AN INVESTIGATION OF STUDENTS' PERCEPTIONS OF PLATO COMPUTER BASED COURSES

THESIS

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By

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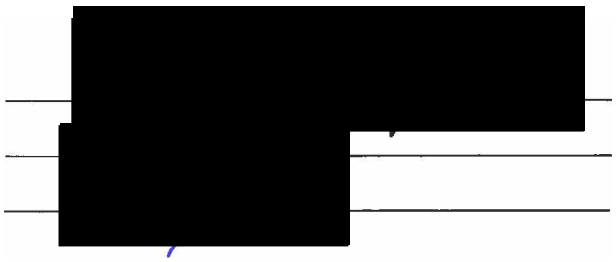

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Abstract

The research investigated students' perceptions of PLATO® online courses they took to recover high school credits. The school district in the study uses online courses provided by a for-profit vendor. The schools in this district are using the program for students who need to make up credits and the courses are designed to stand alone. The participants were students at two high schools, one a traditional high school and the other an alternative high school, in a northern Minnesota school district. The researcher solicited volunteers in PLATO® classrooms and explained the purpose and method of the project. Students who consented took a survey in their regular classroom during class time.

The research showed that students were positive about the program. Most students were taking an online course for the first time but technical issues with the program were minimal. Students also gave favorable ratings to the program for expectations on tests, clear presentation of material, reasonable assignments and communication about their progress in the course. The survey had mixed results in two areas. In questions about how well the course motivated them the average was closer to the positive side of the scale but 40% of the students reported the program only rarely or never motivated them. PLATO® teachers primarily monitor students' progress and allow students to take tests. Because students were confused about questions regarding communication with a teacher the issue of interaction in an online course warrants further research.

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Chapter 1

Introduction

"I can't believe I got an F!" These are dreaded words, yet in the 50 largest cities in the U.S. only 53 percent of the students are graduating on time (Dessoff, 2009). The solutions for making up credits have included repeating courses, extra blocks of courses, especially Mathematics and English, and now computer delivered courses offered side by side with traditional classroom courses. Virtual high schools offer individual courses for students not enrolled full-time with the school. The options in distance learning vary in rigor, the amount of monitoring, and the amount of interaction with a teacher, timelines for completion, and the technological requirements for the class.

One of the biggest changes in secondary schools in the last decade has been the increase and prevalence of computer delivered courses. The Distance Education Courses for Public Elementary and Secondary School Students: 2002-03 (DECPESSS) report by the National Center for Education Statistics (NCES) estimated 328,000 enrollments in distance education courses for that school year. Of these enrollments, only 1% was at the elementary level (NCES, 2003). Picciano and Seaman estimated over 1,000,000 students, translating into an even higher number of courses, in their 2009 survey. Despite exponential growth in computer-based learning, research at the K-12 level is lacking.

Purpose of the study

The purpose of this project was to investigate perceptions students have about their learning in computer-based courses. Many students need to repeat a course in order to graduate and several credit recovery options are available in the public school district that is the subject of the study. Some students attend the Area Learning

Center, working one on one with a teacher. Some students repeat a course in the classroom, and an increasing number of students are enrolled in classes delivered by computer software. The project is important because completing failed courses affects a student's graduation, and the percent of students completing courses influences a school's graduation rate. In addition, for students planning on postsecondary education the quality of the course is important.

The most widely used tool helping students make up required courses in the district in this study is PLATO®. PLATO® is an educational software company which provides courses to the Duluth School District. Students who are enrolled attend during a period of the regular school day. Students work entirely at their own pace, and in many cases they can work from home computers or mobile phones. They complete the courses in varying amounts of time. At the alternative school in the district there are two sections of a PLATO® lab scheduled and 20 students are enrolled in PLATO® courses. At the tradition high school 95 students are enrolled in PLATO® courses, and many have taken multiple courses in this manner.

This study investigated success in these courses using several measures. The primary source of data will be input from the students in the form of a survey. The research included data on the amount of time needed to complete the credit, and which courses are most successful. Analysis of students' surveys attempted to discover whether certain types of students fare better with this method of learning. There was qualitative information in the form of personal communication with PLATO® teachers and school counselors regarding the use of PLATO®. The study was designed to answer the question, "do students believe that they learned something in their PLATO® course?",

and the associated questions “are students satisfied with their experience?” “Were there any substantial benefits?” and “were there any common roadblocks?”

Background

The NCES report, Distance Education Courses for Public Elementary and Secondary School Students: 2002-2003 (DECPESSS) described a variety of options for learning via computer. Technologies mentioned included two-way interactive video, Internet courses, both with asynchronous and synchronous instruction, and one-way video. Mupinga also lists formats such as cable television, correspondence courses, and interactive television in an article on distance education (2005). There are also software packages designed by educational companies and sold to districts that have courses used to replace traditional classroom courses.

The study was significant because it investigated an issue becoming larger in the educational field. There is an increasing amount of literature studying online courses and blended courses, but there is a lack of information on courses for K-12 students that are delivered entirely by computer. Researchers conducting a meta-analysis for the Department of Education noted the small number of scientific studies of online learning for K-12 (Means, Toyama, Murphy, Bakia, Jones, 2010). Some of the teachers implementing these classes have little training or knowledge of the capabilities available in the instructional package. According to Rice and Dawley’s 2007 survey, only 38% of the teachers teaching online had training before doing so (Oliver, 2009). Students are exposed to courses where they have no connection with teachers licensed in the field they are studying, if the vendor sells a package with that licensing issue resting with the district (PLATO® webinar, 2011).

Setting and Participants

The study was conducted in a public school district in the upper Midwest. The district has two traditional high schools and one alternative high school. The two traditional high schools are medium size schools with enrollments of 1430 and 1546 students. The alternative school has a seat-based section with 55 students and additional enrollment 194 independent study students. Information was gathered from students, teachers and counselors in one of the larger high schools and from the alternative school. The study attempted to include students in a variety of courses and interviews will be conducted with a small number of students who volunteered. The project gathered information from students in the form of surveys and background in the form of personal communication with teachers and counselors in the district.

Definitions

- Face-to-face course

  A course delivered in the classroom with both teacher and student in the same space

- Computer-based course

  Any course in which students learn material delivered entirely via computer. This includes software packages, web-based courses offered by vendors, and virtual schools courses

- Area Learning Center

  The alternative school in the school district which serves at-risk students between 16 and 21 years of age

- PLATO®

  The web-based courses as well as the non web-based versions used

- Students

High school students in the school district and enrolled at either school in the study

- Teacher

The staff person assigned to monitor the student's progress in the course and administer the course as well as classroom teachers

Assumptions

The researcher has experience in teaching mathematics at the high school level. This researcher has taught in the district for 10 years, most recently at the alternative school. Many of the students the researcher works with are from the traditional high schools and come to the Area Learning Center to make up credits. Based on observations of the labs and conversations with teachers and students in daily work there was an expectation that the program was a very basic version of the curriculum for the course that is being recovered, and that students received little assistance from the teacher in the course.

