Title: Combining College and Career Readiness and Reading in a Blended Learning Context for Adolescents with and without Disabilities

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Background / Context:

Secondary students must be exposed to technology in blended learning environments across general and special education settings to ensure they learn technology skills as well as continue to learn fundamental reading skills in order to be prepared for college and careers. Reading skills affect later life outcomes, such as employment status (Kutner et al., 2007) and dropping out of school (McGee, Prior, Williams, Smart, & Sanson 2002). Digital or blended learning is increasingly emphasized, as evidenced by the recent prioritization in the Every Student Succeeds Act (ESSA) of 2015, which states digital learning is "any instructional practice that effectively uses technology to strengthen a student's learning experience", and blended learning is "a formal education program that leverages both technology and face-to-face instructional approaches".

As such, the integration of reading instruction into college and career readiness content, and delivery over digital or blended learning contexts is critical. One example of an emerging evidence-based online curriculum is EnvisionIT developed by the Ohio State University Nisonger Center (2012-2017). Table 1 shows explicit examples of how the EnvsionIT curriculum maps onto the ESSA definitions of digital and blended learning.

Purpose / Objective / Research Question:

The purpose of this study was to examine the effect of EnvisionIT on secondary student reading skills as measured by the *AIMS Web Maze Test for 8th Grade* (Shinn & Shinn, 2002*).* Three research questions guided this study: (a) What is the effect of EnvisionIT on AIMSweb8 scores? (b) Does this effect differ by grade? (c) Does this effect differ by length of class (semester or year)?

Setting:

The curriculum was implemented in secondary school settings including special and general education courses (e.g., English Language Arts, Career and/or Vocational Education, and Postsecondary Planning) and resource rooms in 10 schools located in Ohio and Connecticut.

Population / Participants / Subjects:

The total sample included secondary students with and without disabilities (n = 338). See Table 2 for sample characteristics, stratified by intervention status.

Intervention / Program / Practice:

EnvisionIT is a 12-unit curriculum centered on career readiness, information technology literacy, and reading (Izzo et al., 2010), and delivered through an online learning management system called Schoology. The lessons are teacher-directed and meant to be implemented in a blended learning environment. Another feature is the alignment to Common Core State Standards in English/Language Arts, in particular the reading for informational text, writing, and speaking and listening standards. The units can be taught over the course of one semester or one school year, depending on frequency (e.g., once per week, etc.).

Research Design:

A quasi-experimental pretest-posttest design with students nested within teachers was utilized to examine the relationship between receiving the curriculum and reading outcomes. Prior to implementing, intervention teachers participated in a one-day training on the curriculum. Comparison group teachers did not receive any training, did not use EnvisionIT, and carried out business-as-usual instruction that had been designated by the school, district, and state.

Data Collection and Analysis:

To collect pretest and posttest data, trained members of the research team visited intervention and comparison classrooms. The AIMSweb8 test was group-administered as a paper-based measure.

A difference score, Δ*aims8*, representing change from pretest to posttest responses was calculated and utilized as the dependent variable. The *intraclass correlation coefficient* (ICC; ρ) was calculated using parameter estimates from a *random effects analysis of variance* (RE-ANOVA) model, in order to determine whether a *multilevel linear modeling* (MLM) was appropriate.

The first research question was answered via an intercept-as-outcome model with an intervention indicator. The second and third research questions were answered by entering student characteristic variables (e.g., grade level and intervention length).

Using the resulting parameter estimates (e.g., t-values) effect sizes, in the form of *partial correlation* (pr) coefficients (Rosenthal & Rubin, 2003), were calculated; where 0.51, 0.36, and 0.14 correspond to large, medium, and small effect sizes, respectively.

All analyses were estimated in *Mplus, version 7.3* (Muthén & Muthén, 2015) using the *full information maximum likelihood* estimator.

Findings / Results:

An ICC of 0.129 was calculated for Δ*aims8* and was found to be distributed $\Delta aims8 \sim N(\gamma_{00} = 0.516, \tau_{00} = 5.69)$. The inclusion of the intervention status indicator, represented by γ_{01} resulted in a pseudo r^2 of 0.32; due to the RE-ANOVA τ_{00} estimate being reduced to 3.86. The expected change from pretest to posttest for the comparison group was found not to be significantly different from 0 ($\gamma_{00} = -1.262$, SE: 1.106, $p = 0.254$); whereas, those who received the curriculum

experience a significant boost in their change score (γ_{01} = 2.818, SE: 1.375, $p < 0.05$); therefore, the model implied change in AIMSweb8 from pretest to posttest is calculated via the linear combination of γ_{00} and γ_{01}, 1.56.

