

A Comparison of Commonwealth Accountability Standardized Test Scores Between High School Agricultural Education/Career and Technical Education Students and the Kentucky State Standards

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Abstract

Throughout the history of education, assessment has been a crucial part of the teaching process. Various forms of assessment can “affect decisions about grades, advancement, placement, instructional needs, and curriculum” (Dietel, 1991). In Kentucky, the Board of Education designed the Commonwealth Accountability Testing System, or CATS, to assess its school programs. Each school has its own performance goal for every two-year period, ending in 2014. By 2014, the Board of Education hopes every school will receive a score of at least 100 out of 140.

While scores can be evaluated by grade, they can also be evaluated by a number of other divisions, such as academic program. Scores in various areas can vary greatly depending on the student’s curriculum choice. For example, students enrolled in an agriculture program may fare differently than those enrolled in communication classes in the areas of science, reading or mathematics. A study of these varying scores will not only improve student interest in certain educational programs, but also spotlight other programs that may need assistance in reformatting curriculum or teaching styles.

Through a look at the CATS scores of Kentucky’s high schools in 2003, the overall scores of agriculture students compared to those of non-agriculture students can determine the influence agricultural education has on the CATS test. By evaluating these scores by educational program, the CATS tests can be used to evaluate not just the curriculum of the subjects being tested over, but also the programs that contribute to learning these subjects. Through this evaluation, Kentucky’s standardized tests can be used to their fullest potential by assessing curriculum and teaching styles, and in turn aiding in the advancement of education.

Introduction

In today's growing world, education is changing at an ever-quickenening rate due to constant advancements in technology and science, as well as other academic fields (Newman, 1998). Officials realize that in order for our students to remain on the cutting-edge of learning, schools must be able to adapt curriculum to the changing times. In order for schools, states, and the entire nation to determine whether students are effectively learning the most up-to-date material, a form of assessment must be used to evaluate what each child has learned.

While there are several forms of assessment, norm-referenced assessment, such as standardized testing, allows student knowledge to be compared at the individual, grade, school, state, and national levels. Today, the United States government allows each state to create its own form of norm-referenced assessment to compare students and curriculum. In Kentucky, the Commonwealth Accountability Testing System, or CATS, is a form of norm-referenced assessment that has been in place since 1992 (White, 1998). It provides reliable scores that can be compared between schools so Kentucky can accurately and effectively evaluate not only individual student progress, but also the efficiency of teaching practices and relevance of curriculum in various subjects (Kentucky Department of Education, 2002). Today, Kentucky high schools provide many career and technical education programs for students, including agricultural education.

Historically, agricultural education has been a popular and well-rounded curriculum that teaches the basics of various other subjects through agriculture rules, procedures, and concepts (Shinn et al., 2003). T. Bailey, in *Integral Vocational and Academic Education* states,

Agriculturally based activities, such as 4-H and FFA, have for many years used the farm setting and students' interests in farming to teach a variety of skills. It only takes a little imagination to think of how to use the social, economic, and scientific bases of agriculture to motivate and illustrate skills and knowledge from all of the academic disciplines (as cited in Shinn et al., 2003).

The effects of agricultural education's teaching methods and curriculum on high school students is difficult to determine because much of the performed assessment in the program is authentic, allowing students to be graded on portfolios, projects, and other performance-based assessment. Additionally, little research has been gathered on how agricultural education students fare on norm-referenced tests, such as standardized tests. However, by comparing the CATS scores of high school agriculture students to those of non-agriculture students and to the Kentucky state averages, one can determine how high school agriculture students fare on the standardized test overall compared to these other groups of students.

First, a review of literature regarding the advantages and disadvantages of standardized tests and the particulars of the CATS test is necessary in order to fully

understand how the CATS test is a valid measurement in the evaluation of high school students. Additionally, a brief history of agricultural education is included to display how this subject area differs from other high school subject areas, and why the teaching practices and curriculum of agricultural education may affect CATS scores.

Theoretical Framework

Assessment in today's school system holds many purposes for various groups of individuals (Dietel, Herman & Knuth, 1991). Policymakers use assessment to set standards and monitor education quality. School administrators use assessment to plan and improve programs, while teachers utilize it to observe student progress. Additionally, parents and students use assessment to determine student strengths and weaknesses. While no one form of assessment can accurately measure a student's ability, the standardized test is a popular method of evaluating students, and proves useful for each of the latter groups (Postman, 2001).

