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Effects of a Coaching Class on the ACT Scores of Students at a Large Midwest High School

Abstract

The role of standardized tests in general and college admission tests in particular is a hot topic for educators, administrators and others evaluating the outcomes of educational institutions. The importance of the test scores for both students and institutions is acknowledged, and the test preparation industry has spawned into a multi-billion dollar enterprise. Yet, objective evidence supporting the effectiveness of coaching for college preparatory tests, including the ACT, is virtually nonexistent. This study investigated the effectiveness of a four-week, 20 -hour ACT coaching class offered at a large Midwestern high school. The results of this study show that students who participated in the coaching class increased their composite ACT score by 1.5 points over their previous highest ACT composite score. A comparable group at the same high school who did not participate in the coaching achieved an increase of 0.65 points, indicating an effect of coaching of 0.85 points.

Despite some anecdotal evidence to the contrary, the preponderance of evidence shows that ACT scores are in fact becoming increasingly more important to students, their high schools and the colleges they attend. Students know that colleges use ACT scores for admission, scholarships and even assignment to remedial classes and are thus motivated to take the test multiple times to earn higher scores. This increased power of ACT scores has spawned an ever-growing demand for expensive test preparation aimed at helping students raise their scores. While the test preparation industry is now a multi-billion dollar enterprise, very little objective evidence exists to support the effectiveness of ACT preparation or coaching.

The purpose of this study is to investigate the effects of test coaching on the scores of students from a large suburban high school in the Midwest. The coaching took place over a four-week period during the fall of 2011 in preparation for the October 2011 ACT. The coaching included four five-hour sessions (10 hours of math and science and 10 hours of English and reading preparation) and was provided by Focus on Learning Center, a small private learning center that has for over 20 years offered test preparation services. Approximately 60 students participated voluntarily in this class and were divided into two groups based upon previous ACT and PLAN scores. Although this self-selection might represent a limitation to this study, administrators at the school indicated that the students who participated were representative of the school in both academic and non-academic areas.

To measure the effectiveness of this preparation, the best ACT score for each participating student was identified and compared to the scores achieved by these same students on the October 2011 ACT (a repeated measures design). To isolate the effects of coaching, the same test data was also collected from all students in this school who took the October 2011 ACT but did not participate in the coaching class. This simulated control group should allow the research to control for other factors not related to the preparation provided (Briggs, 2001). This procedure assumes that students who did not participate in the class did not participate in other forms of test preparation, an assumption that was not investigated and that represents a limitation of this study.

Review of Related Research

While there are many claims of large increases attributable to ACT preparation (primarily by commercial coaching firms), there is very little objective evidence to establish the actual gains that can be directly linked to a particular coaching program. This next section

will summarize the findings of these previous studies and describe the differences among them, as well as their limitations.

A study on the effects of coaching on African-American students (Moss, 1995) found an average gain between a pretest and posttest of 1.34 points on the composite score of the participants. However, there was no control group, and each of the participants was a volunteer. While it does show a statistically significant gain, the limitations of this study make it unsuited for comparison with the current study.

A study by Briggs (2001) found a gain of about 0.1 points on the composite score, 0.2 to 0.3 points on the math score, 0.4 to 0.6 on the English score, and a negative effect of between 0.6 and 0.7 on the reading score. No results are provided for the science score.

The Task Force on Standardized College Admission Testing (2002) states: "While there is a dearth of independent and credible research in this area, what is currently available strongly suggests that the effects of coaching on the SAT I and the ACT Assessment is minimal and within the standard errors of measurement for the tests. Neither coaching nor retesting has as much effect on raising scores as does decisions by students to prepare themselves for college by taking the most challenging coursework available to them." This study does not dispute the importance of a rigorous curriculum, but does attempt to identify a gain that can be directly attributable to coaching that goes beyond any gains attributable to rigorous high school courses.

ACT argues the best test preparation involves taking longer-term, college preparatory classes (ACT, 2005). They also state that, "The effects of activities, such as commercial test preparation classes and test preparation tutoring on ACT subject test scores were (even) smaller: score increases associated with these activities did not exceed one point for ACT English, Mathematics or Reading" (Briggs, 2001 in ACT, 2005). It should be noted that ACT does not dispute gains larger than 1 point for students who retake the test after coaching. However, ACT believes the portion of this gain that can be directly linked to the preparation or coaching is far less than 1 point. (ACT, 2005)

The purpose of this study was to investigate what effect could be directly attributed to coaching or test preparation. The methodology employed compared the gain achieved by students who took a coaching class to a comparable group of students from the same school who did not. This simulated control group controlled for the other factors that contributed to test-retest gains, isolating the effect attributable to the preparation. While not having random assignment was a limitation of this study, administrative sources at the school indicated that the students who took the class did not differ in any identifiable way from those who did not.

