

Andrea: Yeah.

Jennifer: They’re not hard if you know and understand them, but the whole thing is we don’t get them. The heart, yeah, I understand the veins go to the heart and the arteries go away, but I work in a nursing home, so of course I’m going to know that one. But there are just a lot of things that we have no idea what he’s talking about.

Andrea: I mean, the basic stuff, the general stuff that we learned in sixth grade health or eighth grade health, that’s the stuff that we get, but everything else it’s like . . .
Jennifer: What are you talking about? (Laughter)

Lance: Would you say it's really fine details that trip you up, or more complex concepts? Like today, he showed how the electrical impulses go through the heart and stimulate it to beat in rhythm. OK, now I would guess that you understand that, but is it that type of concept that you're not getting right on the test? Or are the questions so detailed . . .

Jennifer: That has a lot to do with it because he doesn't talk about it in detail. I mean, he gives us a general talk about it, but in the test he'll give it to us in details, and I've never understood that.

Lance: You mentioned the last time that it would be nice for you to be able to sit down one-on-one, or like we are here, and work through some of those things. "I'm not getting a good grade. Tell me what's going on here." Or "I notice I'm doing OK on this and this, but I'm not doing well on the tests. Can you help me?" I think if you were there, most teachers would probably help you, but it's that distance . . .

Jennifer: And we don't have any privacy to ask him, because anything he hears, so does the class.

Lance: Right. Which would be OK if it was "I don't understand that heartbeat thing. Can you go over that?"

Jennifer: But if it's "I don't understand the whole chapter . . ." (Laughter)

Lance: That would be hard to say.

Jennifer: And it's wasting their classtime, too.

Lance: That's always a hard call as you teach. Most students will get most of what you're talking about most of the time. But then how much time do you spend with the students who don't get it? And there's always going to be a certain percentage who don't get it right away. If it's half the class, you know you didn't do a very good job of explaining that, or it's a very hard concept. But sometimes it's two students, and two students can take up more time than 22 students.

OK, now, coming back to today. In the two days I've observed, work time at the end of the period seems pretty common.

Andrea: Yeah.

Lance: So that's helpful. Because you COULD ask questions then. As you were working though your worksheets, did you ever buzz in and ask, "Hey, we're working on this worksheet, and we just don't get this."

Andrea: Yeah, we've done that a couple of times.
Jennifer: Yeah, a couple of times. But the worksheets are pretty much all in the book. There are always a couple of them we can't find, but they are always in there. It might take us an hour to find one answer, but always know it's in there.

Lance: So you don't necessarily want to interrupt for that?

Jennifer: When we did talk to him, he would say, "Can anyone help her here in Mount Zion?" and it's like, "Oh, God, I feel dumb now." And they were pretty cool about it, but they would chuckle at us. It's kind of embarrassing, two seniors over here . . .

Andrea: Looking kind of ditzy.

Lance: Now you don't have to take this suggestion, but you are going to be out of school before most of the Mount Zion students. It would be kind of fun to get in the car and drive down there and bring them donuts for one day.

Jennifer: That would be kind of funny . . .

Lance: You'd want to check with the office and make sure it's OK, but that would be a nice gesture.

Jennifer: Because I'd like to meet them. Because I'm sure Andrea and I look pretty funny over here. People who know us understand we look goofy, but over there, they probably think we're just taking this class as a joke. We're just naturally giggly.

Lance: And your friends know that.

Jennifer: Everyone knows that! I'd love to just sit in the class for one day and get a feel for the subject. Get to know the teacher one-on-one. Just sit in the classroom with the rest of the students and let this teacher teach me what I'm supposed to know. Instead of sitting over here and giggling and farting around. (Laughter)

Lance: Would it have been worth your while to get together sometime during this semester, at the beginning of the semester?

Jennifer: Just like to know him. Because we've met you, what, two times? Three times? And I can sit here and talk to you. But what do I say to him on TV?

Andrea: Yeah. Maybe we should meet at least once a month. Take one day and meet them.

Jennifer: Just so you feel like you know the guy, and at least he can tell us apart, finally. That would be nice if they could tell me and Andrea apart.
The interview winds down at this point.
APPENDIX Q: SAMPLE ONLINE SELF-TESTS
SAMPLE ONLINE SELF-TESTS

AT&T's Virtual Academy


Dallas Telecollege http://telecollege.dcccd.edu/Fast_Facts/sub/learnqui.htm

Florida Online High School questionnaire

Am I self-directed, highly motivated, and self-disciplined?

Can I set a personal schedule and complete assigned work by the required dates?

Are my writing and communication skills better than average?

Do I try to solve problems and work through difficulties independently?

Can I read and follow detailed instructions on my own?

Am I already comfortable with using the Internet as a means of communication and research?

Do I own or have access to a computer with Internet access as email?