The researcher assumes that the students have previously failed a course before enrolling in PLATO®, and that they consulted with their high school counselor when choosing PLATO® over retaking the course in the classroom or taking the course at the Area Learning Center. Because the district offers summer school to make up credits the study assumed most of the students to be juniors or seniors who need to make up a significant amount of courses to graduate.

Limitations

The study considers a small number of students which affects the reliability of the data. The study does not examine a control group, or randomize students in any way. The students were approached in several periods early in the school day because one teacher

informed the researcher that classes later in the day were more off-task. Students under 18 needed parental or guardian consent and all other participants needed to give consent. The procedures specified by the Institutional Review Board may have had influence on the type of students participating. The researcher attempted to obtain surveys from students who had completed the course but that was not possible in all cases given the short period of time for data collection.

Summary

The researcher expects local schools to expand their use of computer-based courses. This study is important because it directly affects student learning in a specific school district. The study may have indirect benefits on the computer-based courses in the district's schools. Further findings of this study may support addressing concerns and support staff who administer courses.

Chapter 2

Literature Review

Numerous authors report a limited amount of scientific research on computer-based learning for K-12 students (Barbour & Reeves, 2009; Means, 2010). Cavanaugh, Barbour, and Clark assert much research is in unpublished theses (2009). Means (2010) stresses a lack of published studies contrasting online learning with classroom learning for K-12 education.

Computer based learning enrollment and distance learning options

The definitions of online learning vary and distance learning is not always online learning yet the NCES survey, Distance Education Courses for Public Elementary and Secondary School Students: 2004-2005, collecting data on distance learning reported information that included audio, video, or Internet technologies together as distance learning (2005). Technology includes internet courses with either synchronous (real-time) or asynchronous discussion, two-way video conferencing or one-way prerecorded video (DECPESSS, 2003). The delivery of courses using computers is varied as well. There are web-based learning management systems (Moodle, Blackboard or WebCT) provided by a third party, software delivered by a vendor, virtual high schools, and courses developed by districts in-house, cable television formats, correspondence courses, and Interactive Television (ITV) (Mupinga, 2005). Blended or hybrid models which incorporate classroom and computer components are becoming increasingly popular. Picciano & Seaman (2009) add terms such as “fully online”, “blended courses”, “virtual courses”, “e-leaming”, “web-facilitated”, “asynchronous learning”, “hybrid courses”.

Online education got a boost in 1997 when the first two virtual schools in the U.S., The Virtual High School (VHS) and the Florida Virtual School (FLVS) appeared. Barbour and Reeves described the creation of these two schools with the support of state and federal grants (2008). By 2001 there were fourteen states with existing or planned virtual schools and researchers found over half of the states had written policies for virtual schooling. As the report by the Education Sector notes, over two dozen states have established state-run virtual high school programs (Tucker, 2007). The National Education Association predicted that by 2006 a majority of students would have taken an online course before graduation (Fulton, 2002). Indeed, one state, Michigan will require that all students take an online course for graduation.

The number of students enrolled and number of courses has grown tremendously. Clark (2001) reported 40,000 to 50,000 students enrolled in courses through virtual schools. The Distance Education Courses for Public and Secondary School Students: 2002-2003 (DECPSSS) study by the National Center for Education Statistics reported in 2002-2003 there were close to 350,000 enrollments in distance education courses. The DECPSS based on the 2004-2005 school year reported an estimate of 506,950 enrollments, and Pincciano and Seaman (2007) found approximately 700,000 k-12 students in online courses the following 2005-2006 school year. Distance learning is most common for secondary or post-secondary students. Only 1 percent of the enrollments were in elementary schools, 2 percent were in middle schools, and the rest were in high schools or mixed level schools (DECPSSS, 2003).

This explosion in virtual schools is in addition to the increase in computer software options. When educational software companies began developing and marketing products

for home use products such as Oregon Trail and Carmen San Diego were popular. In 1985, $179 million of the $246 million spent on educational software was to the home market (Borton and Rossett, 2001). The popularity of educational software for home use was mirrored by programs developed for use at schools. Today, electronic products for education accounts for $1.9 billion in sales, and that portion of the educational market grew almost twice as fast as the growth in overall educational products, according to Oppenheimer (2007). Companies such as Pearson, PLATO®, and Aventis, offer instructional supplements and courses designed to meet high school standards for credit. PLATO® offers 27 high school courses, from remediation to advanced placement (AP) courses (http://www.PLATO®.com/high-school-9-12, retrieved May 16, 2011). The APEX Learning Company offers courses in the four core classes plus foreign languages, Physical Education, Health and Art appreciation fhttp://www.apexleaming.com/Curriculum/Overview.htm' retrieved May 16, 2011). APEX's offerings include 12 in math alone as well as 15 advanced placement (AP) courses.

Studies of effectiveness

The research on effectiveness of computer-based learning for K-12 students is limited for several reasons. Means, et al. (2010) note the small number of studies that used scientific methods. There are confounding factors due to implementation as well (Means 2010; Dessoff, 2009). In their survey of school district administrators Picciano and Seaman (2007) hypothesize that research on effectiveness of computer-based learning is inhibited by several factors, a) a minimal amount of data required by states due to confusing definitions of distance learning and online learning, (b) private or for-profit

companies providing education which is outside of the usual public sphere, and (c) home schooling students using online learning but not required to provide data. The many definitions and terms for distance learning, online learning and computer-based learning complicate research in the area.

The research on effectiveness of online learning that has been conducted is conflicting. To be truly scientific research requires randomization of treatments, control groups and measureable treatment effects. Further evidence in a meta-analysis of online learning research show a lack of scientific studies comparing online instruction with face-to-face learning (Means, et. al. 2010). That report searched databases from 1996 through 2008 and found 176 studies using experimental design. Only nine of these involved K-12 learners, and only five of those were deemed to have enough data for computing effect sizes. The conclusion of this meta-analysis showed a larger positive effect when comparing blended approaches with face-to-face than when comparing strictly online with face-to-face learning. The researchers also noted inconsistency in conditions such as the amount of learning time and the materials used in the courses. For example, in a blended course students would often spend more time on task. Because of these confounding factors the authors caution that the slight improvement in achievement cannot be attributed to the delivery by computers due to differences in curriculum and pedagogy.

