

**A+dvancer and ACCUPLACER: A Pilot Study of Intervention Efficacy**

A White Paper

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**Introduction**

Many students entering colleges are coming with skills insufficient for success. As a result, students are frequently delayed in their entry to college level coursework. Time is lost for the student's completion of their education and enrollment with its attendant tuition and fees is jeopardized for the college or university. For some, it is thought that the low skills are caused by time away from the academic environment where skills are lost from lack of use. This explanation is particularly suspected in the non-traditional student representing a significant portion of the college student population.

The means by which the skill deficiencies have mainly been addressed is through enrollment in developmental courses or the provision of access to learning materials at the student's discretion. The question arises as to whether a more efficient way to provide individualized learning prescriptions to enable students to meet entrance requirements for college courses is possible. Can another intervention better prepare for success in college level instruction, or reduce the number of remedial courses needed prior to entrance in college level courses?

Two tests are widely used to determine student readiness for college level courses. These are ACCUPLACER which is provided by the College Board, and Compass which is provide by ACT. These two tests have an excellent track record in identifying the probability of student success in college level classes as well as determining success in specific remedial classes. However, the utility of either test for determining the specific learning objectives for which students need assistance is weak according to many personnel surveyed in both community colleges and 4-year colleges. So, if students are to receive individualized assistance, determining the specific needs of the student is left largely to the discretion of instructors.

Increasingly, electronic learning resources are more readily available to students. Nevertheless, the direction for the students is often minimal. *A+dvancer* is an online instructional system that is designed to provide individualized learning prescriptions. The prescriptions are generally developed as a result of brief criterion-referenced assessments within the *A+dvancer* system that are associated with specific learning skills identified by ACCUPLACER and Compass. *A+dvancer* then provides a skill deficiency report and individualized instruction to address the specific learning needs of the student.

*A+dvancer* has been in use for approximately two years in a number of colleges and universities across the country. Several have provided pilot data to the American Education Corporation for analysis of the efficacy of *A+dvancer* in raising scores on the ACCUPLACER test. This paper is written to address the findings of that pilot data.

## Methodology

The methodology for this pilot study is straight-forward. Three colleges and/or universities from four regions of the United States participated in this study. The regions included Pennsylvania, Oklahoma, Colorado, and Minnesota. Students who did not qualify for entrance into one or more college level courses as a result of their ACCUPLACER test scores were offered the opportunity to take the *A+dvancer* prescriptive assessment and prescribed instruction. Following the completion of their *A+dvancer* prescription, students took the ACCUPLACER test a second time.

AEC has currently received pre and posttest data to document the effectiveness of the *A+dvancer* interventions for approximately 140 students in Elementary Algebra, 30 students in Reading Comprehension, and 12 student for the Sentence Skills subtest of ACCUPLACER.

## Results

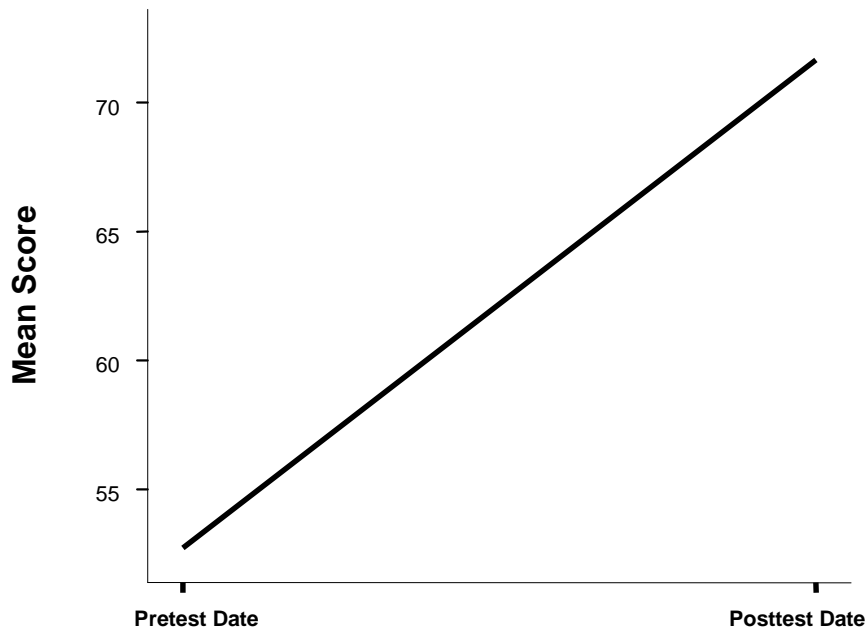
### Elementary Algebra Data

ACCUPLACER Elementary Algebra pre and posttest scores for 139 students who used the *A+dvancer* system to address Elementary Algebra were returned to AEC. Students in this study used *A+dvancer* for an average of 6 hours and 37 minutes. A dependent t-test found that students utilizing the program demonstrated a significant increase of 18.917 points from their pretest scores (mean = 52.732; SD = 15.043) to their posttest scores (mean = 71.650; SD = 16.834);  $t(138) = 13.248, p < .001$ . The Graph One clearly shows the gain demonstrated in Table One.