The research hypothesis for this study was: For the composite score and each subtest on the ACT assessment, the difference between the best prior ACT score before the preparation class and score after the preparation class will be larger for the students who took the coaching class than for those students who did not.

Method

The students in this study were juniors at a large Midwestern high school. Their four-week course included 20 hours of class time: 10 hours of English/Reading and 10 of Math/Science instruction. Students were grouped into two sections on the basis of their prior ACT scores: students with a prior ACT composite score of 21 (the average score on the ACT) or higher were placed in one group, students below 21 were placed in the other. Students without a prior ACT score were placed on the basis of their PLAN or PSAT score, but not included in the study. Classes were taught by experienced teachers trained as test coaches from Focus on Learning Center, a tutoring and test preparation company also located in the Midwest. The preparation included a review of the course content addressed by the ACT, instruction of test-taking strategies and completion of several practice tests. Homework was assigned but was not mandatory and was not checked for completion.

The treatment sample for this study included students who had a prior ACT score, took the coaching class, then took the ACT in October of 2011 (n=52). The office staff at the high school provided the data for this study. The best composite score and the individual subject scores from the same test were recorded for each student. In case of a tie, the more recent score was used, and the October 2011 scores were entered into an Excel spreadsheet. The mean and standard deviations for each subject test and composite score were calculated (see Tables 1–5). The control sample for this study included students from the same school who took the ACT in October. All had at least one prior ACT score, but they were not enrolled in the coaching class (n=55). The method used to select the composite and other test scores was identical to the treatment sample. It was not known whether any of the control students received any other form of test preparation, and this was a limitation of the study.

Structure of the ACT Preparatory Class

The 20-hour ACT preparatory class was divided in half, with 10 hours devoted to English/Reading and 10 hours to Math/Science. Each student received a packet of materials that included ACT practice tests, instructional handouts and a workbook for each content area: *Focus on the ACT: Math and Science*, and *Focus on the ACT: English and Reading*. Students were placed into two groups based upon their previous highest ACT composite score: Group One included the higher scorers (21 and higher) and Group Two the lower (below 21). The instruction was differentiated between the groups to provide students with instructional strategies appropriate for gains within their individual scoring ranges. The instruction was divided into eight 2.5 hour-segments, and students participated in two segments each day. The classes were designed to offer students a balance of content review, test-taking strategies and practice using retired ACT tests. Homework was given at the end of each class to be completed by the following week. Homework was not checked, so it was unknown how much was actually completed.

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A summary of the instruction given over the four weeks of the class, including how instruction was differentiated between the two groups, is provided in the following sections.

English and Reading Instruction

The 10-hour instruction for the English and Reading test was weighted to the more predictable and thus easier to coach English test: six hours to four. The goal of the class was to combine content review of punctuation, grammar and rhetorical skills and apply them to English passages on the ACT.

English

Week one. In the first session students learned about the structure and composition of the English test, set a personal goal for their scores (two to four points higher than on their previous test), identified how many correct answers they needed to meet their goal, and learned how to pace themselves to maximize their performance (nine minutes per passage). Students were instructed not to read a question more than twice and how to recognize when their best strategy was to guess. Teaching students that the scoring on the ACT allows them to miss multiple questions and still reach their goal reduced pressure and created a positive mind-set.

The English ACT test includes two major sections: Punctuation and Grammar (40/75) and Rhetorical Skills (35/75). Students used the *English-Reading Workbook* and the instructor had an accompanying PowerPoint presentation. All examples in the workbook were taken from retired ACT tests. The first session focused on the most predictable Rhetorical Questions that are easy to teach and are good confidence builders. The first session also introduced students to punctuation questions. Students then completed the first English passage in Test 64E test in nine minutes.

The students in the two groups used the same workbook, but with a slightly different emphasis: Group One completed more examples of questions in the workbook independently and when the practice passage was scored, only questions students missed were discussed. Group Two worked most examples as a group, and the instructor discussed every question on the practice passage. Students in Group One were asked to complete sections of the workbook and Test 64E

for homework. Group Two was given fewer workbook pages, though it was also asked to complete the English test.