Computer based learning that is not online has little scientific justification. The government agency, What Works Clearinghouse (WWC) was established in 2002 to review studies of instructional packages and determine whether there was sufficient data supporting the products. By 2006 the WWC had found only 51 products worthy of

review after sifting through 255 studies to determine whether those studies were true scientific research (Oppenheimer, 2007). The WWC found only one study of a scientific nature rating effectiveness of the PLATO® Achieve Now package for mathematics and the results showed indeterminate effects (U.S. DOE, 2010). One study (Campuzano, Dynarski, Agodini, & Rail, 2009) that met WWC standards rated 10 products using test scores. Nine of the 10 products showed statistically insignificant effects on test scores in a two year study. One study reported a positive effect while the other reported a negative effect, but neither of the studies showed a statistically significant effect.

To be scientific, studies of software instructional packages need to take into account the way the courseware is used. Dessoff (2008) described three districts that conducted credit recovery programs with software products. All three implemented their programs in different ways. In one district teachers used a face-to-face model but allowed time on computers, one district used a blended approach, and one district used a fully online model. O'Byme, Securro, Jones, and Cadle (2006) studied software use with low-achieving students and found a slight positive effect. The authors note the study was not completely scientific due to lack of pretest data, a small sample size at one school and a lack of randomization. The software was used in conjunction with classroom learning which confounding the effect of the software.

A major provider of educational software packages is PLATO®, and in 2004 John Washburn spent time with a PLATO® representative who explained that students are required to complete 60 hours, the equivalent of 12 weeks, in the lab to complete a failed course, but students are exempt from areas they have mastered. The seat time

requirements using this program can vary according to the parameters of the district, and this makes studies with control groups difficult.

Oppenheimer (2007) claims software companies' present studies that have not been deemed to meet the standards of scientific research. A case he mentions is Pearson's Waterford Early Reading, designed for K-2 grades. The Los Angeles School district spent $50 million on Waterford, and found no significant differences between students using Waterford and those who did not. Pearson defended the program with a study they conducted, but the researcher for the schools noted the small sample size (60 students), data from all grades in a school which confounded the data from K-2 where Waterford was used, and the use of a test designed for non-English language speakers (Oppenheimer, 2007).

Benefits of computer based learning

The benefits most often mentioned in connection with computer-based learning are flexibility in time and space, more course offerings, and the ability to work at one's own pace. One of the most frequent comments on the popularity of distance learning is the flexibility. Both students and administrators find that online learning eases scheduling issues. In the 2003 DEPESSS survey between 52% and 70%, depending on the size of the district, cite scheduling as a reason to offer distance education. Some students with specific needs, such as rural students, homebound students, and traveling families benefit greatly from the flexibility offered by taking classes without travel.

Students also appreciate being able to work at their own pace. For students in credit-recovery courses this is valuable since they have been exposed to the material and may know where they need to speed up or where to slow down. An aspect in online learning

beneficial to students is software with diagnostic features, so students do not have to repeat the whole course. O'Hanlon wrote about districts that employ online learning, and quoted Carol Downing from Florida, where Apex Learning is used, "The beauty of the system is that any course not finished in the juvenile detention program, for example, can be finished at the high school with the same system" (2009, p. 13). This flexibility in pacing has allowed many students who have dropped out to drop back in and use some of their previous partial credit.

Some students feel more comfortable seeking help while on a computer than in a traditional classroom. Beal, Qu, and Lee (2008) studied motivation and achievement and their relationship with guessing and help-seeking behavior. The authors assert that some students, especially those with low self ratings, feel more comfortable seeking help while on a computer than in a traditional classroom. Nicholas and Ng refer to Swan's claim that online learning environments can be more democratic (2003). This atmosphere can encourage participation from students who might not do so in a face-to-face class.

Often courses not available at a high school are available through distance learning, such as advanced placement courses in small schools or rural areas (DECPSS, 2003). Fifty percent of districts with students in distance education courses had students enrolled in Advanced Placement(AP) courses and the proportion of distance education enrollments in AP courses were greater in small districts than in medium or large districts (DECPSSS, 2003).

Challenges to online learning.

In a report by the Education Industry barriers to online course implementation are lack of funding, insufficient evidence that online courses are effective, difficulty finding

courses to meet local needs, lack of interest at the school level and at the district level (DECPESS, 2005). Picciano and Seaman also found a concern with quality of courses to be an issue and this concern with quality affected school administrators' decisions about offering online courses (2007).

Negative feedback on computer assisted learning by students includes less interaction with a teacher, technological issues, teacher training, and motivating students. Interactions with teachers that students want include feedback as well as assistance, reminders about pacing or deadlines in the course, and clear ideas of objectives. Oliver (2009) surveyed both students and teachers on perceptions of online courses. The study found less than half of the students felt they had prompt feedback. The third most common response from students in this same survey was about confusing assignments.

Another concern with learning through virtual schools is the rate at which students either drop out or fail to complete the course. Motivation is always a factor in student success and the anonymous nature of learning without face-to-face contact makes dropping out even easier. The Florida Virtual School (FLVS) has a guideline of completion of a semester course in 18 weeks, but unlike a traditional school this can fluctuate, according to Pam Birtolo, chief learning officer at FLVS (Dessoff, 2009). Further, flexibility can become a lack of structure, something younger students need. K-12 virtual programs have quite high dropout rates, similar to adult online learning programs Nicolas & Ng (2009). The 2005 DEPSSS survey collected data on completion rates and found the average percentage of passing grades was only 66% of courses. In a literature review of 149 articles, Barbour and Reeves (2008) conclude that retention is one of the major challenges found by researchers of virtual schools. They refer to several

studies that hypothesize that the successful online students are students who are successful in the classroom setting as well.

Teachers have stressed lack of training as a major factor preventing them from facilitating online learning. Forty six percent of North Carolina Virtual Public School, (NCVPS) teachers rated their professional preparation as fair or poor (Oliver, 2009). The same survey showed teachers were frustrated with the numbers of students and amount of grading inherent in their online courses (2009). Quoted one teacher "The course asked students to complete over 150 assignments, tests, quizzes in 5 weeks! None of the tests or quizzes were auto-graded, so feedback was delayed."

Strategies for effective e-learning

A frequent suggestion for improvement is more teacher interaction. Whether interaction is real-time or not students need some assistance with learning. The literature review of Barbour and Reeves (2008) quotes Moore saying K-12 teachers maintain control content and delivery and that these younger students are not ready for the autonomy inherent in distance education (2008). Barbour & Reeves tell us how some virtual school courses operate like correspondence courses with interaction limited to written responses to readings while others involve email, chat rooms and even video conferencing (2008).

Other suggestions for improvement include more meaningful assignments, rather than drill work or textbook-type information, (Oliver, 2009). Appropriate use of software is important and a familiarity with technology pertinent to the course is also essential (Oliver, 2009). Information from Beal, Qu, and Lee (2008) and Caftori (1994) discuss appropriate use of software. Beal, Qu, and Lee (2008) describe" gaming-the-system"

behavior and describe how that research has found ways to design software to prevent inappropriate use by students. Middle school students using the computer lab during free time after lunch revealed interesting trends (Caftori, 1994). Students developed preference for certain programs, based on suggestions from friends, thus girls and boys had difference favorites. In that middle school the students were observed using the programs much as an arcade, wherein they raced to complete the game or to get their personal best in points, rather than focusing on learning the concepts the software was supposed to teach. This gaming behavior is another issue to address when looking at improvements to the system.

