

THE BIG BROTHER AND BETTER EARLY COLLEGE GRADES

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ABSTRACT

This paper describes an empirical study over two semesters and five CIS110 “Introduction to Computers” courses held for early college students at a mid-size community college. This age group can be difficult to manage in terms of learning discipline and keeping students on-task. Inappropriate Internet use during class creates a major source of distraction. The supplied data and analysis confirm our initial hypothesis that grades improve when the instructor uses a classroom management system. Using a data set of 104 students, we conduct t-Test and graphical data evaluation. Utilizing a classroom management system improves the final grade average in the order of a full grade step, far fewer students fail, and the spread of grades is significantly narrower. In addition, the overall classroom setting improves in terms of behavior and discipline.

Keywords

Classroom Management System, Early College, t-Test, Normal Distribution, Cyber-Slack, Cyberloafing

INTRODUCTION

Ask a teenager about videogames and Internet communication and you will likely hear that they use it daily and think they could not be without them (Grinter, Palen and Eldridge, 2006). Instant messaging (IM), Facebook, MySpace, YouTube, and email are just a few examples of applications used by high-school-age students for purposes of communication, making new friends, and entertainment. Despite the undoubted benefits of modern-day computer technology and applications, it is also a well-known fact that these applications can hinder classroom instruction (Galluch and Thatcher, 2007). Many classes, not only computer classes, are taught in computer labs. Without use of a classroom management system (CMS) for blocking access to websites, restricting use of applications, and monitoring students' work, student learning can suffer significantly. Not only do the students who stray off-topic suffer, but the students around them might get encouraged to engage in the same behavior or they might simply get distracted by their peers' gaming or web browsing.

We conducted a study at a mid-size, south-eastern community college's Computer Information Technology (CIT) department. This community college has an early college (EC) operating on its campus. The EC program allows high school students to obtain both a high school diploma and associates degree within five years. The EC currently has approximately 175 students and is expected to grow to 400 students in two more years. The CIT department currently provides six sections of the CIS 110 “Introduction to Computers” course each academic year specifically for the EC. The program's first semester in spring 2007 was challenging for the rising 9th graders who went directly from the 8th grade into a college-level class taught by the CIT faculty.

Most CIT faculty members had not been trained to teach high school-level students and were unprepared for the learning environment. The CIT instructors found it difficult to keep the EC students engaged and on-task during class sessions. All computers were connected to the Internet and no tools were used to control the workstations. The CIT department decided to conduct a pilot study of a modern, software CMS to keep the students engaged and on-task.

Hypothesis

EC Students will earn significantly higher final grades in CIS 110 when the instructor utilizes a CMS in the course.

Relevance and Significance

The study is relevant for several reasons. First, many of the 58 community colleges in North Carolina already have early or middle colleges, and the trend of high schools and community colleges working together is expected to continue. Second, many non-computer courses are being taught in computer labs. The CIT department held two staff development sessions to instruct faculty on how to use the CMS. The English department provided very positive feedback and planned to start using the CMS immediately. Due to the positive staff development sessions and the success of this study, the CIT department installed the CMS in all instructional computer labs for widespread college use.

The paper is organized as follows. First, we summarize some existing, relevant works by other researchers. Second, we state the important features an effective CMS should include. Third, we present our empirical findings and experiences with our system, and we analyze our data. We finally conclude our paper with a summary of our most important findings and possible directions for future research.

BACKGROUND

Illicit web surfing and electronic communication are not only a problem at colleges. Companies suffer loss of money and reduced productivity from employees' uncontrolled Internet usage (Blanchard and Henle, 2006; Lim, 2002). Observing co-workers can stimulate the same behavior in other individuals (Azjen, 1991; Fishbein and Azjen, 1975). One can go as far as speaking of peer pressure that brings individuals to repeat the behavior of others even if the behavior is questionable (Venkatesh, Morris, Davis and Davis, 2003). Naturally, this is especially true for the age group enrolled in the early college.