While standardized testing is widely used for evaluating students and curriculum, it is a very controversial form of assessment. In an article entitled *Issues in High Stakes Testing Programs*, Finbarr Sloane (2003) identifies several negative effects of standardized testing on students. First, he claims that these lengthy tests frustrate students and discourage them from trying. Additionally, the fact that norm-referenced tests compare students also makes these students more competitive. Critics claim that because these tests focus on recall, they have led to a narrowing of curriculum and an emphasis on simple memorization with limited opportunity to practice higher-order thinking skills (Dietel et al., 1991). Standardized tests are timed and contain only one answer for each question, which lead teachers to ask questions requiring exceptionally short responses and encourage students to select the best answer rather than developing their own questions and answers, again discouraging higher-level thinking. Essentially, critics are worried that teachers will "teach the test" rather than teaching a broad range of topics, some of which may show up on the test (wikipedia, 2004).

With all of these harsh criticisms, one may wonder if standardized tests are actually appropriate measures for evaluating student knowledge. Fortunately, there are many advantages associated with standardized tests, making the tests very beneficial. While standardized tests may frustrate students by confronting them with difficult questions, they also provide these students with information about their individual knowledge and skills (Sloane, 2003). These tests also send clear signals about what to study. In addition, competitive students are motivated by these tests to work harder in school. When compared with teacher-created tests, standardized tests are more reliable and valid (wikipedia, 2004). Contrary to popular belief, it may be very difficult for teachers to teach tests because many standardized tests have several forms, making it impossible for a teacher to know the test's content. Finally, cost proves to be the biggest benefit accredited to standardized testing.

Caroline Hoxby, a professor of economics at Harvard University, created an example in her essay, *Conversion of a Standardized Test Skeptic*, to illustrate how cheap

standardized testing is. She claims that with the money that is spent per student on standardized testing annually, teacher salaries could be raised by one quarter of a percent, classes could be reduced by two one-thousandths of a student, or the school year could be lengthened by one-tenth of one day. Each of these options is incredibly inefficient for improving student learning when compared with the benefits of standardized testing. Standardized tests may not be problem-free, but they are one of the cheapest and most reliable ways to evaluate students on the state level.

In Kentucky, the CATS test has been the required form of standardized testing for the past five years, being introduced to students in the spring of 1999 (Kentucky Department of Education, 2002). The CATS test is a very useful form of assessment, in that it is designed for both state and national comparison. This test was created through a broad, collaborative process that includes ideas from a group of 8,000 teachers, principals, superintendents, parents, guardians, community and business leaders, legislators, and other citizens. This group of professionals determined that high school students should be tested in the subjects of science, mathematics, writing on demand, writing portfolios, reading, social studies, arts and humanities, and practical living and vocational studies. Today, a formal advisory council, a panel of testing experts, and a designated legislative committee continue to advise the state board. After completion of the ten-day CATS testing period each spring, students' work in every tested subject is labeled as novice, apprentice, proficient, or distinguished, which is the highest score. To ensure fair and accurate scoring, Kentucky teachers completed descriptions for these scores in every subject and grade level. In addition to a conglomeration of student academic scores, schools also receive scores regarding non-academic issues including student retention rate, dropout rate, and the percentage of graduates that continue their education in college. By combining nonacademic and academic scores, each school receives a single score between zero and 140 points.

The Kentucky Department of Education requires that every school have its own individualized goal every two years until the year 2014. By the end of the goal outlines, Kentucky expects every school to reach a score of at least 100, which is considered proficient. Depending on whether a school scores higher or lower than its goal, the school will either receive assistance or financial rewards.

Because the job market is constantly expanding and adapting to new technology, Kentucky schools have added several career and technical education majors to their high school programs. Among those is agricultural education. The mission of this unique program is to “[prepare] students for the successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems” (Gill, 2003). By combining classroom instruction, involvement in the FFA (formerly known as the Future Farmers of America), and supervised agricultural experiences, enrolling in agricultural education can be the highlight of one's high school career. Additionally, students can learn the basics of other academic programs through applications in agriculture classes. According to G.C. Shinn et al. (2003), authors of *Improving Student Achievement in Mathematics: An Important Role for Secondary Agricultural Education in the 21st Century*, “secondary agricultural education, through the use of relevant

curriculum delivered from a student-centered perspective by skillful teachers, has high potential for engaging students in active, hands-on/minds-on learning environments rich with opportunities for learning mathematics” (2003).