Training for teachers in teaching online courses is important. In some instances computer based learning is conducted primarily with software designed for the purpose of course delivery and teacher interaction is limited to monitoring student progress. This is the case with credit recovery software provided by the PLATO® Company. In a webinar this researcher attended a participant posed the question of courses being delivered outside a teacher's discipline. The company response was that the courses were well designed but teacher licensing was the prerogative of the school districts. This researcher met with a teacher of computer-based courses and learned there was only one hour of training before assigning her to a class consisting of students recovering credit in math, science, social studies and English courses (Westholm, 2010). Oliver cited a national survey by Rice and Dawley (2007) which found 62% of teachers did not receive training before teaching online (2009).

Conclusion

E-leaming is evolving every day and has been influenced by many factors. Government entities have provided grants and established policies for distance learning and virtual schools. School oriented software, especially drills for elementary and middle schools are a part of an educational publisher's product line. Educational companies are expanding their offerings; course supplements becoming stand-alone courses. The use of computers in education is growing every day and knowledge of what methods and packages are most effective for a situation has the possibility of enhancing education for

CHAPTER THREE

Methodology

Introduction

The purpose of the study was to determine what perceptions students have of PLATO® courses. PLATO® is the provider of computer-based courses which are being used for credit recovery in all of the high schools in this public school district. There are several questions of interest in this research: (1) How do students perceive the quality of the courses, (2) Are students satisfied with their experience? (3) What benefits and challenges did they experience with this option for earning credit? and (4) How did the student come to choose this option?

Setting and Participants

The setting for this study was a medium size school district in Northern Minnesota. The district has two high schools with 1430 and 1546 students and an alternative high school program with 249 students. On average, 100 students are enrolled in this option for their credit recovery at the traditional high school studied. At the alternative school 20 students were assigned a PLATO® course but due to technical difficulties only 12 utilized PLATO®. Last year over 124 credits were granted at one of the traditional high schools using this method of course delivery. The district offers a variety of courses with PLATO® software, including math, science, social studies, and English courses. The option for advanced placement courses as well as basic core courses, but the district currently uses PLATO® for credit recovery. Students enrolled in PLATO® courses in the traditional high schools are scheduled for a period in the regular school day and report to a computer lab staffed with one teacher. They also have the option to work from

computers off campus and even mobile phones, but they must take tests in the scheduled room with the teacher. The study attempted to include students from various courses.

Participants were students enrolled in PLATO® courses and students who had completed a PLATO® course during the 2010-2011 school year. The research attempted to reach students at both a traditional high school and the alternative high school in the district during a two week period of data collection. The students surveyed were volunteers, thus the sample was not randomized. The teachers, counselors and administrators provided additional information about the implementation of the course. Counselors and teachers also shared their perceptions about the quality of the course and their decisions regarding placing students in the course. The researcher approached teachers who were assigned to teach the course and talked to counselors that were convenient at each school in order to get perspectives from all populations served.

Research Design

The research began with an application to the Institutional Review Board of the University of Minnesota for a study conducted on human subjects. After permission for the study was attained (appendix C) the students were selected using lists of students enrolled in PLATO®. The researcher obtained names from the teacher and worked with the teacher to determine how many students were in each course offered and attempted to gather information from a cross-section of the population and content areas. The researcher gathered data from a variety of content areas to determine whether courses in one specialty was more conducive to a web-based course option. One condition for participation was that students needed to have completed half of the class before taking the survey.

The students were presented with an explanation of the project by the researcher and asked whether they would agree to participate in a project that might improve the course or delivery. The students were offered a chance at a drawing for gift certificates if they participated. Those students under 18 who were willing to participate were asked to have a consent form signed by a parent or guardian. Students 18 or over were allowed to participate without parental permission.

Once students volunteered and consent was acquired, the surveys were handed out during regularly scheduled class time. Students were given the survey early in the period and collected at the end of the class period. The researcher returned for a second round of surveys a week later to include students who submitted consent forms after the initial round.

The survey instrument (appendix A) was developed by analyzing pilot survey answers of students at the Area Learning Center, an alternative high school in the same district as the two major schools, and was reviewed by several other secondary level teachers in the district. The areas addressed in the survey were satisfaction with the course, satisfaction with the teacher and implementation of the course, length of time to complete assignments, tests and courses and challenges of completing a computer-based course. The survey questions related to satisfaction used a 4 point Likert scale rather than categories to make the questionnaire simpler to use and to interpret. The scaled questions had an even number of possible responses to prevent the selection of a neutral or non-answer. A checklist was used to find answers to the question “why do students use PLATO® for credit recovery?” As Fowler suggests open-ended questions were added to

probe for answers that are unanticipated and for answers that might describe the real views of participants (2009).

The teachers who participated were interviewed through unstructured conversations conducted throughout the research. This provided the opportunity to collect broad information and to collect it more efficiently. According to Dick (1998), asking very general questions can help define which questions really need to be asked. Probing with more definite questions late in the interview gathers specific information to analyze. Several of the interviewees were interviewed more than once in an attempt to refine some of the themes generated by the interviews.

Data Gathering and Analysis

Students completed the surveys during their class time. Surveys were collected by the researcher at the end of the hour. To complete interviews in a quiet and relaxed atmosphere the researcher chose teachers and counselors at each high school and scheduled the interviews for whatever time was convenient for the interviewee, generally before or after the school day. The counselors chosen were those researcher had had previous contact with as a credit recovery teacher, while the teachers were those assigned to teach PLATO®.

The survey data was entered into an Excel spreadsheet to organize categorical data. The spreadsheet formulas were used to calculate means and standard deviations. Information in the results indicates the number of students that fit the conditions and did not participate, either because they did not want to or because they did not remember to get consent forms signed.

To review information from teachers the notes were transcribed in a column format, with the comments of the staff member interviewed in one column and researcher notes, observations, and analysis of statements in the other column. After transcribing the comments the researcher looked for common themes and gathered similar comments in order to make conclusions. The comments that seemed disparate were gathered to probe for reasons why they might be different. Further discussions were conducted to verify and probe for explanations for differences, to look for examples and also to confirm similar comments.

Summary

The data gathering was conducted within two weeks, and then analysis began with statistical analysis, and transcription of interviews. Some related questions and themes were grouped before making final conclusions. The results show that there are many benefits for students and the school district, but many concerns about the quality of the courses. These results are discussed more fully in Chapter four.