**Table One: Mean scores for major ACCUPLACER Elementary Algebra Test**

	Number	Mean Score	Standard Dev.
<b>Pretest Score</b>	139	52.732	15.043
<b>Posttest Score</b>	139	71.650	19.115
<b>Change/gain<sup>1</sup></b>	139	18.917	16.834

**Graph One: Change in Math Test Scores from pretest to posttest.**



Additionally, several correlations were calculated. The first was the correlation between total time spent with the *A+dvancer* program and gains on ACCUPLACER. The correlation was  $r(139) = .10$  and was not significant. While it is not customary to report non-significant correlations, it is reported here because of its implications to the second correlation. Next was the correlation of percentage of study time to gains on ACCUPLACER. This correlation was  $r(139) = .26$  and is significant at the .01 level.

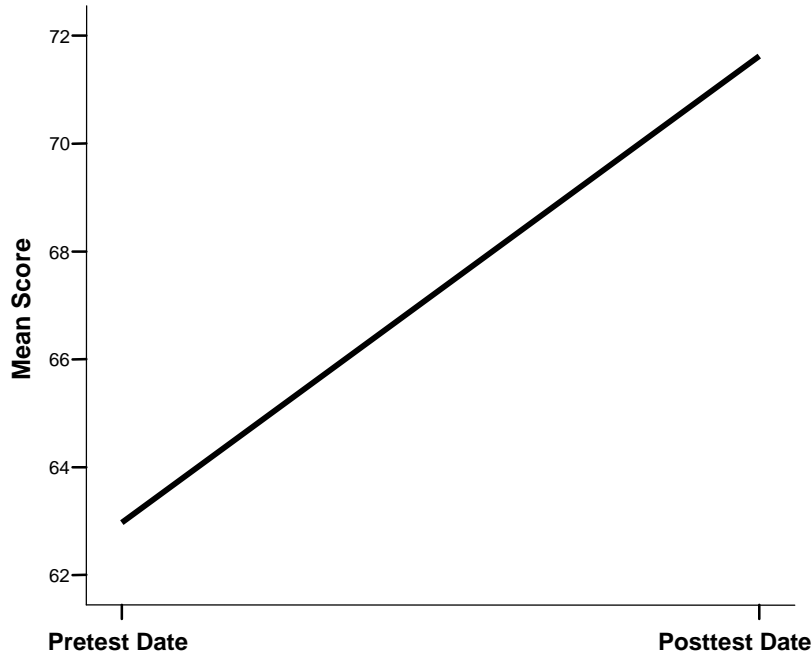
**Reading Data**

ACCUPLACER Reading pre and posttest scores for 37 students who used the *A+dvancer* system to address reading were returned to AEC. Students in this study used *A+dvancer* for an average of 2 hours and 58 minutes. A dependent t-test found that students utilizing the program demonstrated a significant increase of 8.654 points from their pretest scores (mean = 62.970; SD = 10.286) to their posttest scores (mean = 71.620; SD = 11.291):  $t(36) = 4.944$ ,  $p < .001$ . Please see Graph Two for a representation of this change outlined in Table Two.

**Table Two: Mean scores for ACCUPLACER Reading Comprehension Test.**

	Number	Mean Score	Standard Dev.
<b>Pretest Score</b>	37	62.970	10.286
<b>Posttest Score</b>	37	71.620	11.291
<b>Change/gain<sup>1</sup></b>	37	8.654	10.648

**Graph Two: Change in Reading Test Scores from pretest to posttest.**



Additionally, several correlations were calculated. The first was the correlation between total time spent with the *A+dvancer* program and gains on ACCUPLACER. The correlation was .36 and is significant at the .05 level. The next correlation was the relation of the percentage of study time to gains on ACCUPLACER. This correlation was .41 and is significant at the .01 level.