While agricultural education proves to have very different teaching techniques from many other academic programs, theory and performance-based assessment do little to confirm that these differences have an affect on student learning. By comparing the scores of high school agriculture students on the CATS test in 2003 to those of other career and technical education majors and to the Kentucky state averages, the influence of the agricultural education curriculum and teaching styles on CATS scores may be evaluated.

Purposes and Objectives

In order to determine if a difference exists in performance level on the CATS tests between agricultural education majors and all career and technical education majors, as well as agricultural education majors compared to Kentucky’s state standard, this study contains two purposes:

1. To compare the performance of high school career and technical education majors on the CATS test in 2003.
2. To compare the performance of agricultural education majors to Kentucky state standards on the CATS test in 2003.

In an effort to complete these two purposes, the following three objectives were established:

1. To compare the performance of all career and technical education majors in reading, science, on demand writing, a writing portfolio, math, social studies, arts and humanities, and vocational studies.
2. To compare the performance of agricultural education majors to the other career and technical education majors in each previously mentioned assessment subject.
3. To compare the performance of agricultural education majors to the Kentucky state academic index for all Kentucky high school CATS takers in 2003.

Procedures

To complete this study, the 2003 scores of CATS tests from 2275 Kentucky high school agricultural education students were compared to Kentucky’s 2003 state averages, compiled from Kentucky’s 45,676 high school students. Additionally, a copy of Kentucky’s CATS scores of high school career and technical education students for 2003 was obtained from the Kentucky State Department of Education. The scores were broken down by career and technical education major and score categories in a Microsoft Excel file. In addition, Kentucky state high school overall averages for the CATS test in 2003 were verified from the Kentucky Department of Education website.

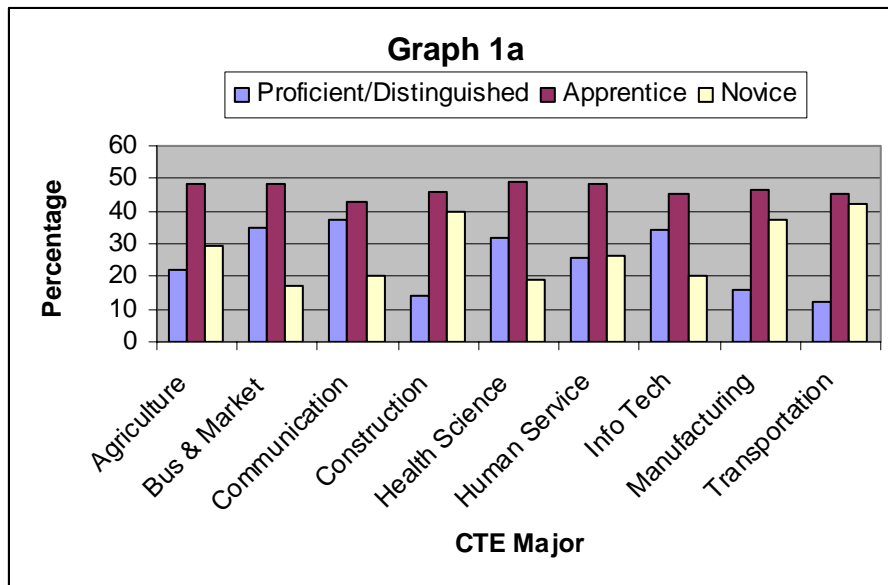
By comparing the percentages of scores in the score categories of Distinguished, Proficient, Apprentice, and Novice between agricultural education majors and other career and technical education majors, it can be determined how agricultural education

majors performed on the CATS test compared to the other career and technical education majors in 2003. With the overall state scores, the difference between state standards and agricultural education scores can be determined.