Chapter 4

Results and Discussion

Introduction

The two schools studied were chosen for convenient access, but did provide a balance of demographic factors. Students at the traditional high school are generally from a higher socio-economic level, indicated by the smaller proportion of students receiving free and reduced lunches. The alternative high school serves students from throughout the district. The students there have either dropped out, been expelled from another school, or have been referred because they are considered at risk of not graduating. The students here are generally from a lower socio-economic level. For the purposes of this study it was not necessary to ask students for information about their socio-economic status, grade level, or gender but a cross-section of the district was represented by using these two schools.

Results

Fifty one students completed surveys for this research. The students were approached by this researcher with an explanation of the project. Students who volunteered to participate in the research completed consent forms (Appendix B) and then they took the survey (Appendix A). The researcher visited 4 class periods at a traditional high school in the district and 38 students agreed to participate. The researcher visited the PLATO® lab at the alternative high school and worked with teachers there to obtain participants. There were 15 surveys collected from students at the alternative school.

PLATO® use in the schools.

A significant number of students in this district have taken PLATO® courses. A teacher at a traditional high school provided information on the use of PLATO® there.

Ninety five students were enrolled in PLATO® courses for the 2010-2011 school year and as of the 4th grade period 124 semester credits had been granted (personal communication, 2011). The subject area that PLATO® courses were most used for was social studies, with 45% of the students surveyed reporting they had used PLATO® to recover credit in social studies. English classes are the second most used of the PLATO® courses offered, followed by math and science. These subject areas have 40%, 34% and 26% respectively of participants reporting enrollment in. These percentages reflect the fact that students have taken multiple courses with PLATO®. (Figure 1).

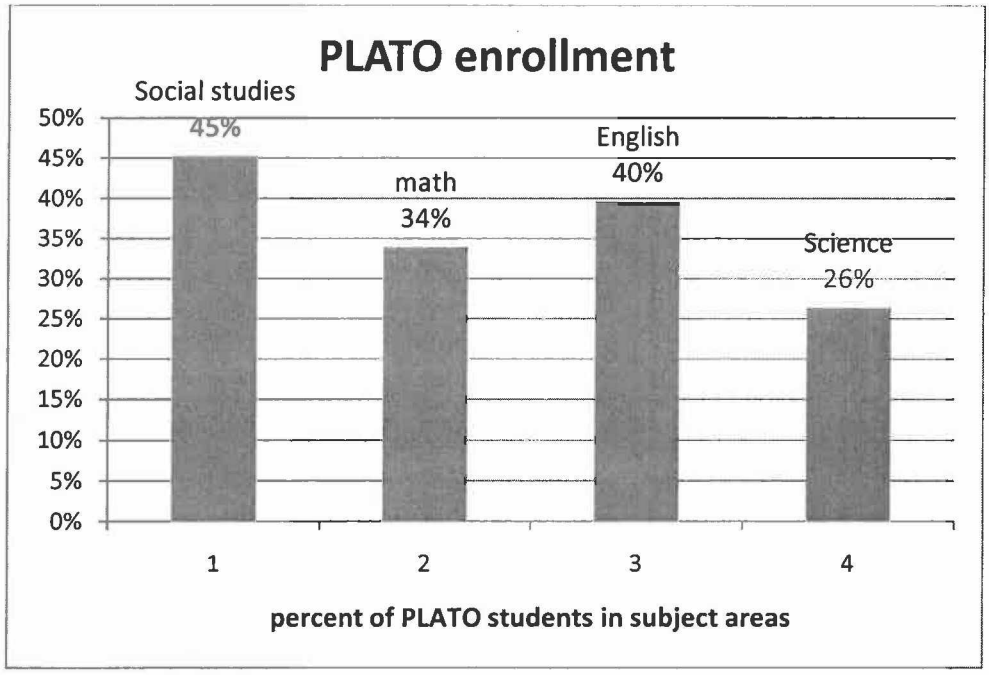

Figure 1.

The first question in the survey asked students about their experience with online or web-based courses. For a majority of students, 66%, this was their first web-based class. Even though it was a first for most students, 81% reported no difficulties in getting to the PLATO® website.

This is not surprising, given the computer literacy of the average student and the fact that many students had taken multiple courses using PLATO®. Thirteen of the students who responded indicated they had used PLATO® for more than one class.

Responses to questions about the program.

A concern with computer delivered courses is the amount and type of interaction between students and a teacher. PLATO® programs are strictly online and do not contain interaction between a teacher or between other students in the course. The interaction students using PLATO® in this setting have is with a teacher monitoring their progress. The researcher was interested in the program because of this aspect; therefore three of the questions on the survey asked students about their perceptions regarding interaction with a teacher. In question five, students responded to the statement "Generally, the instructor was helpful". The mean on a scale of 1 to 4 was 3.5, where 3 was mostly helpful and 4 was very helpful.

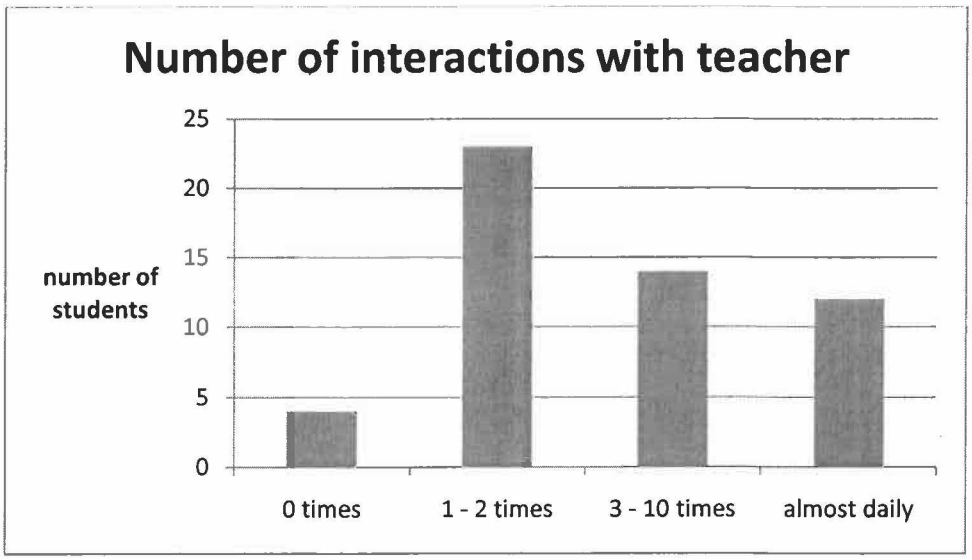

Figure 2.

When students were asked to estimate how much they interacted with a teacher in the course they were completing they selected a range of interactions represented by a scale

of one to four. A one represented no interaction, two represented 1 -2 interactions, three represented 3-10 interactions, and four represented almost daily interaction (Figure 2). The average number of interactions with a teacher is between 1 and 10 for a given course. While the mean of 2.6 is closest to the 3-10 numbers of requests for assistance almost half of the students responded that they had only one or two interactions with their teacher, a fairly low number for a semester long course.

