
A photograph of a modern, bright interior space, likely a library or study area. Three people are seated at a long wooden table, working or studying. The room features large windows, brick walls, and contemporary furniture including armchairs and a small round table. A guitar is visible on the left. The overall atmosphere is collaborative and educational.

EDATASCI

ASU Learning Cloud Effectiveness in Blended Mode: ASU Prep Immersion Schools 2025

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EDataSci is a research firm that collaborates with government agencies and nonprofit organizations to design and conduct empirical studies that inform policy and practice in education, psychology, and the social sciences. The firm’s research team is composed of educational psychologists with specialized expertise in the cognitive processes underlying academic and professional competencies, as well as in the design of quantitative outcome studies that meet requirements for the standards of evidence used by many government and professional review boards.

The present study was conducted by Jeff McLeod, PhD as part of the organization’s ongoing commitment to advancing evidence-based insights that support effective educational policy and practice. He is a certified reviewer for What Works Clearinghouse group design standards as well as advanced group designs and single subject designs. He can be reached at jtmcleod@edatasci.com

Abstract

This quasi-experimental study, designed to meet ESSA Tier 2 evidence and What Works Clearinghouse standards, investigated the efficacy of the ASU Learning Cloud curricula for high school students when used in a Blended Learning Mode compared to courses taught using Lessons alone. The outcome variable was course performance as measured by final grade points, controlling for baseline differences on the ACT Aspire Composite score, selected demographic variables, and curriculum domains. Results demonstrated The ASU Learning Cloud curricula had a significant, positive effect on learning for Science and Social Studies domains, while Lessons alone were more effective in the English Language Arts domain. These findings suggest that the Learning Cloud is an effective resource for ASU Prep charter schools to engage in Blended Learning modalities.

The rigorous quasi-experimental design of the efficacy study meets the requirements for ESSA Tier 2 evidence under the What Works Clearinghouse (WWC) 5.0 Group Design Standards with reservations.

Introduction

The ASU online Learning Cloud is a proprietary learning platform capable of delivering high quality, immersive learning experiences online. Such a platform is a promising resource for implementing blended learning, allowing teachers to customize assignments for personalized learning experiences. Due to its modular design, the Learning Cloud platform offers flexibility for students to work at their own pace while allowing teachers the ability to match assignments to the classroom scope and sequence. Together with direct instruction, supplemental online content enhances personalized learning because it provides customized pathways for student growth through immersive instructional experiences.

The purpose of this study was to test the efficacy of the ASU Learning Cloud for its suitability for blended learning using course performance as the outcome criterion.

Methodology

Data and Sample

Leadership at ASU Prep authorized the research study whereby the course registration system would assign students randomly to different versions of courses in Science, Social Science, and English Language Arts across four different schools during the 2024/25 academic year. One group was assigned to teach Lessons as usual, the other was assigned to the Blended condition, defined as Lessons plus supplementary online modules through the ASU Learning Cloud. Table 1 below shows the sample distribution across ASU Prep schools.

After two semesters of instruction in thirty-nine different courses -- grouped into domains of English, Science, and Social Science -- researchers extracted course data from the campus learning management system for 4,734 student participants who completed the courses. To facilitate rigorous consistent with ESSA Tier 2 requirements, researchers merged student-level demographic data and Arizona State test scores (ACT Aspire Composite Score) from the previous two years.

Table 1. ASU Prep Academy Immersion School Initial Sample (N=4,734) by School

School	Course Style	N
ASU Prep Casa Grande	Blended	754
	Lesson	403
ASU Prep Downtown Phoenix High School	Blended	537
	Lesson	481
ASU Prep Polytechnic High School	Blended	602
	Lesson	1093
ASU Prep South Phoenix High School	Blended	474
	Lesson	390

Measures

ACT Aspire measures longitudinal growth and progress toward college and career readiness. It is a vertical scale that compares year-over-year growth. It is a standards-based, summative assessment. This exam is an indicator of whether a student will pass

the ACT. The standardized score range is 400 and above. Researchers chose the ACT Aspire Composite Score from the previous two years to use as a baseline equivalence measure and as a covariate in the research design.

Final Grade Points are the total points accumulated by each student in the teacher’s grade book for the course. This measure has a scale from 0 to 100. The scale is a working definition of course grade, as the scale maps clearly to letter grades (A, B, C, D, and F). The What Works Clearinghouse recognizes course grades as reliable and face valid achievement outcome measures (Institute of Education Sciences, 2023).

Analytic Sample

After matching course records to demographic and ACT Aspire records, the analytic sample was defined by 1,349 students total, broken into Lesson (n=597) and Blended (n = 752) groups.

Baseline Equivalence

Table 2 below shows the mean ACT Aspire Composite Scores for the Lesson and Blended Learning groups. The difference between means was 1.6 points. This is 0.19 standard deviations which qualifies the study for WWC Tier 2 evidence as long as the baseline is used as a covariate in the statistical analysis of outcomes (Institute of Education Sciences, 2023). This requirement is implemented in the present study.