Students were informed that subsequent classes would be conducted on the assumption that the homework would be completed. However, the homework was not checked.

Week two. The class started with a review of the Rhetorical and English sections covered the previous week. Students discussed the practice test and were encouraged to ask questions. Students scored and recorded their scores for the first practice test.

Students reviewed comma usage and high-frequency grammar rules. Group One moved ahead to subject-verb agreement rules and questions. A supplemental punctuation worksheet was used for additional review.

Homework was differentiated. Group One was assigned a review of apostrophes and basic grammar and was given an additional English test to take for homework. Group Two was also asked to review pages from the grammar section of the workbook and to complete an English practice test.

Week three. The third week was used to review principles taught during the previous two weeks. The answers to the English practice test were given, and one passage was reviewed in its entirety. Group One discussed the apostrophe worksheet. Group Two discussed the grammar homework and received instruction about the use of apostrophes and subject-verb agreement.

Group One was asked to complete two timed practice English tests for homework, and Group Two was assigned one test.

Week four. The final week of English coaching began with a comprehensive review of the test content. Following the review, students completed and scored three English passages. Every question was evaluated, which allowed students to identify the types of questions with which they were still struggling.

Reading

Week one. The first week was devoted entirely to English.

Week two. Reading coaching began. The ACT reading test is difficult both because of content and time constraints: four passages and 40 questions in 35 minutes. Reading passages are intended to reflect college level texts and are culled from fiction, social sciences, humanities, and science. Both the complexity of texts and length of questions vary from one test to the next, and students are often overwhelmed. Timing is critical, and the pressure of the clock creates a significant barrier. Furthermore, few students have the reading skills to complete the test in the allotted time, so strategizing becomes critically important for maximizing individual scores.

Students thus set goal scores, which determined how many passages they read: two passages for a score in the high teens up to 21; three passages for a score up to 26; and all four passages only for scores of 27 and higher. Students were shown how to preview the test, presented criteria for determining which passages to choose and offered a guessing strategy for answering questions on unread passages.

Students were then shown strategies for tackling each reading passage: skimming questions, circling key words, entering line references in the margin of the passages, and circling correct answers in the test booklet. Students worked as a group applying strategies and completed the first passage for homework.

Week three. Students reviewed the strategies they had learned the previous week and discussed "traps"—predictable strategies used by test writers to mislead readers who skim too fast and do not comprehend the question—on the reading test. Students then reviewed the questions for the homework passage, discussing why incorrect answers were wrong.

Group One completed two more reading passages independently. An online stopwatch was used to record time. Students in Group Two completed one additional passage as a group and another one independently. Answers were provided and questions answered.

Students were given two reading passages to complete for homework and asked to record their time. They scored their own tests. Students started to recognize which subject tests reflected their strengths and how long they needed to complete the passages. They also showed greater awareness of how to read questions carefully and eliminate incorrect answers.

Week four. The final reading session was spent reviewing reading strategies and traps. Students discussed their homework and evaluated why they were missing questions. Students then took a complete reading test during the class period, and they critiqued incorrect answers.

Students reviewed a *Cheat Sheet* summarizing the major strategies for the English and Reading test. They were encouraged to read it the morning of the ACT test.

Math and Science Instruction

Half of the preparation class was devoted to helping students prepare for the math and science tests, with each of these tests receiving approximately the same amount of instructional time.

Math

Week one. Each student was provided with a two-page summary identifying the topics addressed by at least 50 percent of the ACT math tests released by ACT since 1999. This was designed to show students that all or almost all of the math topics on the ACT were included in their math class. Next, the students were taught pacing strategies appropriate to achieving different goal scores. Students were encouraged to pace themselves toward a goal that was three to five points higher than their previous best math score. Students were also encouraged to read with discipline or to try to be perfect with the questions they knew how to do. Third, students were given three multiple-choice strategies to use when they understood the question, but were not able to solve the problem using standard mathematical approaches. Examples appropriate for the scoring goals of each of the classes were provided and discussed. The final math topic addressed during the first class was the appropriate use of calculators. Students were then assigned to complete the first half of the math review contained in the *Focus on the ACT: Math and Science* workbook.