Question seven asked students whether they felt the amount of interaction was right for the course, and most students agreed it was. There were comments during administration of the survey about this question because some students did not perceive the teacher as a teacher in the traditional sense of being a specialist in the content area. The students were told to use their own judgment about the type of interaction. The question asked students to reply to the statement "Generally, the amount of interaction was right for the course." The mean was 3.3, between 3***{somewhat agree***) and 4***(agree).***

One of the duties of a teacher of PLATO® courses is helping students with technical issues and question number four asked students to indicate whether they had experienced technical difficulties (other than access to the program) on a categorical scale of one to four. A "one" represented a lot of difficulties, "two" represented quite a few, "three" represented some difficulties and "four" represented none. The average of the responses was 3.3, showing there is not a serious number of problems.

In questions about students' satisfaction with the course the results were generally positive about the program and how well it worked for them. The strictly online nature of the course did not have a significant adverse effect on the perceptions of students regarding PLATO®. Students reported that the assignments were reasonable, the

information was presented clearly, the expectations for tests were clear, and they had a clear idea of their progress in the course. When asked whether assignments were reasonable in length, the mean was 3.1, between usually and almost always. The mean for question 9, which asked students whether the material was presented clearly was 3.3. When asked whether expectations for tests were clear, the mean was 3.4, between ***usually*** and ***always.*** Question 12 asked students whether they had an idea of their progress in the course and the mean here was 3.5, between ***usually*** and ***always.*** Both of the PLATO® teachers this researcher observed required students to print regular progress reports. Two questions that asked students about their views on the quality of PLATO® received positive responses. Question 13, "Generally, I have learned a lot in this course" had an average of 3.1, between ***somewhat agree*** and ***agree.*** Question 14 said "Overall, the course was worthwhile" and the average was 3.3, between ***mostly*** and ***very*** (Figure 3).

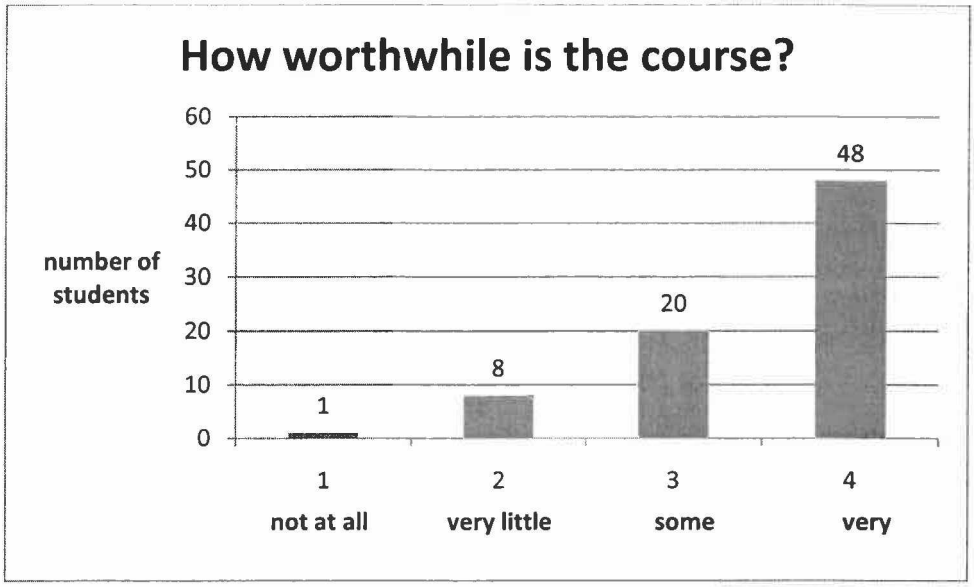

Figure 3.

Two questions asked students about motivation. Question ten asked students to respond to the statement that "the assignments were interesting and motivating". A

sizable number, 21, answered 1 ***(never)*** or 2 ***(rarely)*** even though the average was 2.6, between ***rarely*** and ***usually*** and closer to ***usually.*** Question 15 was "Overall, the course made me motivated to learn." The mean for this question was 2.7 on the scale of one to four; between ***rarely*** and ***usually*** but closer to usually. A large percentage, 36% reported the course ***never*** or ***rarely*** motivated them. The research shows a large percentage of students do not find the assignments or the course motivating even though the average suggests that the assignments and the course are motivating.

A benefit of the PLATO® system is that students who have taken the course previously will begin the PLATO® course with some knowledge, and in fact, they may test out of part of the PLATO® course. It would be a reasonable assumption that students can complete a course more quickly when they can skip over some of the material. Participants report they have learned a lot, the course was worthwhile, they were motivated to learn, and over 90% indicated that they would take a PLATO® course again. A large number of comments that teachers report (personal communication, 2011) students have made were comments mentioning the ability to complete a course quickly with PLATO®. Because the course allows students to test out of part of the course the speed of course completion is not necessarily a function of the quality or ease of the course.

Factors in choosing PLATO®.

Question number 17 in the survey asked students to report why they chose PLATO® over the other options of repeating the course in the classroom, taking summer school, or attending the Area Learning Center. There were seven factors listed. Most of the

respondents had multiple reasons for choosing PLATO® so percentages add to more than 100% (Figure 4).

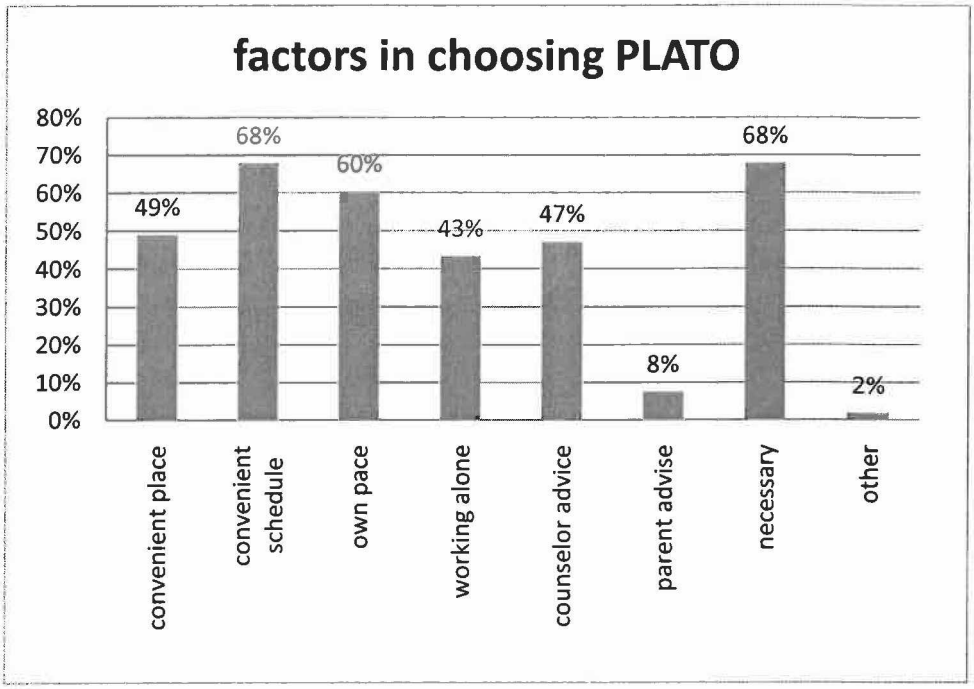

Figure 4.

