

Running Head: Practice Computer Tests

Is There a Difference On End of Course Scores Between Students Who Take Computerized Practice Tests and Those Who Do Not Take Computerized Practice Tests?

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ABSTRACT

This study analyzes the effectiveness of taking practice computerized End of Course (EOC) tests at XYZ High School. The purpose of this study is to determine if taking practice computerized EOC tests at XYZ High School have a significant impact on raising the EOC test scores. The concerns of the administration are targeted so that the building maintains a great faculty and staff. The study groups for this survey were randomly selected male and female students from different years EOC testing. Data were collected using the actual EOC test scores, and the t-Test of significance was used to determine the significance with the Alpha level set at 0.25. Mean and Mean D will be analyzed for each of the dependent and independent variables. The analysis results indicated that there was a significant need for changes to increase EOC test scores. Algebra I EOC test scores are important issues that need to be addressed in all school districts so that teachers and students can be successful.

Introduction

In a time where technology is taking over the world, it is crucial for schools to have students score in the proficient or advanced categories on the Algebra I End of Course (EOC) tests using computers. For the sake of the school or school district's accreditation, these students must score at least proficient on the EOC test while using computers. Although there are current articles that talk about taking pencil paper tests versus taking tests on a computer, there is not much in literature that addresses taking practice tests on the computer before taking the actual test.

School districts of many sizes have students of all grade levels taking assessments on computers. "Some states have employed or piloted computer-based assessments for the purpose of improving instruction, monitoring student progress, and promoting accountability, while other states have employed it as part of their high-stakes testing programs" (Kim & Huynh, 2009, p4).

The number of students taking a computerized End of Course (EOC) test at the XYZ school district that is being studied is about 176 students. The information that was collected came from an Algebra I EOC test. All Algebra I EOC test scores from this year (2012) and the previous year (2011) were selected as part of the study. The data collected shows how the Algebra I students scored on the EOC tests last year compared to how the Algebra I students scored on the EOC tests this year. Two independent or input variables were analyzed; EOC test scores from previous school year and the gender of students. There was one dependent variable being analyzed; EOC test scores from the current school year (2012). A decision was made to analyze these contributing factors based on the research study of EOC practice computer tests. As stated in the article, *Computer or paper?*, "The more familiar children are with computers,

the more positive their attitude towards them” (Hargreaves, M., Shorrocks-Taylor, D., Sweinnerotn, B., Tait, K., & Threlfall, J. 2004, p30).

Background.

The XYZ School offers on average seven classes of high school Algebra I per year. The enrollment of each class has an average of about twenty-six students. The Algebra I classes are made up of a both males and females, where no one class is exactly half and half. The Algebra I teachers at the school believe that the students have many opportunities to learn and understand the concepts being tested on the End of Course (EOC) tests. The schoolteachers strive to differentiate their teaching styles to improve learning and understanding of the Algebra I concepts for the students. The XYZ School is located in a lower social economic area, which leads to the school having a relatively high percent of free and reduced lunch students, which is approximately 70%.

Practice under investigation.

The practice under investigation at XYZ School is that of having students take Algebra I End of Course (EOC) practice computerized tests throughout the year before the students take the actual EOC tests on the computer. The practice tests will be created by the Algebra I teachers and entered into a program called Limelight. The Limelight program will score the tests for the teachers so they can see where the students are currently according to the EOC standards, below basic, basic, proficient and advanced. The practice tests that the students will be taking are structured identically with the state mandated EOC tests, consisting of multiple-choice items.

School policy to be informed by study.

The current school policy is to teach the curriculum to the students and test at the end of each unit. Homework and quizzes are assigned throughout the unit to gage student

comprehension. At the end of each quarter, the students are given a benchmark test on computers over the concepts covered in that quarter. The benchmark tests consist of multiple-choice items much like the End of Course (EOC) tests, including a performance event type question that the EOC makers are considering putting back on the test. Teachers and students analyze the benchmark scores to find concepts that were not mastered and then these concepts are retaught or spiral reviewed through homework and “bell work”. Through out the year, teachers present students with “bell ringer problems” or spiral review problems to help with reviewing as review for the End of Course (EOC) tests. The spiral review problems and “bell ringers” are guided by the benchmark analyses the students fill out. This study will inform the current school policy to consider taking practice EOC tests on computers to better ready the students for the actual tests.

Conceptual Underpinnings.