Working efficiently and enthusiastically is often associated with being in a state of flow (Agarwal and Karahanna, 2000; Ghani, Supnick and Rooney, 1991; Trevino and Webster, 1992). Web surfing, IM, email, and gaming during class have been found to be distractions that prevent students from getting into the flow of work. Instead, students get stuck in the flow of the distractions themselves (Galluch and Thatcher, 2007). There is no arguing about the immersion one experiences when playing a good game. Galluch and Thatcher provide a model and test it with a partial least squares approach to structural equation modeling. They also concluded that it is advisable to use a CMS in order to prevent cyber-slack and cyberloafing. In contrast to their work, our study focuses not only on behaviors but outcomes, namely final grades. To support our findings we employ t-Test and graphical analysis.

FEATURES OF THE SYSTEM

The classroom management system used in this pilot study is Vision by GenevaLogic. The CIT department selected this particular product for its robust set of features, a price that seemed reasonable, its ease of use, and because it is a software-only solution. Instructors from technical and non-technical curricula started using the CMS after attending a one hour internal staff development session.

Even though a small subset of the CMS's capability was utilized initially, the system is effective when the basic features are understood. In the early stages of our project, instructors found the following features especially useful: Internet blocking, keyboard and monitor disabling, teacher-student chat, and the demonstration mode. All instructors using the system agreed that the CMS should not only be used to control and block student access, but as a teaching tool by projecting presentations and demonstrations throughout the classroom. The Vision product includes an interesting feature called "virtual teacher". This feature allows a student workstation to broadcast its screen throughout the classroom.

ANALYSIS AND EXPERIENCES

We collected data over two semesters for five classes. The CMS was used in two of those classes with a total of 37 students. The number of students in the other group is 67. In the following text we will refer to these groups as "CMS group" and "unrestricted group" respectively. This study is work in progress. We intend to continue our study and expect to shed further light on our claims through longer-term observation and a larger data sample.

Assessment

We assess student performance in the CIS 110 course through individual hands-on projects, chapter tests, individual and group presentations, and a final proficiency test. The latter consists of a comprehensive concepts test and a hands-on portion in Word and Excel. We use a 7% grade scale. EC students are required to achieve at least a final grade of "C" in order to pass the course.

Table 1 lists the distribution of grades for the two groups. According to Table 1, only 11% of the students in the CMS group failed the class while a hefty 36% failed without the CMS. The CMS group exhibits a larger concentration around "B", an adequate passing grade. The unrestricted group exhibits a slightly better outcome around As.

It is important to mention that a CMS should be used from the first day of class. We tried introducing the system into one class several weeks into the semester. The sudden change in the teaching environment caused a drastic change in student behavior that can best be described as boycott and revolt. This led the instructor to discontinue using the CMS. The rules, expectations, and general classroom environment must be established from the get-go. When the students understand and adjust to the learning environment, less instructor interventions are needed.

| | CMS group | Unrestricted |
|------|-----------|--------------|
| A | 11% | 14% |
| B | 48% | 22% |
| C | 30% | 28% |
| Fail | 11% | 36% |

Table 1. Grade Distribution

T-Test

We use an independent t-Test to see if the two groups’ mean grade values differ significantly. The t-Test is commonly used in social sciences and business (Sekaran, 2003). Our hypothesis is that EC Students would earn significantly higher final grades in CIS 110 when the instructor utilizes a CMS in the course. The null hypothesis is that there would be no difference between the groups.