Findings

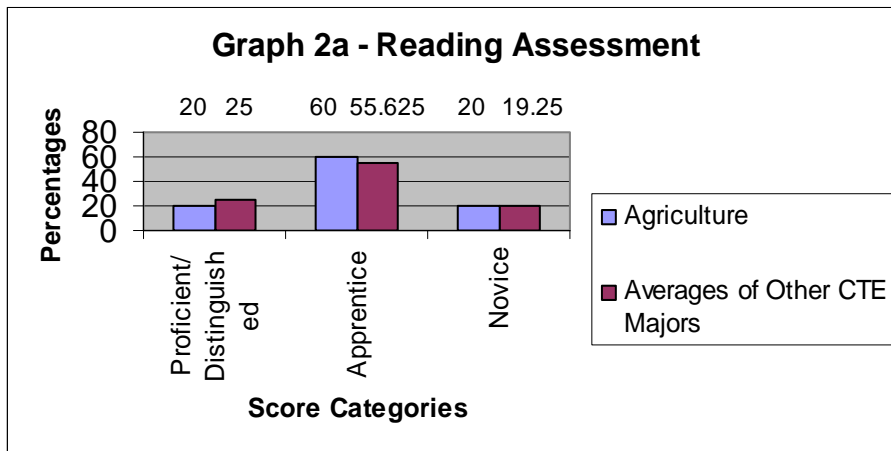
In order to complete each of the three objectives defined above, the graphs below are split into three categories to coincide with the objective they satisfy. Graph Set 1 compares the performance of all career and technical education majors on the CATS test.

Graph 1a compares the overall performance of each career and technical education major on the CATS test in 2003. Communication has the highest percentage of students scoring in the categories of proficient or distinguished, while transportation has the fewest number of students scoring similarly. Additionally, transportation has the highest number of students scoring in the novice category. Because by 2014, the Kentucky Department of Education expects all students to score in the categories of proficient or distinguished, this graph concludes that communication is the subject most likely to reach this goal. Further, the graph shows that the areas of transportation, construction, and manufacturing all need to make great improvements in their students' scores in order to meet the 2014 goal. The remaining subjects appear to fall somewhere between communication and transportation, implying that while scores need to be improved, they are not yet producing scores that should cause great alarm to analysts of the CATS test.

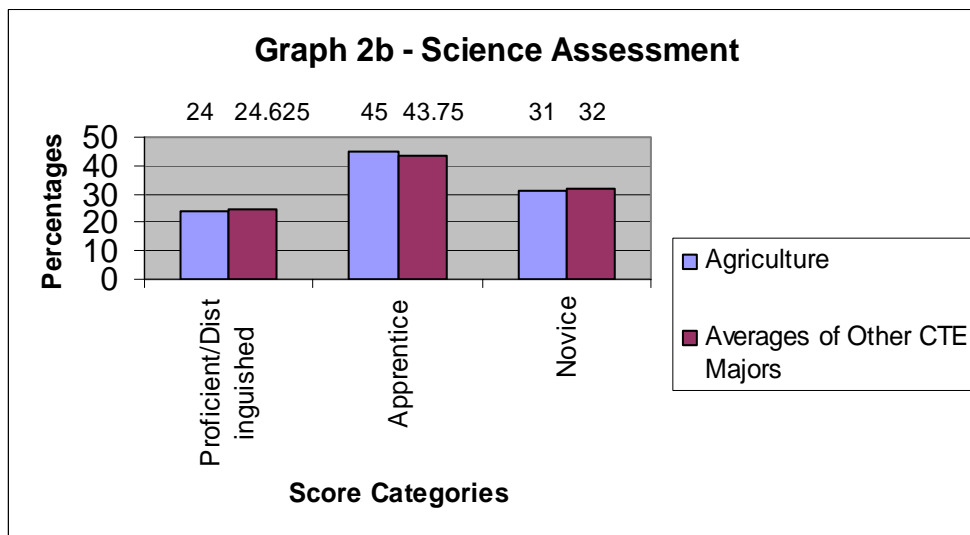


Graph Set 2 compares agriculture students to students in all other career and technical education majors in each assessment area. In the following graphs, agriculture scores are compared to the average scores of all other career and technical education majors in each score category. With regard to scores in each assessment, high school agriculture majors are considered slightly below average. This major does not display

proficient and distinguished scores that are severely below those of the other career and technical education majors, but the scores are nevertheless below satisfactory.