The conceptual underpinning centers on the role of practice in improving performance. The word “practice” can be used in many different contexts, like the football team is practicing, the scholar bowl team is practicing and the art students are practicing. No matter what context the word is being used in, they all have the same purpose. According Wikipedia (2012), practice is the art of learning and performance improvement. In this research study, practice means to engage in taking a computerized practice test again and again striving for improvement on tested concepts before it is time to take the actual End of Course (EOC) tests. More specifically this study considers the need for students to practice taking the EOC tests as formative assessments before taking the actual EOC test. Given current accreditation requirements, the XYZ School and its teachers need the students need to score proficient or advanced on the EOC tests. Taking practice tests alone will not ensure improvement in the concepts being tested by the students.

According to Dr. David Sousa, “The old adage that “practice makes perfect” is rarely true. It is very possible to practice the same skill repeatedly with no increase in achievement or accuracy of application” (Sausa, 2011). This is where the role of the teacher comes in. The teacher will take the EOC practice computerized tests and analyze questions to see what concept areas the students are low in. This analysis will build the spiral reviews or “bell ringer” activities that will be used at the beginning of each class period. As stated by Leith, “the practice tests are a form of formative assessment that gives feedback to not only the students but also to the teacher” (Leith, 1999). According to Maslow’s Hierarchy of Needs, the Esteem Needs, everyone needs confidence and the need for achievement. Having the students take EOC practice computer tests will give the students confidence in taking the tests on computers before actually taking the real EOC tests. Having the students take practice tests on computers also gives instant feedback from the tests. As stated by Schuasler, “These students talked about how much they liked doing it on the computer, how because they test so many times a year, that it doesn't feel like an event anymore-it's an activity. Now they get [test results back] the same day. It means something to them. That was a huge aha for me” (Schaffhauser, 2011). Everyone knows that practice makes perfect and the more a person practices something, the more proficient the person will become at that particular activity.

Statement of the problem.

The majority of Algebra I students at XYZ School are scoring basic or below basic on the End of Course (EOC) test given on the computer. The problem is that students take the state mandated EOC tests on computers every year without being comfortable while testing on the computers. The students do not take enough tests on computers throughout the year before taking the actual EOC test at the end of the year.

Purpose of the study.

The purpose of this study was to identify the effects of taking End of Course (EOC) computerized practice tests to increase the number of students scoring proficient or advanced on the actual EOC tests. The more familiar a student is with a computer, the more positive the student feels about using a computer to take a test (Hargreaves, Shorrocks-Taylor, Sweinnerotn, Tait & Threlfall, 2004). “By spending time with the computers, children can learn how to ‘read and utilize the information on computer screens’.” (Delen & Bulut, 2011, p311) When data were collected from the EOC tests the values were categorized into four groups: below basic, basic, proficient and advanced scores. As an aspiring administrator one would want to know how to increase Algebra I EOC test scores in the school district they are working in. With larger districts, there are more Algebra I classes, which means there are more Algebra I students that must get to the “magic level” of proficient or advanced. What changes can the XYZ School and XYZ School district make to increase the number of Algebra I students scoring proficient or advanced on the EOC computer exams?

Research questions.

RQ1. Is there a difference on End of Course scores between students who take computerized practice tests and those who do not take computerized practice tests?

RQ2. Is there a difference on End of Course scores between males who take the computerized practice tests and males who do not take the computerized practice tests?

RQ3. Is there a difference on End of Course scores between females who take the computerized practice tests and females who do not take the computerized practice tests?

Null hypothesis.

H₀: There is no significant difference or correlation between taking computerized practice End of Course (EOC) tests and not taking computerized practice tests.

H₀: There is no significant difference or correlation between males' scores that take the practice End of Course (EOC) tests and those males' scores that do not take the practice End of Course (EOC) tests.

H₀: There is no significant difference or correlation between females' scores that take the practice End of Course (EOC) tests and those females' scores that do not take the practice End of Course (EOC) tests.

Anticipated benefits of the study.

The result of this study will inform school officials as to the success of having students taking practice computerized End of Course (EOC) tests. The Algebra I teachers and administration will benefit in gaining the knowledge to see if taking EOC practice computerized tests raise the scores and levels of the students testing. Allowing the students to practice taking the tests on computers will give them confidence in working with the computers during the test. "This allows the student to identify strengths and weaknesses and to better prepare for the "real" exam" (Cassady & Gridley, 2005, p.7). This in turn will allow the teachers to provide the students with an intervention to improve on their weaknesses found by the practice exams. Not only are the regular education students seeing benefits of taking practice EOC computer tests, but special education students as well. "Computer-based testing (CBT) has the potential for improving the participation and performance of students with disabilities in large-scale assessments"(Flowers, Kim, Lewis & Davis, 2011, p.2). The CBT does not allow reading and writing barriers to affect the students' scores, because the CBT will only test their knowledge of the subject. According to DESE (Missouri Department of Elementary and Secondary

Education), there are many school districts that have not met Annual Yearly Progress (AYP) for mathematics. Increasing the number of problems students' practice on a computer may increase their confidence in working with technology and increase their achievement level on the EOC tests.