Table 2. ACT Aspire Composite Scores Baseline Scores Pre-Treatment

Treatment Group	Mean	SD	n
Blended Learning	422.69	8.25	1,056
Lesson	424.26	8.42	1,074

Statistical Design

The statistical design was a multi-factor Analysis of Covariance with the following linear structure.

Model 1.

$$\text{Grade} = \text{Aspire} + \text{Demographics} + \text{School} + \text{Subject} + \text{Treatment} + \text{Subject} * \text{Treatment} + e$$

Components of Model 1

Aspire is the continuous composite score baseline covariate

Demographics, a block of variables including English Language Learner, Special Education, Reduced or Free Lunch, Gender, Race, and Truancy Warning

School is a fixed factor with 4 levels

Subject is a fixed factor with 3 levels

Treatment is the experimental condition (Lesson vs Blended Learning)

Subject x Treatment is the interaction between Treatment and the Subject domain

e is the residual unexplained error

Data Analysis

Model 1 was fit resulting in no demographic variables being found significant. These variables were removed and a second model was chosen as the final model.

Model 2.

$$\text{Grade} = \text{Aspire} + \text{School} + \text{Subject} + \text{Treatment} + \text{Subject} * \text{Treatment} + e$$

In a linear Analysis of Covariance model such as Model 2, the factors are analyzed independently. This means that the Treatment effect and the Subject x Treatment effect are estimated after first removing the influence of the covariate, the influence of School, and the influence of Subject domain. The analysis of Treatment and Subject x Treatment, which are the two focal hypothesis tests in determining treatment effect, are statistically controlled to give the incremental influence of these factors after having accounted for the influence of the other factors.

Results

ANCOVA Table

The Model 2 ANCOVA table is provided below.

Table 3. Analysis of Covariance Results for Model 2.

Effect	df	SS	MS	F	p-value	Partial η^2
Aspire Composite	1	80131	80131	215.129	< .001	0.13
School	3	26339	8780	23.571	< .001	0.05
Subject	2	17008	8504	22.831	< .001	0.03
Treatment	1	1638	1638	4.398	0.036	0.00
Treatment x Subject	2	15136	7568	20.318	< .001	0.03

The 7th column of the ANCOVA table contains partial eta-squared values. This effect size allows direct comparison between the five effects in the model. It is evident that the largest model effect is the Aspire Composite Score. A partial η^2 magnitude of 0.13 is quite large, confirming that prior achievement test scores explain a great deal of the variance in school grades.

The next largest effect is the school effect. This demonstrates that the four schools had wide variability in their final grade points. An effect size of 0.05 is a moderately large effect.

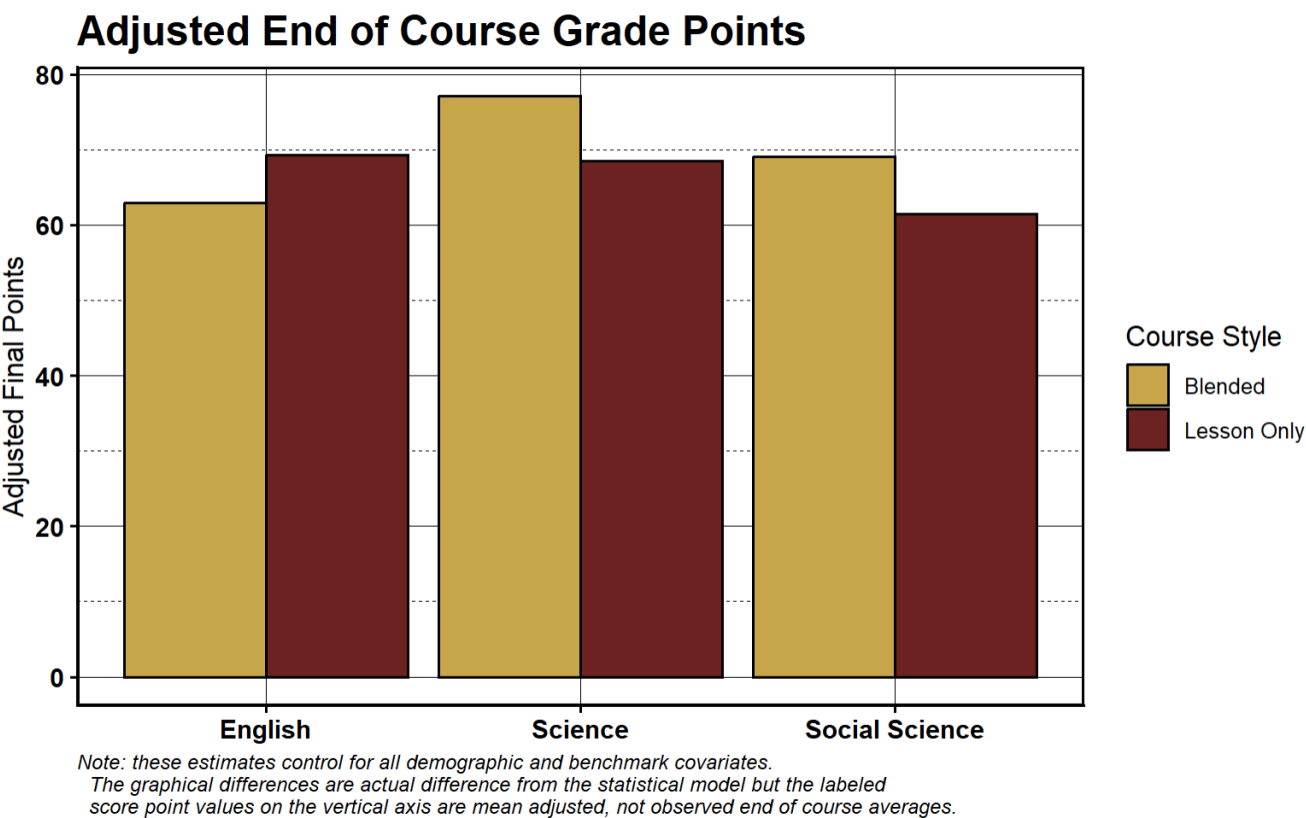
The course subject factor shows moderately wide variability as well, indicating that the subject domain is associated with variability in student course performance.