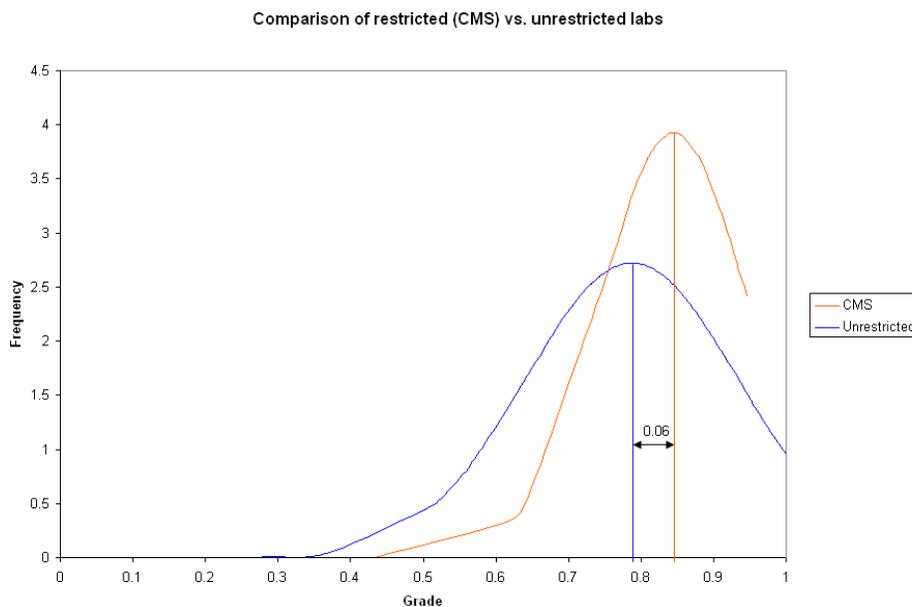


Figure 1. Graphically Compare Grade Distribution

We plot the data from both groups in Figure 1 to verify that it reasonably fits the normal distribution. We use an f-Test (Snedecor and Cochran, 1989) to check the equality of variances. The variances of the two groups are significantly different for a rejection probability of $p = 0.01$. Therefore, we use the t-Test that does not assume equal variances. The mean grade value for the CMS group is significantly higher than for the unrestricted group. Refer to Table 2 for the actual values. Using the two-sample t-Test for unequal variances we yield $t(102) = 2.36$ and $p = 0.01$. The value 102 represents the degrees of freedom for significance testing: number of participants – 2. A value for $p < 0.05$ is the generally accepted threshold chosen for statistical significance in social research. The calculated t-value $t = 2.36$ indicates that the two grade means in our groups are significantly different. To verify this one does a look-up in a standard table of significance.

| | Observations (N) | Mean Grade (M) | Standard Dev. (SD) |
|--------------------|------------------|----------------|--------------------|
| CMS Group | 37 | 0.85 | 0.102 |
| Unrestricted Group | 67 | 0.79 | 0.15 |

Table 2. Descriptive Statistics

Due to these findings and our initial hypothesis, we conclude that the final grades of the CMS group are significantly higher than those of the unrestricted group. The null hypothesis is rejected.

Graphical Analysis

In addition to statistical analysis we want to illustrate our findings with a graphical analysis. The grade distribution for both groups as seen in Figure 1 supports our earlier claims. We observe a narrower curve for the CMS group with a bias on solid passing grades. There is a wider spread of grades for the unrestricted group. In accordance with Table 1, the unrestricted group contains many more failing grades. The peaks of the two groups are 6% apart. This almost corresponds to a difference by a full grade step according to the 7% grade scale used.

CONCLUSION

This paper presented some preliminary but interesting results. The results are being shared in order to help other departments that may currently be working with EC students or have plans to do so in the future. We encourage institutions and departments that intend to implement similar EC programs to start out with a CMS installed.

We plan to extend our research by conducting a longer-term observation with more students. Furthermore, we intend to look at the influence of a CMS not only on the final grade but on individual areas of course content, e.g. the hands-on portion vs. concept tests. Another way to expand the study would be to gather data from non-technical courses such as introductory composition courses taught in computer labs.

The essence of our findings is that, when properly used, a CMS can lead to significant improvement of grades. The CMS should not only be used to control student work. Instead, it should be an active instructional tool that the instructor utilizes to enhance student learning. The instructor should project presentations and demonstrations, communicate with the students via chat sessions, and use the system to keep the students on-task. This is especially true for early college students. It is important to set clear rules and expectations from the first day of class; use the CMS from the start. Doing otherwise may generate detrimental results.

Although people may perform adequately when multitasking, it can easily prevent them from getting into the state of flow that focuses on course content. In a classroom setting, Internet use for purposes of communication and entertainment can easily remove a student from the flow.

Our findings were well received by other, not CIT-related departments. This led the College to purchase a site license for the Vision CMS and install it in all instructional computer labs.

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