Definition of terms.

The following definitions were constructed for use in this study.

EOC: End of Course tests given to students.

DESE: Missouri Department of Elementary and Secondary Education.

Advanced Score: Raw Score of 28 -35 or Scale Score of 225 – 250 or a
Percentage of 80% - 100%.

Proficient Score: Raw Score of 20-27 or Scale Score of 200-224 or a Percentage
of 57%-77%.

Basic Score: Raw Score of 12– 19 or Scale Score of 177 – 199 or a Percentage of
34%- 54%.

Below Basic Score: Raw Score = 0-11 or Scale Score of 100 – 176 or a
Percentage of 0% - 31%.

CBT: Computer Based Testing.

AYP: Annual Yearly Progress.

Summary.

The majority of the students at XYZ High School are scoring in the basic to below basic levels on the End of Course (EOC) tests. The EOC tests are administered to the students on computers. The study had this year's (2012) students take EOC practice computer tests to see if it would increase the number of students who scored in the proficient or advanced level from the

previous year (2011). This study compared Algebra I EOC tests from XYZ High School. The study was conducted using EOC test scores in accordance with last year's (2011) EOC test scores to this year's (2012) EOC test scores and gender of the students.

Review of Literature

Taking practice tests or test reviews before taking the actual test is an ongoing occurrence in many schools nationwide. Most of the time the practice tests are called test reviews and are used for the unit that the student is covering. However, low-test scores on state mandated tests are causing many problems in our schools and school districts, like the loss of accreditation for the school or school district.

Several articles and research over computerized practice tests resort to one main topic, which is the students having test anxiety problems. According to Cassidy and Gridley's article, "...students with high levels of cognitive test anxiety tend to procrastinate, worry over potential failure, utilize ineffective study strategies, and demonstrate insufficient cognitive processing skills to gain effective conceptual understanding for the content" (Cassidy & Gridley, 2005, p5). Computer problems, not being able to see all the answers, and noisy keyboard movements are just a few reasons for students to perform poorly on computer tests (Cassady & Gridley, 2005). Having students get familiar with using a computer is the most common answer to getting rid of the test anxiety of the students. This builds the student's confidence when taking tests on the computers. The students must build up their confidence level to using a computer for testing. Computer Based Testing (CBT) can be a disadvantage for students, especially for the students who have less computer access and less familiarity with computerized testing (Flowers, Kim, Lewis & Davis, 2011). In today's society, we are very technologically advanced in many areas including the education field.

The No Child Left Behind (NCLB) guidelines do not get any easier when it comes to computerize testing. The schools and school districts still have to close the achievement gaps and even faster now than ever before. To combat the problems faced by computer testing, the schools and school districts need to complete a trial run or a practice test before taking the real test on computers (McHenry, Griffith, & McHenry, 2004). This will give the schools time to look at the results and get the accommodations correct for each student that needs accommodations. According to Dr. David Sausa, teachers need to observe the practice tests and provide the students with immediate and specific feedback on what strategies and concepts need to be altered to correct and enhance their performance (Sausa, 2011). Feedback to the students seems to be particularly important during the learning process. By performing a trial run or practice test, it will allow the students to see the kinds of problems that can occur during testing while on the computers. Computer based testing (CBT) may also help students with disabilities by removing the reading and writing barrier's on the test (Flowers, Kim, Lewis & Davis, 2011).

When comparing test scores, the gender category is typically always considered. How did the males perform versus the females? According to Stephens, there is a mix of research and feelings on which gender performs better on computer tests (Stephens, 2001). Some research shows there is no difference between males and females once computing classes are started in school. Stephens mentioned that females tend to possess more test anxiety when it comes to working on computers, which leads to less confidence (Stephens, 2001). However, in Stephen's research, he found "no significant differences based on gender could be found using a t-test" (Stephens, 2001, p270). The research study that is being conducted is not to compare the two genders head to head but to compare the genders from the previous year (without practice tests) to this year (with practice tests).

There are many positives from students who have taken tests on computers. The students have given comments like: neater format, easier to mark answers, more relaxing, more time to work, more interesting to complete test, and it encourages computer use in classrooms (Stephens, 2001). From the article, The potential, pitfalls and promise of computerized testing it states "...points out that computerized testing allows students to take exams in which one question at a time is asked; thus, lessening the possibility of filling out an answer sheet incorrectly. Furthermore, computerized tests theoretically yield 100% accuracy of results. With computerized tests meeting today's tech-savvy generation of kids, ever-faster, more accurate and clearer ways of testing will continue to develop" (McHenry, Griffith, & McHenry, 2004, p1). Computer Based Testing (CBT) gives students a faster turn around on grades and feedback for the students to help them become more successful in the learning process.