The effect of treatment had zero effect, but the interaction effect of Treatment x Subject was statistically significant with a moderate effect size. This pattern of results means the treatment had a significant impact, but the impact is different for different course domains.

Interaction Effect Illustrated

Figure 1 below is a visual depiction of the treatment x course interaction effect.

Figure 1.



This graph clarifies the key study result. It is important to bear in mind that the graph portrays adjusted end of course grade averages. What this means is the statistical model, by controlling for multiple factors, reveals aspects of the outcomes that might be masked by the confounding of other factors, such as the ACT Aspire. These adjusted means control for all other model effects. The means should be seen as free from construct contamination by other factors.

The adjusted mean graph demonstrates that courses in the English domain had better outcomes in the Lesson condition, while courses in the Science and Social Science domains had better outcomes in the Blended learning condition.

Simple effects analysis of the interaction was performed to determine if treatments were significantly different within each subject domain, and what effect size each difference indicates. Results indicated that the treatment groups were significantly different within all three subject domains.

English showed a negative difference, meaning that the Lesson condition was more effective than the Blended Learning condition ($t(1413) = -3.5$, $df=1413$, $p < .001$; Cohen's $d = -0.33$). Science revealed significant differences in favor of Blended Learning ($t(1413) = 4.35$, $p < .0001$; Cohen's $d = 0.44$), as did Social Science ($t(1413) = 3.85$, $p < .0001$; Cohen's $d = 0.39$). All these Cohen's d effect sizes are moderate, and they can all be interpreted as making a meaningful educational difference.

Conclusions and Suggestions

There is a positive, statistically significant effect for Blended Learning with the ASU Learning Cloud for Science and Social Science. The Lessons were significantly more effective than Blended Learning for the English Language Arts domain. This might stimulate some discussion among curriculum architects. It might be the case that English does not lend itself easily to online modules, or perhaps the essential instruction in English thrives more in a group classroom setting.

Conversely, it might be more challenging to create effective online modules in the English Language Arts domain. In this case the research study might be considered a formative outcome that might encourage further attempts to realize the benefits of online modules in the English Language Arts domain.

It might be noted that the course records allow teachers to enter exam results in the learning management. Discussions with school staff indicated this field was optional and used differently by different teachers.

Exploratory analysis of this variable indicated that there were significant differences between students of teachers who entered data in those fields and those whose teachers did not. The Learning Cloud students whose teachers entered exam data had higher grades at the end of the year. However, without a uniform rationale for how this variable might influence outcomes, researchers decided not to use the variable.

Researchers recommend taking a closer look at exams as course progress measures. There are several fields available for teachers to use. If those fields represent frequent testing occasions, it might be suggested that a part of the success of Learning Cloud online lessons could be due to a phenomenon known as the Testing Effect (Roediger and Karpicke, 2006; Karpicke and Grimaldi, 2012).

The Testing Effect is a highly replicated finding in cognitive psychology suggesting that taking brief objective knowledge tests throughout a semester leads to significant improvement in course performance over and above self-study, reading, or review. The explanatory mechanism is that standardized structured test items elicit cognitive

retrieval which strengthens neural connections more than recognition does. Challenging tests throughout the year yield knowledge gains even when the student gets the questions wrong.

The significant differences between groups in final grade points is the strongest evidence that ASU Learning Cloud technology is associated with positive results.

References

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