Week two. The class began with a discussion of the math review assigned the previous week. This math review addressed the topics normally covered in Pre-algebra, Algebra 1 and Geometry. The purpose was to help students remember math concepts they had previously learned and understood. In this context, remediation is not feasible. The depth of this review was varied according to the ability of the two groups. Second, the students were reminded of the pacing strategies provided the first week and were given specific pacing markers that varied by goal score. Students were then given 30 minutes (1/2 the total time for an ACT math test) to complete the number of questions appropriate for their goal score. At the end of the 30 minutes, the answers were provided and students were asked to check their own answers. Once students identified the questions missed, they were encouraged to note the questions missed that they thought they had answered correctly. They were then asked to identify whether the mistake was attributable to a reading error, a procedural error or something they had forgotten. Students were encouraged to learn from these fixable mistakes. A discussion of student questions, including appropriate multiple-choice strategies and calculator use, followed this diagnostic assessment. The second half of the math review in the workbook was assigned for homework.

Reading passages are intended to reflect college level texts and are culled from fiction, social sciences, humanities, and science. Both the complexity of texts and length of questions vary from one test to the next, and students are often overwhelmed. Timing is critical, and the pressure of the clock creates a significant barrier. Furthermore, few students have the reading skills to complete the test in the allotted time, so strategizing becomes critically important for maximizing individual scores.

Week three. The third week of math instruction was similar to the second week. This class included a discussion of the reminder of the math review. Because of the difference in ability level, the depth of this discussion and the topics addressed varied between the two groups. After students were reminded of pacing markers appropriate for different goal scores, students were given 30 minutes to finish the math practice test started week two. The same diagnostic tool used during week two was employed. This was followed by a discussion of questions within the range appropriate for the goal scores of each group. Students were assigned to 30 quality minutes in a specific ACT practice test.

Week four. The class began with the same diagnostic tool employed during weeks two and three for the math test assigned as homework. This was followed by a discussion of questions appropriate for the score ranges of the two groups. The higher ability group was given 30 minutes to finish the test given as homework. (If the homework was not completed they were asked to start with question 31.) The same diagnostic tool and discussion procedure followed after the 30 minutes was completed. The lower scoring

group was given an additional practice test and was allowed 30 minutes to complete the recommended number of questions starting with the first question. This was followed by a discussion of the diagnostic tool and questions appropriate for the scoring ranges of that group.

Science

Week one. Students were first asked to read a two-page introduction summarizing the key features of the ACT science test. These key features were then highlighted and discussed. Second, students were given pacing strategies appropriate to achieving different goal scores. This included an identification of how many passages students needed to attempt to achieve their goal score (a gain of three to five points suggested as an appropriate goal). Next, the students were shown strategies for how to efficiently read the ACT science test. These strategies were differentiated between the different types of passages and different goal scores. Finally, the students were given practice with each of the three types of passages found on the ACT science tests, and these were discussed. An equal balance of pacing issues and scientific principles was sought for this instruction. No homework was assigned.

Week two. This portion of the class began with three reminders of how to take the ACT science test efficiently. Students were then given 35 minutes to complete an ACT science test (from a real, retired form of the ACT). At the end of 35 minutes, the answers were read and students were asked to place a single mark through the number of any question missed. Each student was then shown how to compute his or her raw score (number of questions correct) to scaled score using a table provided by the ACT. Next students were asked to place the questions they missed into two categories for purposes of pacing. Category one mistakes were questions students thought they knew. For these questions students were asked to identify their second choices. The second category of mistakes was questions students knew they were going to miss; students were asked to write "2" by them. The answers were then read for a second time to allow students to see how many of their second choices were correct. Questions students got correct with their second attempt were identified as Go Slower questions. Category two mistakes were identified as Give-Up Quicker questions. The vast majority of students who take the ACT science test do not have time to carefully complete 40 questions in the time allotted. Thus, the ability to identify questions a student knows he/she cannot answer is essential to achieving gains with the ACT science test. Students were then asked to recalculate their scaled score by adding the questions they answered correctly on their second try. Following this diagnostic, several key questions from each passage (questions illustrating the common scientific principles addressed by the ACT) were discussed. No homework was assigned.

Week three. Week three for science was the same as week two with a different practice test. No homework was assigned.

Week four. Week four for science was the same as weeks two and three with a different practice test.

After the discussion of the final science test, both groups were given several tasks to complete before and during test day. Between the last class and the actual test, the primary task for students was to create a *Things to Remember Sheet* of ideas and strategies they found helpful from the preparation packet. The primary tasks for test day were to arrive on time and to bring everything they needed to be admitted and to complete the test.