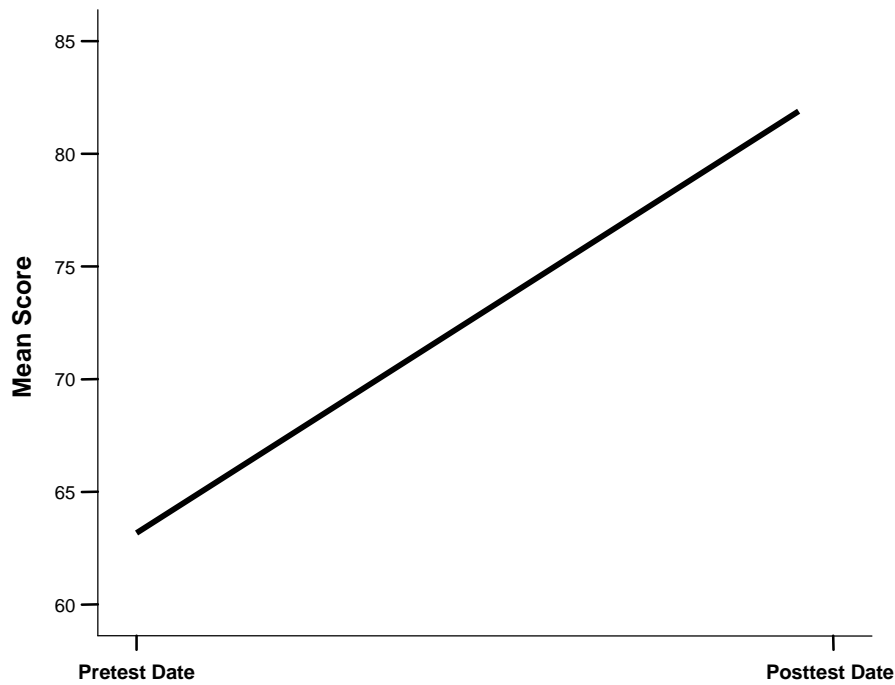
### **Sentence Skills Data**

ACCUPLACER Sentence Skills pre and posttest scores for 12 students who used the *A+dvancer* system to address grammar and usage were returned to AEC. Students in this study used *A+dvancer* for an average of 2 hours and 24 minutes. A dependent t-test found that students utilizing the program demonstrated a significant increase of 19.7 points from their pretest scores (mean = 62.190; SD = 12.210) to their posttest scores (mean = 81.890; SD = 14.123):  $t(11) = 5.018, p < .001$ . Please see Graph Three for a representation of this change as enumerated in Table Three.

**Table Three: Mean scores for major dependent variables.**

	<b>Number</b>	<b>Mean Score</b>	<b>Standard Dev.</b>
<b>Pretest Score</b>	12	62.190	12.210
<b>Posttest Score</b>	12	81.890	14.123
<b>Change/gain<sup>1</sup></b>	12	19.700	13.600

**Graph Three: Change in Sentence Skill Test Scores from pretest to posttest.**



No additional statistics were calculated because the number of students with pre and posttest scores reported was too low to produce meaningful results.

### **Discussion**

The findings of this small study are very encouraging. The statistical findings were very strong where the numbers were high, as in the Elementary Algebra intervention. Findings with the smaller sample sizes were also positive but cannot be as conclusive because of the lower numbers involved. The gains were made in following a brief intervention, 6 and 1/2 hours and under three hours, respectively. Additionally, the findings show a strong trend indicating that students who use the study materials gain more than students who spend more of their time merely practicing doing problems.

The gains over a short period of time are especially encouraging. For most students taking a college placement test such as ACCUPLACER or Compass, there is a short window between the test and enrollment in classes. Many students who cannot begin the college level classes simply walk away from enrollment. It has been the observation of this writer, that students completed the *A+dvancer* intervention at a much higher rate in institutions where students were permitted to re-take ACCUPLACER after completing the *A+dvancer* intervention and have the second ACCUPLACER score accepted for class placement. With the short window, an effective, brief intervention is critical to retention.

The question that arises is whether students whose ACCUPLACER scores are raised by the *A+dvancer* intervention are as successful as students whose ACCUPLACER scores were high in the first place. Institutions using *A+dvancer* reported to this writer than their preliminary findings are positive.

As noted above, the statistical trends show that students who use the study materials made greater gains. This is encouraging for two reasons. First, it is consistent with the premise that instruction is important to learning. It is also encouraging because the learning management system within *A+dvancer* allows controls that require the learner to use the study guide. It was noted early in the history of the implementation of *A+dvancer* that students who had not made cut-scores on ACCUPLACER often did not use the study guide and skipped right to test questions. They then proceeded to continue taking test questions repeatedly, without going to the study guide. Their performance did not change, nor did their study habits. Perhaps this was the reason many of these students were not able to attain the cut-scores required for college enrollment. It was after this observation that a requirement of some study time was included as a default setting in the *A+dvancer* program. Therefore, a question worthy of further study is what is the optimal study time to practice question ratio?

Finally, an observation from one of the university faculty will be presented. It was said that students do not always make up sufficient ground to be eligible for college level work, but nearly always improve to test out of at least one remedial course. This is an extremely powerful observation. Delaying entry into college level work most likely hinders retention. It has been thought of many that accelerating entry into college level material would enhance retention. It might impact on those students who come into the testing office but never complete matriculation and their enrollment is lost. These pilot results suggest that *A+dvancer* can help with this problem and it is certainly an area worthy of in-depth consideration.

In conclusion, it appears that *A+dvancer* is an intervention that is effective in raising ACCUPLACER scores. Users report that students who enter college classes based on improved scores after an *A+dvancer* intervention succeed at just as high a rate as those who had high placement scores in the first place. This pilot data supports the hypothesis that *A+dvancer* is an effective intervention.