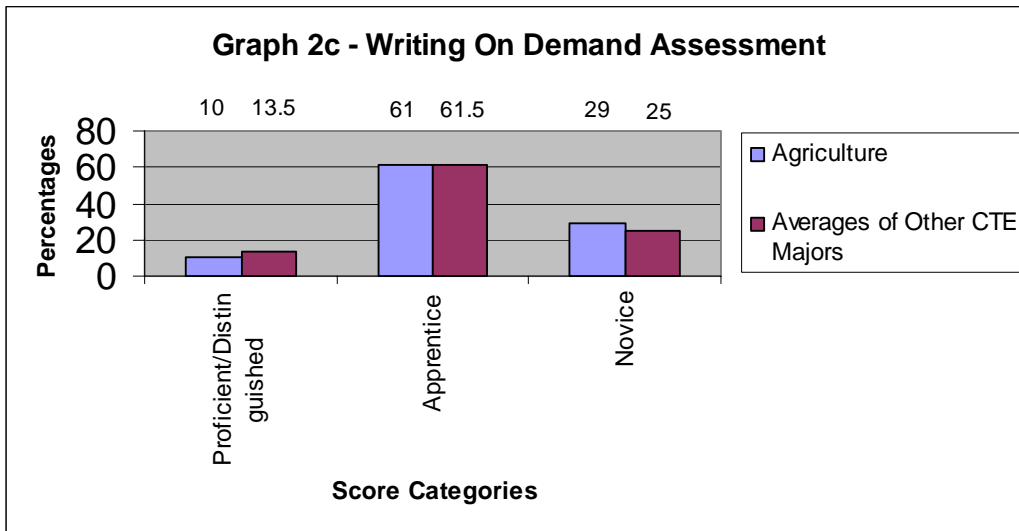


Graph 2a shows the difference in scores between agriculture and other career and technical education majors in Reading. The graph displays that the average of the other career and technical education majors is higher in proficient/distinguished than agriculture. The novice scores of the two groups are close in value, showing that agriculture is not very far below the average of the other career and technical education majors in Reading, but needs some improvement in scores to become above average.

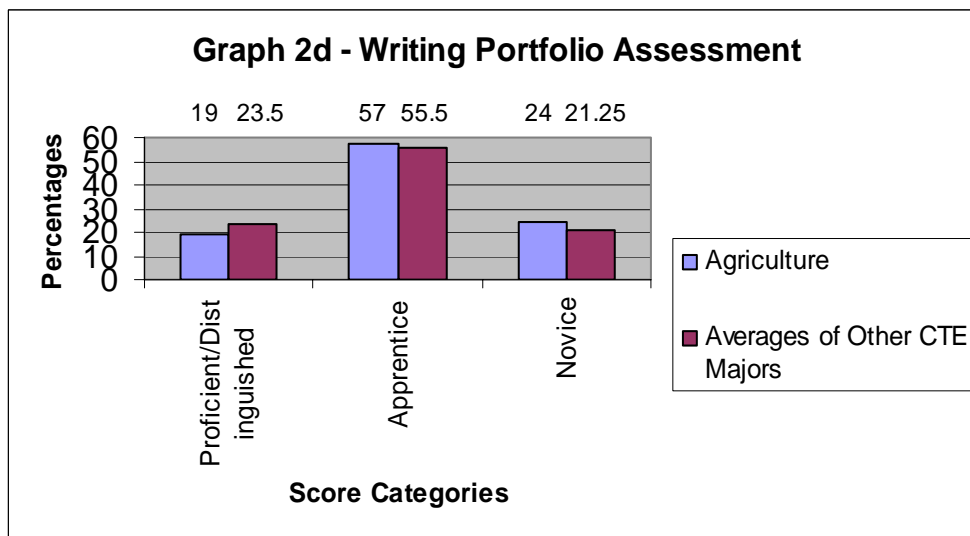


Graph 2b displays the scores of agriculture compared to those of other career and technical education majors in the assessment area of Science. According to the graph, agriculture students are very slightly under average in their number of proficient and distinguished scorers when compared to the other career and technical education majors. Additionally, the novice average of the other majors is just higher than that of the agriculture students. This indicates that agriculture students are virtually average on their

assessment in Science, and some improvement would definitely put agriculture students above the average.