The factor students selected most frequently was that it was necessary for on-time graduation. 72% of the students were in this category. The next most chosen factor was the convenience of the schedule and 68% of the students selected this from the list of options. Having a class in a convenient place was important as well, and 53% of participants reported that convenience affected their decision. The fact that students report convenience as a reason for choosing PLATO® is reflected in the declining enrollment in the afterschool program at the Area Learning Center (personal communication, or enrollment data? 2011). The ability to work at their own pace was also important to students and 64% of students mentioned this in their survey. Counselors also had a significant impact on why students chose PLATO®, with 53% of the students

who responded stating their counselor had an effect on their choice, while only 10% of the students were affected by a parent's opinion.

Comments from student participants.

The students who did add a comment to their survey had many positive comments. The actual comments included:

"very helpful for making up credits. This class is much better than regular classes",

"I think PLATO® is helpful in many ways and you get done quicker",

"I needed the credits to graduate and its much faster to do it on PLATO®",

"awesome"

"this has helped me learn at my own steady pace"

"I can work w/o classroom distractions."

"works good for people who are independent"

"The new PLATO® is extremely better than the first, the new "Pretest" given at the beginning of each unit is very, very, helpful because it exempts you from things you already know."

"if I were to do it again I would set a time everyday so I don't have to scramble to catch up",

"try having less trick questions with mastery tests"

Communication with teachers and counselors about PLATO®.

"PLATO® is a joke here",

"I don't use the lab because none of the students were able to access PLATO®" (from a teacher assigned to teach PLATO®),

"I only had one hour of training. It took us six weeks to get up and running."

"This is a very good program"

"I'm happy that I am still helping kids".

"There is no way that a three week course equates to a semester of being in a classroom".

Teachers from a variety of disciplines and schools have a negative view of the program though few have any direct experience with PLATO®. Teachers who teach PLATO® courses and the students themselves are quite satisfied that it is doing what the schools want it to do. A PLATO® teacher interviewed said that PLATO® is no replacement for the classroom, but it does have a place and helps many students (personal communication, 2011).

Discussion

Student response to questions about communication of subject matter, expectations for tests, ease of use, and feedback on their work and their status in the course were positive. The students were less favorable towards issues of quality such as how motivating the program is, how well it motivated them to work, how much interaction with the teacher they experienced. Their responses to question 17 shows that major factors for using PLATO® is the convenience of a course they can work on at their own pace on their own time, and on computers outside the school classroom.

Summary

The survey showed that the high school students using PLATO® were generally very satisfied with their experience. The district this study took place in is taking a cautious approach to implementing online courses. PLATO® is used only for credit recovery courses and the courses are available only on a pass/fail basis. PLATO® gives students the ability to catch up and stay on track to graduate. The schools do not sacrifice the

course quality and experience of working with a teacher in the discipline because all students are exposed to the traditional method of course delivery in their initial enrollment in a course. The PLATO® course programs are there only if and when a student needs help.

CHAPTER FIVE

Summary and Conclusions

Methods and findings

This research was conducted in order to determine how satisfied students, teachers, and counselors are with the PLATO® program used in the district studied. The research surveyed students on their perceptions of PLATO® courses with a 17 item survey. The survey was administered in PLATO® classes. Information from teachers was obtained through conversations.

This study found overall the students were satisfied with the program. Despite teachers' concerns about the quality of the courses, PLATO® is providing students a chance to make up credits in a convenient manner and students value this opportunity. This option improves the students' chances of on-time graduation, benefiting the students and the school district. A significant number of students utilize this option.

Limitations

There are areas this research did not explore. One issue is what type of learner does well with a computer-delivered course. Student comments suggested some students preferred working alone but the survey did not ask students to reflect on their learning style. None of the questions attempted to determine whether or how much students missed the experience of being in a group or to compare PLATO® with a classroom experience.

There were items on the survey that were worded imprecisely and could be interpreted several ways. Students were surveyed to determine what factors made them choose PLATO®. This question about factors could have been more informative if

students were instructed to choose only one factor or if they rated the factors by importance. The questions about interaction with a teacher may have been confusing questions for the students. The teacher's role for PLATO® classes is to take attendance, to monitor students' progress, to allow students to take unit tests, and to solve technical issues. Because the PLATO® teacher's role is as a facilitator students were unsure whether to answer these questions based on interaction about course content or whether to include interaction about administrative issues. Question two asked student which courses they were enrolled in and students interpreted this in two ways with some students selecting their current class and others checking off every subject they had used PLATO® for.

Finally, much of the information gathered in this research was found because of convenience. The information gleaned from teachers in the district was from teachers this researcher had frequent contact with or teachers in the classrooms visited. The methodology may have biased the information gained from teachers. The researcher did not use experimental methods to select students balanced by age, gender, subject matter, or schools but instead collected data from participants who volunteered during visits to PLATO® classrooms.

Educational implications

There are several benefits to use of a product such as PLATO®. The most important benefit for students is graduation with their class. This project found, from the student's perspective, the program satisfies this need well. A significant number of students are recovering credit with the PLATO® program and this directly affects their ability to graduate on time. Another benefit for students is the opportunity to become familiar with online courses and to be more prepared for post secondary education.

There are benefits for the school district also. One benefit is the improved graduation rate this program provides for the district. A district's graduation rate is calculated using on time graduation. Students who do not graduate with their class are not counted as graduates. Another benefit to district administration is the potential for savings by utilizing this program. Information from a PLATO® company webinar (2011) noted that the possibility of structuring classes where students can be in one room taking different courses can be a savings because only one teacher is necessary. A Massachusetts school district that participated in the webinar quoted the $300 cost for summer school, and compared this to the $200 cost of the same course offered by PLATO®. (PLATO® webinar, 2011).

There are concerns about use of online courses that have not been completely addressed yet. A concern of many teachers and other adults who spend time around young people is the loss of social interaction. The PLATO® courses are designed to stand alone (PLATO® webinar, 2011) and require no interaction with a teachers or students. In past years students experienced a great deal of their socialization in schools, and this is eliminated from their educational experience with the use of PLATO® courses. Mupinga notes the possibility of stranding difficult student online (2005). Online interaction may simulate classroom activities in limited ways.