After the addition of the within level predictors (e.g., grade and class length), a large effect was detected for the intervention status indicator. Thus, those in the reference groups (e.g., 9th graders) experienced a 3.11 boost in AIMSweb8 score (γ_{01} = 3.11, SE: 1.31, $p < 0.05$; pr = 0.55); whereas, those in the 11th grade receiving the intervention and falling into all other reference categories, experience a boost of 3.88, corresponding to a small effect size (γ_{40} = 3.88, SE: 1.64, $p < 0.05$; pr = 0.14); these students experience, on average, a boost of 6.99 points. See Table 3 for parameter estimates from this final model.

Conclusions:

These results are promising; however, several limitations exist. Primarily, the study was not randomized; therefore, threats to internal validity exist. In this vein, the settings in which the curriculum was disseminated and the dosage was not controlled for; rather, class length was found to be non-significant (γ_{10} = -0.99, SE: 1.96, $p > 0.05$); and fidelity of implementation was not investigated. Despite these limitations, EnvisionIT shows promise as a viable intervention that emphasizes college and career readiness and literacy skills delivered in a blended learning environment. Future research studies should prioritize these areas in order to more rigorously test the efficacy of the curriculum.

References

Every Student Succeeds Act (ESSA), S. 1177 § 1000 *et seq.*

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Table 1

Alignment of Every Student Succeeds Act (ESSA) to EnvisionIT Curriculum

Every Student Succeeds Act (ESSA) 21 U.S.C. 812(c)	EnvisionIT Tools and Practices
‘‘(3) DIGITAL LEARNING.—Refers to any instructional practice that effectively uses technology to strengthen a student’s learning experience and encompasses a wide spectrum of tools and practices, including —	
‘‘(A) interactive learning resources, digital learning content […], software, or simulations, that engage students in academic content;	Delivers content via the Schoology LMS or Google Drive that teaches information and communications technology literacy skills to engage students in career research using credible Web sources and databases
‘‘(B) access to online databases and other primary source documents;	Teaches students how to navigate educational, career and college websites
‘‘(C) the use of data and information to personalize learning and provide targeted supplementary instruction;	Facilitates age-appropriate transition assessments to personalize learning so students explore college and career options aligned with their interest, personality and learning styles
‘‘(D) online and computer-based assessments;	Students complete online age-appropriate transition assessments, such as the VARK Learning Questionnaire, O*NET Interest Profiler, and unit quizzes
‘‘(E) learning environments that allow for rich collaboration and communication;	Students participate in group discussions, adult support and peer review activities, and blogs to share results of age-appropriate transition assessments and career research
‘‘(F) hybrid or blended learning, which occurs under direct instructor supervision […] through online delivery of instruction with some element of student control […]; and	Students work independently to read content and complete activities and assignments, resulting in a comprehensive Transition Portfolio
‘‘(G) access to online course opportunities for students in rural or remote areas.	Implemented in rural school districts with Internet access; students can access digital curricula at school, home, library – wherever student can access the Internet
‘‘SEC. 4102. DEFINITIONS.	
‘‘(1) BLENDED LEARNING.—Refers to a formal education program that leverages both technology-based and face-to-face instructional approaches —	
‘‘(A) that include an element of online or digital learning, combined with supervised learning time, and student-led learning, in which the elements are connected to provide an integrated learning experience; and	Teaches students to navigate career based websites based on age-appropriate transition assessments Students work independently on activities after content is delivered by either a teacher or independently by students
‘‘(B) in which students are provided some control over time, path, pace.	Students work independently to read content and complete activities and assignments, resulting in a comprehensive Transition Portfolio

Table 2. Sample Characteristics

	Intervention	Comparison
Number of Teachers	11	7
Number of Students	223	115
No Documented Disability	40%	48%
On IEP	57%	48%
On 504 plan	3%	4%
Disability Categories		
Learning Disability	27%	24%
Autism Spectrum Disorder	10%	4%
Attention Deficit/Hyperactivity Disorder	8%	2%
Chronic Health Condition	8%	12%
Psychological Psychiatric Disorder	4%	4%
Intellectual Disability	< 1%	2%

Table 3

Fixed Effects Estimates (Top) and Variance-Covariance Estimates (Bottom) for Final Model of the Effectiveness of EnvisionIT on aimsweb8

Parameter	Final Model	$r_{equivalent}$
	Fixed Effects	pr
Intercept	-3.40 (1.43)	0.55
Level 1		
(Student Specific)		
Year Long	-0.99 (1.96)	0.03
Lunch	0.88 (0.83)	0.06
10th Grade	1.45 (1.76)	0.05
11th Grade	3.88* (1.64)	0.14
12th Grade	3.11 (2.19)	0.08
Level 2		
(Teacher)		
EnvisionIT	3.11* (1.31)	0.55
	Random Parameters	
Level 2		
Intercept ($\tau 00$)	2.86 (1.86)	0.39
Level 1		
Intercept (σ^2)	39.13 (3.36)	0.57
-2*log likelihood	1852.2	