Results

Data for all students (coached and un-coached) are provided in Tables 1-5

Table 1. ACT English Means and Standard Deviations

Coached			Un-coached		
Best Prior	**Oct-11**	**Gain**	**Best Prior**	**Oct-11**	**Gain**
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
20.36 (5.13)	22.71 (4.7)	2.35 (3.12)	21.95 (4.66)	22.4 (4.54)	0.45 (2.78)
Note. Coached vs. Un-coached t = 3.30; p = .00066					

Table 2. ACT Math Means and Standard Deviations

Coached			Un-coached		
Best Prior	**Oct-11**	**Gain**	**Best Prior**	**Oct-11**	**Gain**
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
21.35 (4.56)	22.27 (4.56)	0.92 (2.13)	21.49 (3.77)	21.89 (3.69)	0.4 (2.38)
Note. Coached vs. Un-coached t = 1.20; p = .116					

Table 3. ACT Reading Means and Standard Deviations

Coached			Un-coached		
Best Prior	**Oct-11**	**Gain**	**Best Prior**	**Oct-11**	**Gain**
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
19.85 (4.86)	21.62 (4.56)	1.77 (3.53)	21.29 (4.97)	22.31 (4.13)	1.02 (3.61)
Note. Coached vs. Un-coached t = 1.08; p = .140					

Table 4. ACT Science Means and Standard Deviations

Coached			Un-coached		
Best Prior	**Oct-11**	**Gain**	**Best Prior**	**Oct-11**	**Gain**
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
21.63 (3.65)	22.6 (3.38)	0.96 (2.36)	22.11 (3.24)	22.82 (3.65)	0.71 (2.9)
Note. Coached vs. Un-coached t = .50; p = .31					

Table 5. ACT Composite Means and Standard Deviations (Unrounded)

Coached			Un-coached		
Best Prior	**Oct-11**	**Gain**	**Best Prior**	**Oct-11**	**Gain**
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
20.8 (4.13)	22.3 (3.94)	1.5 (1.56)	21.71 (3.36)	22.35 (3.43)	0.65 (1.83)
Note. Coached vs. Un-coached t = 2.60; p = .005					

The results of this study indicate that the students who received coaching achieved a gain of 2.35 points between their previous best ACT English score and the English score on the ACT immediately after the coaching class (1.9 points higher than the students who did not receive the coaching class). For math, the gain was 0.92 points (0.52 higher than the un-coached students). For reading, the gain was 1.77 points (0.75 higher than the un-coached students). For science, the gain was .96 (0.25 higher than the un-coached group). Overall, the composite score increased by 1.5 points (0.85 points higher than the un-coached group). Although the gains were uneven, the coached group achieved gains greater than the un-coached group on every test, as well as the composite score.

Discussion

A gain of 0.65 from a best previous ACT composite score to a subsequent score is consistent with research conducted by ACT (ACT, 2005). A gain of 1.5 points would be larger than the average gain between two composite scores reported in any published research to date. By comparing the students who received preparation to a comparable group who did not allow the difference to be attributed to the preparation received by the students in the class. While the gains attributed to the preparation were uneven across the four subtests, these gains, too, are subject to random error and could be expected to be different if measured for another group on another day.

A gain of 0.85 points may not appear large to parents or individual students, but raising the scores of a group by this amount using a short-term preparation class represents a significant gain. These results indicate that preparation can increase ACT scores.

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ENE-KAJA CHIPPENDALE, Ph.D., is a reading/learning specialist and president of Focus on Learning Center in Columbia, MO. who instructs teachers to become ACT coaches. She also familiarizes teachers with the overlapping CCSSs and ACT College Readiness Standards and offers instruction for improving students' reading comprehension.

CLARK MERSHON, hired as Staley High School's first principal, has 16 years experience in the North Kansas City School District and a total of 32 years in education. He is a graduate of Southwest Baptist University (MO) and holds a master's in administration from the University of Missouri-Columbia (MO) and education specialist degree in administration from Missouri State University (MO).

PATRICIA CARNEY provided the English and reading instruction for the study. She has been an ACT English/reading coach and literacy tutor with Focus on Learning for four years. She is also seeking a master's degree with a focus in literacy and is currently teaching Adult Education and Literacy classes in Kansas City, MO.

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