Research Methods

Research design using a non-experimental quantitative methodology will be used to investigate the research questions. Data was collected on the previous school year (2011) and the present school year (2012) by using the Missouri Department of Elementary and Secondary Education (DESE) website and a statistical analysis was used to compare the data.

Study group description.

The study group will consist of all Algebra I students taking the End of Course exams (EOC) at the XYZ School District. This study used a sample of convenience, as this sample was the sample of concern for this researcher. A variety of EOC exam scores were collected in the data. Each student required to take the EOC test completed the test in the allotted time frame. Four levels of scoring, below basic, basic, proficient and advanced, will be tallied and analyzed.

Data collection and instruments.

Data from the End of Course tests (EOC) will be collected and analyzed using a t-Test analysis. The scores will be retrieved from the Department of Secondary and Elementary Education (DESE). Each school is given a list of students who have tested and how each individual student scores on the EOC test. Then each teacher is given a list of each student in his or her classroom and how each individual student did on the EOC test. A computerized statistical software package called ASP will be used to determine the frequency and percent regarding gender and the other dependent variables, as well as the mean score and standard deviation for each group.

Statistical analysis methods.

The mean, mean deviation, p-values, t-test and degree of freedom values will be computed for all data sets. Categorical data will be collected with the End of Course tests (EOC) and a t-Test will be conducted to see if there is a difference between taking Algebra I EOC computerized practice tests before taking the actual EOC computer test and not taking Algebra I EOC computerized practice tests. Because of the small study group size, the Alpha level 0.25 will be used to challenge the null hypothesis.

Findings

The following information will contain tables for each of the three variables researched. This section also reports the analysis and interpretation of all data collected. The section is organized by variable name and each variable result is reported by the research questions listed above.

2011 EOC Test Scores V 2012 EOC Test Scores

As shown in Table 1, there are one hundred seventy-six End of Course (EOC) tests selected to observe differences between the year the EOC was taken and the EOC scores

that were received during that particular year. The year the EOC scores were taken was split into two categories: 2011 EOC Score (year 1) and 2012 EOC Score (year 2). The mean of the 2011 EOC Score was 16.50 and the mean of the 2012 EOC Score was 17.51. The Mean D, or difference between the mean of the two groups, was -1.01. The t-test result for the study was -1.26 and the df, or degrees of freedom were 174. The null hypothesis states that there is no significant difference or correlation between taking computerized practice End of Course (EOC) tests and not taking computerized practice tests. Since the p-value was 0.2110, and the Alpha number was set at 0.25, the null hypothesis must be rejected. Therefore, there is a significant difference in EOC test Scores received from year 1 (2011) to year 2 (2012). The year 2 (2012) EOC test Scores with the mean EOC score rate of 17.51 had students score higher on the EOC test than the year 1 (2011) EOC test scores with a mean EOC score rate of 16.50. The data shows that the more computerized practice test a student completes, the higher the possibility of an EOC score.

Table 1

***Summary of t-Test Results for 2011 EOC Test Scores
and 2012 EOC Test Scores***

Source	Mean	Mean D	t-test	df	p-value
2011 EOC Score (n=111)	16.5000				
2012 EOC Score (n=65)	17.068	-1.0069	-1.2564	174	0.2110

Note: Significant when $p \leq 0.25$

2011 Female EOC Test Scores V 2012 Female EOC Test Scores

As shown in Table 2, there are eighty-nine Female End of Course (EOC) tests selected to observe the differences between the year the EOC was taken and the EOC score that was

received during that particular year. The year the EOC tests were taken was split into two categories: 2011 EOC scores (year 1) and 2012 EOC scores (year 2). The mean of the 2011 Female EOC scores was 16.28 and the mean of the 2012 Female EOC scores was 17.59. The Mean D, or difference between the mean of the two groups, was -1.30. The t-Test result for the study was -1.23 and the df, or degrees of freedom were 87. The null hypothesis states that there is no significant difference or correlation between females' scores that take the practice End of Course (EOC) tests and those females' scores that do not take the practice End of Course (EOC) tests. Since the p-value was 0.22, and the Alpha number was set at 0.25, the null hypothesis must be rejected. Therefore, there is a slight difference in EOC test scores received from one year to the next. The 2012 (year 2) EOC test scores with the mean EOC score rate of 17.59 had female students score higher on the EOC test than the 2011 (year 1) EOC test scores with a mean EOC score rate of 16.28. The more computerized practice tests a female student works on, the higher the EOC score rate.