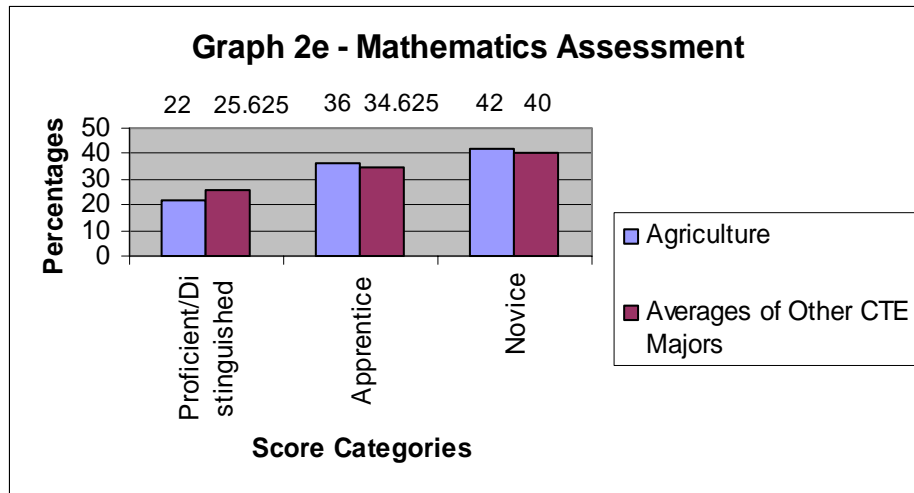


Writing on Demand scores are evaluated in Graph 2c. While fewer students from both agriculture and other career and technical education majors scored proficient or distinguished than on previous assessment subjects, agriculture students still have a lower proficient and distinguished score percentage than the average of all the other career and technical education majors. While apprentice score percentages are very close, agriculture has more students that score novice, concluding that the scores of agriculture students are slightly below the averages of the other career and technical education majors.

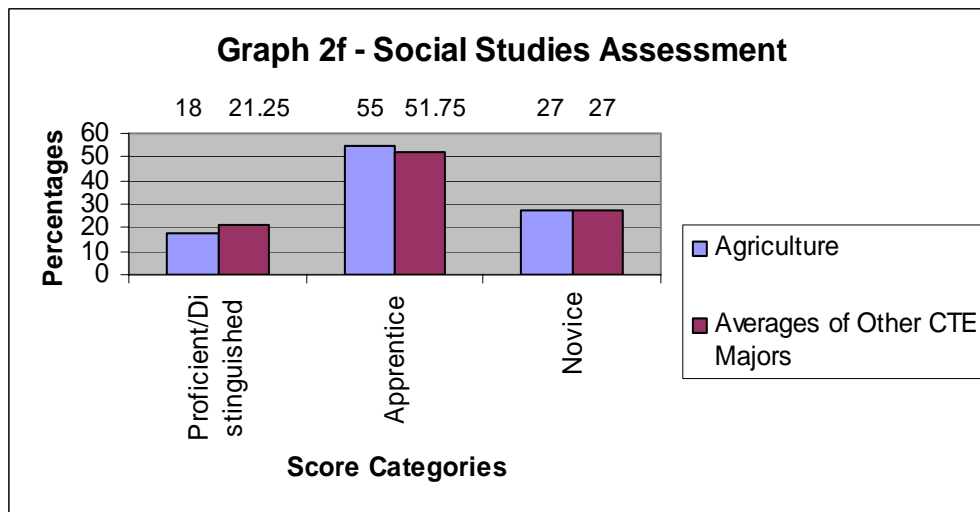


Graph 2d compares the score percentages between agriculture and other career and technical education majors on the Writing Portfolio. Once again, the average of the proficient and distinguished scores from all the other career and technical education

majors is higher than agriculture’s percentage. This, along with agriculture’s higher novice percentage, implies that agriculture is below average compared to other career and technical education majors in the Writing Portfolio assessment.