A loss that affects the community is the loss of local control and loss of local jobs. There is evidence that the PLATO® program has replaced other options used by the district in the past, primarily courses completed at the Area Learning Center (ALC) or during summer school. During the 2008-2009 school year the ALC provided 152

semester credits for students in the area. This number was down to 74 credits for the 2010-2011 school year (personal communication, 2011). The increase of enrollment in PLATO® and decrease in enrollment at ALC and in summer school affects employment for local teachers. Fewer teachers will be needed in these programs.

A final issue is the question of course quality. There is a lack of information about how much k-12 students learn using these types of computer delivered courses. Most research so far focuses on hybrid classes or virtual schools taught in conjunction with a teacher in the subject. There is a need for studies of these type of courses provided by vendors. Future research might explore the issue of student learning with quantitative measurement of the concepts expected in the course. Information on how well these courses retain students is important given the high dropout rate for online courses, and information about the time required to complete a course could help administration, counselors and students with scheduling.

This research has many implications for education by exploring an aspect of education that is an increasing component in high schools. Courses provided by vendors such as PLATO® are unlike virtual schools and courses designed by and implemented by teachers within a district or courses purchased from outside institutions. In courses offered by PLATO® no interaction is required. Students learn by themselves and at the pace they choose to work at. Because these programs are new products the issues of course quality, socialization, and the effect on the community are unresolved.

Recommendations for future research

There are some issues that arise from use of a product such as PLATO® that warrant further study. This research was limited to subjective data on perceptions of students. Further investigation of PLATO® from teachers, counselors and school administrators

can provide information from educators' perspectives. Research comparing perceptions of students with those of educators would be helpful. Future studies should consider the population of the district when planning a sampling method.

Another area to explore is how learning with PLATO® compares with classroom learning. Research comparing the PLATO® curriculum with classroom curriculum would provide a direct benefit to teachers. To make direct comparisons between the online and classroom version of a course research must measure learning with quantitative methods. To provide thorough data pre and post tests are necessary to answer questions about course quality. Course quality in K-12 education is important for students planning on post secondary education. Learning in higher education settings has changed with the advent of online courses. However, the preparation of incoming students is an issue affecting student success in post-secondary programs.

A third area that would have direct impact is whether certain types of learners fare better with computer-delivered courses. Future research to explore whether certain types of students benefit more is worth investigating. Scales in which students rate themselves on their learning style or information gleaned from counselors about students would benefit the referral process and affect which option a student is referred to for makeup credit. A related issue is the socialization of students who complete a large number of courses in this manner.

Conclusions

Instead of "I can't believe I got an F" students are able to say, "I passed the class and I'm going to graduate" when they have the ability to recover credit in such an efficient manner. School districts are able to offer more courses and to enhance the current courses

when they implement computer- delivered courses. Schools will be transformed and education can be tailored to individual students when more research on

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Appendix A

Survey Instrument

PLATO Student survey

1. Is this your first online or web-based class? Yes_____ No_____

2. What type of course are you enrolled in? check the current or most recently taken one.

_____Social studies (includes history, world history, government and economics)

_____Math (any math course: algebra, geometry, algebra 2 or basic math)

____English (any level)

_____Science (physical science or biology)

Satisfaction with the course

3. Were there any difficulties getting to the website? Yes_____ No_____

4. Were there any difficulties in using the program?
   A lot quite a few a few none
   1 2 3 4

5. The instructor was helpful.
   Not at all somewhat mostly very
   1 2 3 4

6. How much interaction did you have with a teacher about the subject?

   0 times 1-2 times 3-10 times almost daily

7. Generally, the amount of interaction with teachers or students was right for the course.

   disagree somewhat disagree somewhat agree agree
   1 2 3 4

8. Generally, the information was presented in a clear manner.
   Never rarely usually almost always
   1 2 3 4

9. Overall, the assignments were reasonable in length.

   Not at all rarely for the most part always
   1 2 3 4

10. The assignments were interesting and motivating.

    Never rarely usually most of the time

12 3 4

11. The expectations for tests were clear for the most part.

Never rarely usually always
12 3 4

12. Generally, I had a clear idea of my progress in the course.

Never rarely usually always
12 3 4

13.1 usually had an idea of my grade in the course.

Never rarely usually always
12 3 4

Perceptions of the course

14. Generally, I have learned a lot in this course.

Disagree somewhat disagree somewhat agree agree
12 3 4

15. Overall, the course was worthwhile.

Not at all somewhat mostly very
12 3 4

16. Overall, the course made me motivated to learn.

Never rarely usually always
12 3 4

17. Would you take a similar course in the future? Yes___ No _

18. What factors influenced your decision to use PLATO® instead of repeating the course, attending summer school, attend the Area Learning Center? Check all that apply.

__Convenient place___ Fit my schedule _____ Liked working at my own pace

__Liked working by myself___ My counselor advised it____ parents preferred it

Necessary for on time graduation_____ Other (please

list)_____

Do you have any other comments about your experience or suggestions for improvement?_____

Appendix B

CONSENT FORM

What do students think about their experience using PLATO® for high school courses? You are invited to be in a research study of the use of the PLATO® software program for high school courses. You were selected as a possible participant because you are enrolled in a PLATO® course in the Duluth Public School system. We ask that you read this form and ask any questions you may have before agreeing to be in the study. This study is being conducted by: Janice Hille, graduate student at the University of Minnesota Duluth Education Department.

Background Information:
The purpose of this study is: learn how students view their experience in PLATO® courses. The study will attempt to discover common problems or issues students encounter in using PLATO®, how well students like using this method for completing courses, and what students' perceptions of the course are.

Procedures:
If you agree to be in this study I will ask you to take a survey after completing the course. The survey will take approximately 15 minutes. If you are willing, I would like to interview some students also. Please indicate your willingness to participate in an interview at the bottom of the form.

Risks and Benefits of being in the study:
There are no risks to participation, and there are no direct benefits. There are indirect benefits if the study finds problems with the course, or administration of the course that can be improved.

Confidentiality:
The records of this study will be kept private. In any report published we will not include any information that makes it possible to identify a subject. The teacher of the course or administrator of the school will not have any information about any student's participation either. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study:
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any questions and you are free to withdraw from the study at any time without affecting any relationship with the University.

Contacts and Questions:
The researcher conducting this study is: Janice Hille. **You are encouraged to ask any questions** you have, or may contact me later at the Area Learning Center, 336-8700 extension 1302, or at Janice.Hille@duluth.kl2.mn.us. The advisor of the project is Kim Riordan, Department of Education, UMD, 726-7251, kriordan@d.umn.edu.

If you have any questions or concerns and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St., Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature:_____ Date:_____

Signature of parent or guardian: ***(If minors are involved)***

_____Date:_____