Table 2

Summary of t-Test Results for 2011 Female EOC Test Scores and 2012 Female EOC Test Scores

Source	Mean	Mean D	t-test	df	p-value
2011 Female EOC Scores (n=46)	16.2826				
2012 Female EOC Score (n=43)	17.5854	-1.3028	-1.2232	87	0.2232

Note: Significant when $p \leq 0.25$

2011 Male EOC Test Scores V 2012 Male EOC Test Scores

As shown in Table 3, there are ninety-seven male End of Course (EOC) Tests selected to observe differences between the year the EOC was taken and the EOC score that was received during that particular year. The year the EOC tests were taken was split into two categories: 2011 EOC Scores (year 1) and 2012 EOC Scores (year 2). The mean of the 2011 male EOC Tests was 16.34 and the mean of the 2012 male EOC Tests was 17.71. The Mean D, or difference between the mean of the two groups, was -1.36. The t-test result for the study was -1.12 and the df, or degrees of freedom were 85. The null hypothesis states that there is no significant difference or correlation between males' scores that take the practice End of Course (EOC) tests and those males' scores that do not take the practice End of Course (EOC) tests. Since the p-value was 0.27, and the Alpha number was set at 0.25, the null hypothesis must be accepted. Therefore, there is no significant difference or correlation between males' scores that take the practice End of Course (EOC) tests and those males' scores that do not take the practice End of Course (EOC) tests. The year 2 (2012) EOC Test Scores with the mean EOC test score rate of 17.71 had male students score higher on the EOC test than the year 1 (2011) EOC test scores with a mean EOC score rate of 16.34. Even though the year 2 male students scored higher on the EOC tests, there is not a significant amount of difference to warrant using this strategy in every Algebra I classroom.

Table 3

Summary of t-Test Results for 2011 Male EOC Test

Scores and 2012 EOC Test Scores

Source	Mean	Mean D	t-test	df	p-value
2011 Male EOC Scores (n=61)	16.34426				

2012 Male EOC Scores (n=36)	17.7097	-1.3649	-1.1193	85	0.2661
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Note: Significant when $p \leq 0.25$

Conclusions

The study points to the need for further investigation on using practice End of Course (EOC) tests as a formative assessment to increase EOC test scores. Based on the study, the year EOC tests were taken developed a significant relationship with the score received on the EOC tests. Using a practice EOC test before taking the actual test increased the overall EOC scores from the previous year. The year females took the EOC tests also developed a significant difference with the scores received on the EOC tests. The only area that failed to develop a significant relationship was with the male's EOC tests taken by year.

According to Leith's article, students who are familiar with computers or become familiar with using computers will dissolve their test anxiety (Leith, 1999). I found students do not necessarily need to become familiar with the computers, but they need to become familiar with the tests on the computer. Once students understand the practice tests and what they are being tested on, it in turn enhances student learning and achievement.

In researching this topic and from the findings in the data collection, I realized that even though they all showed some type of increase in score, each student is affected differently by taking the practice computer tests. The End of Course (EOC) test scores by year had a slight difference in their mean scores. This could be due to the fact that the year before (2011), the students had not seen a test on the computers until they took the actual EOC test. The data showed that students that were exposed to the EOC computerized practice tests became more comfortable with taking the test on the computers and on average scored higher on the EOC test. Overall students like taking tests on computers because it is something "new" and it holds their

attention for the entire test because they can only look at one question at a time. Even though test anxiety is the main reason why students do not score well on computer based tests, with computerized practice tests the students can become familiar and comfortable with testing on computers. An interesting point in this study is that with all the technology in our society, that students would have anxiety working on a computer to complete a test.

Recommendation

The recommendation to the administration of the XYZ School District according to the data obtained would be to look into the use of End of Course (EOC) practice computerized tests. In order for the XYZ School and XYZ School district to become a better district and increase test scores, practice computerized EOC tests should be considered to increase student achievement levels on the Algebra I EOC tests. It is also a recommendation to have teachers incorporate giving some unit tests on computers. Getting the students to become familiar with the EOC testing format on the computer is very important. Taking a test that the students cannot write on is a different technique for most students, who are use to the paper pencil version tests. The more realistic you can make the practice tests, the more comfortable and better the students will get at answering the questions over the concepts that are being tested. Since the p-values do not indicate an extremely significant relationship in the study, it is also recommended that the XYZ school district continue to monitor and study the effects of EOC practice computerized tests.

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