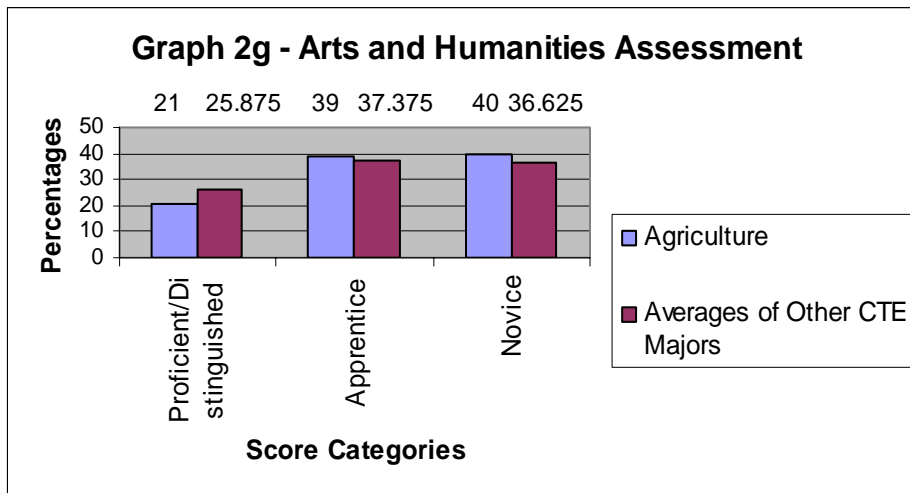


Graph 2e displays score percentages of agriculture and other career and technical education students in Mathematics. While the overall high novice percentages from both parties indicates that Math is an area all career and technical education majors need improvement in, agriculture is still below the career and technical education average. This is proven by agriculture’s lower proficient and distinguished score and higher novice score.

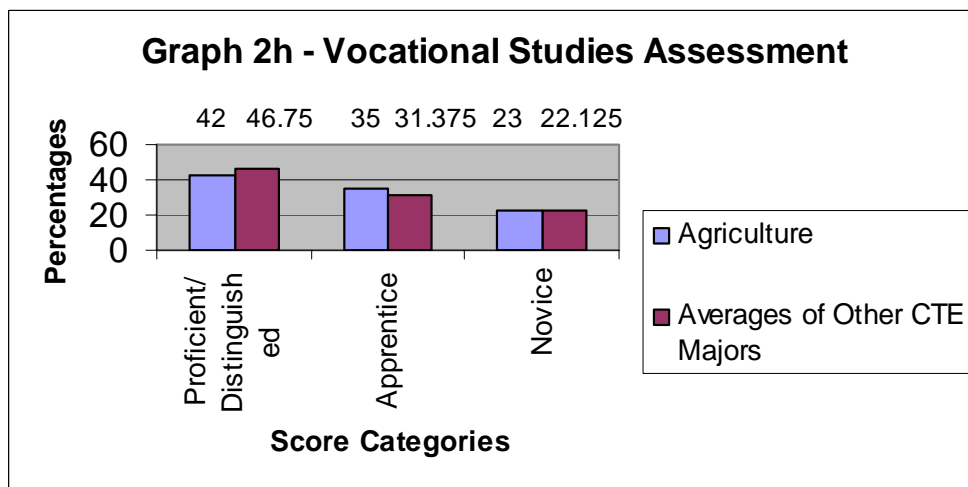


Unlike the Mathematics assessment in Graph 2e, Graph 2f displays the bell curve that is expected in assessment. This graph looks at scores between agriculture and other career and technical education majors in Social Studies. Similar to other assessment subjects, agriculture scores are lower in proficient and distinguished. They are, however, equal to the average in the novice category. This shows that while there is not a very

large gap, agriculture is still slightly behind the average of the career and technical education majors in Social Studies.

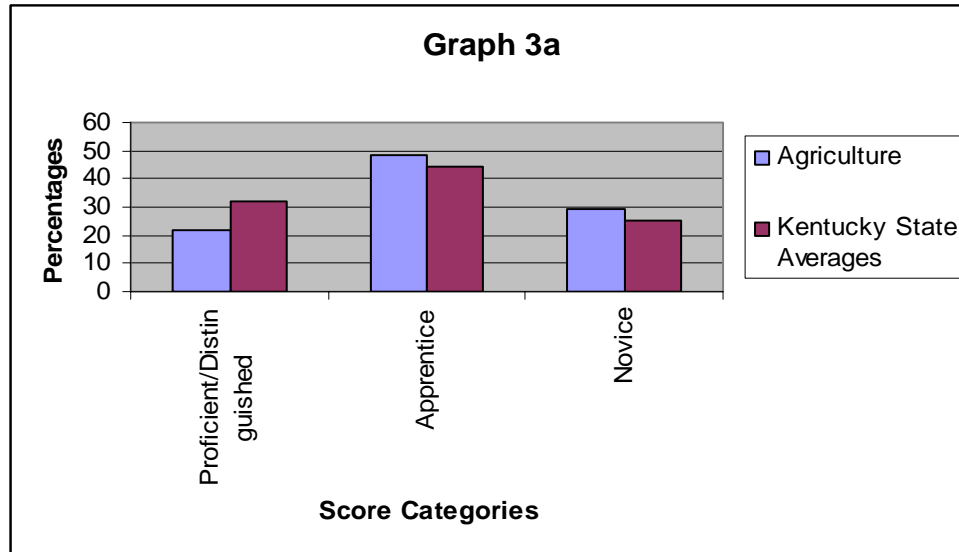


An assessment of Arts and Humanities is looked at in Graph 2g. While the graph displays that all career and technical education majors need improvement in this subject, agriculture has higher novice scores and lower proficient and distinguished scores than the averages of the other career and technical education majors. These differences in scores show that scores of agriculture students in Arts and Humanities are below average compared to other career and technical education majors.



Graph 2h looks at the assessment of Practical Living and Vocational Studies. While the percent of proficient and distinguished scores is higher in all career and technical education majors compared to other assessment subjects, agriculture is still behind the averages of the other majors because of agriculture's lower proficient and distinguished score percentage.

Graph 3a compares score percentages of agriculture students to Kentucky's state averages on the 2003 CATS test. As the graph displays, Kentucky averages in proficient and distinguished are higher than those of agricultural education majors. These, in addition to Kentucky's lower novice averages, conclude that the scores of high school agricultural education majors are below the state standards.



Conclusions

After evaluating the differences in various CATS score averages, several conclusions can be gathered with regard to the previously mentioned objectives of this study. After comparing the performance of high school career and technical education majors on the CATS test in 2003, certain majors stand out as opposite ends of the assessment spectrum.

By evaluating Graph 1a, the major that displays the highest ability on the CATS test is easy to determine. Communication students display the greatest score averages overall, having both the highest proficient and distinguished score percentage and a low novice score percentage. The CATS test has proven that communication programs need little reform. The three majors most in need raising CATS test scores are transportation, construction, and manufacturing. These majors fall short of the other six career and technical education majors both in their proficient and distinguished score average and their novice score average.

While this study looks at all career and technical education majors, it focuses primarily on agricultural education. Graph Set 2 shows that, with regard to CATS test scores, high school agriculture majors fall short of the score averages of other career and technical education majors. Unfortunately, comparing agricultural education scores with Kentucky state averages in Graph 3a paints a similar picture. Kentucky's proficient and distinguished score average is higher than that of agriculture, showing that many non-agriculture students score higher than agriculture students on the CATS test.

Recommendations

After looking at the results of this study, it seems as though the unique teaching methods applied in agricultural education may not be enough to meet CATS test goals. However, before any conclusions can be drawn on whether or not some assistance should be offered, a few questions need to be answered. First, are there other factors that may lead to these lower scores, other than the curriculum and teaching methods? What are the IQs and GPAs of the students entering agricultural education? Perhaps these scores are an improvement from those of previous years. If so, the educators and students in agricultural education should be commended for their efforts. Additionally, score percentages may be skewed if certain majors are not offered in many schools, if students incorrectly state their major, or if students are placed in a certain major because of their IQ. A further look into these career and technical education majors may prove that agricultural education scores are not as poor as this study implies.

Discussions and Implications

Obviously, this study is merely a starting point in what could be a more definitive idea of how career and technical education majors, and more specifically agricultural education, affects the learning of high school students. Through additional research into the IQs and study habits of agricultural education students, agricultural education curriculum, and common teaching methods, educators can discover more about how students learn and retain knowledge. Additionally, a continuation of this research may help to reveal which specific teaching practices can help students learn and retain more information. After agriculture students' 2003 CATS test scores, agriculture educators should make it a priority to raise the standards and expectations they hold their students to. Improvement can begin with agriculture teachers in the form of varied teaching styles, greater commitment to teaching all students, and higher expectations of these students. While improving educational quality on the classroom level is not the only answer to raising Kentucky's agriculture students' CATS test scores, it is a reasonable and realistic place to begin. Perhaps in future years, additional investigations will be able to determine how valuable career and technical education programs are in today's schools, and continue to expand the educational horizons of America's students.

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