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Editors and Editorial Board

Letter from the Editor

Kathleen J. Tate, Ph.D.

Welcome to the Fall 2017/Winter 2018 issue of *Internet Learning Journal!* Within, you will find book and media reviews, perspectives from the field, and research and theoretical articles. A focus on students is prevalent in this issue, which includes pieces about student persistence and achievement, and student experiences by way of apps, open educational resources (OERs), typography, and portfolios.

Dr. Erik Bean's book review provides an overview of the Kinder and Articulate (2015) electronic text, *Typography to Improve Your E-Learning.* Dr. Bean discusses the book's points about the proper use of fonts, colors, size, and positioning in E-learning environments in order to prompt more student connectedness and engagement. He highlights the authors' emphasis on creating a successful visual course environment based on typography decisions.

In her media review, Cali Morrison describes a better ePortfolio and related platform, Portfolium, for students to use within and beyond university walls. Morrison shares both student and employer benefits as well as challenges of using a *learner demonstration network*, which helps to reduce the *demonstration gap*.

In the From the Field section, Dr. Robbie K. Melton, Emerging Technology Consultant for Tennessee Board of Regents (40 campuses) and Professor at Tennessee State University, is featured in *3 Questions for an Online Learning Leader*. Dr. Melton is an *Appologist*, which is a title she coined in regard to the curation and evaluation of mobile apps for education and workforce programs for teaching, learning, and more. Robbie shares her favorite apps for students and instructors as well as general considerations related to technologies for higher education contexts.

Research and practical articles in this issue focus on student persistence, student achievement, and OERs. Drs. Robinson, Kil, and Milliron analyzed Civitas Learning datasets on students to examine the impact of course modality (i.e. face-to-face, online, hybrid) on persistence rates. They use multiple datasets and predictive models from educational analytics company, Civitas Learning, across a number of higher education institutions to explore potential contributing factors.

Dr. Tiffany DePriter seeks to understand the nature of the relation between term length and student achievement in an online college algebra class. Dr. DePriter performed a Mann–Whitney *U*-test with a sample of 812 students from both 8-week and 16-week online college algebra classes. The implications of her findings suggest that accelerated term lengths in mathematics are a viable choice for online students.

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Finally, Drs. Brannum and Drumhiller share challenges, benefits, and lessons learned after transitioning from textbooks to OERs in *all* of their international relations and intelligence studies courses at an online university. They provide insights about working with multiple departments, addressing faculty resistance, planning ahead, selecting appropriate materials, and budgeting resources. They delineate five key steps for successful OER transition and explain equity issues, cost reductions, and enhancing students' experiences and information literacy development.

This issue provides a wide range of approaches, tools, and research for university constituents to consider. Articles capture research, theory, and experience from the field. As always, I hope you extract discussion points that you can share with your own students, colleagues, or supervisors to prompt new directions in discourse, research, and practice.

Enjoy!

Dr. Kathleen J. Tate,

Editor-in-Chief of Internet Learning Journal

Reference

Kinder, H., & Articulate. (2015). *Typography to improve your E-Learning*. Retrieved from http://www.helokinder.com/Typography_E-Book.pdf

Better Together: How Blending Course Modalities Impacts Student Persistence

Robert Robinson, David Kil, and Mark Milliron, *Civitas Learning*

Abstract

Recent research has indicated that students who mix course modalities have higher persistence rates than students who take all of their courses online or who take all of their courses in the classroom. This paper probes those findings using the Civitas Learning data set, and corroborates those findings. Additionally, using the predictive modeling platform, it explores some specific data features and values to show that students who blend their curriculum also tend to have a higher course load per term and enroll earlier than other students. Some simple comparisons are shown, and further research is suggested.

Keywords: *Civitas Learning, student persistence, predictive modeling platform*

Mejor Juntos: cómo las modalidades mezcladas de clases impactan la persistencia estudiantil

Resumen

La investigación reciente ha indicado que los estudiantes que mezclan modalidades de clase tienen mayores porcentajes de persistencia que los estudiantes que toman todas las clases en línea o que toman todas sus clases de forma presencial. Este documento examina esos hallazgos utilizando el set de datos de Civitas Learning y corrobora estos hallazgos. Adicionalmente, utilizamos la plataforma de modelos predictivos, esta explora algunas características específicas de los datos y valores para mostrar que los estudiantes que varían su currículum también tienden a tener más clases por término y se registran antes que otros estudiantes. Algunas comparaciones simples se muestran y se sugiere investigación futura.

Palabras clave: *Civitas Learning, persistencia estudiantil, plataforma de modelos predictivos*

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双管齐下：混合课程模式如何促进学生的持久力

摘要

最近研究表明，通过线上线下混合课程模式学习的学生比仅靠网络学习或课堂学习课程的学生更有持久力。本文运用Civitas Learning数据集对这些发现进行了探讨和验证。此外，本文通过预测建模平台探索了一些特定的数据特征和数值，从而表明与其他学生相比，学习混合课程的学生每学期的课程负荷更高，入学时间也更早。本文简要地进行了对比分析，并提出了进一步研究内容。

关键词：Civitas Learning，学生的持久力，预测建模平台

The majority of institutions of higher education in the USA now offer at least some credit-bearing courses online (Allen, Seaman, Poulin, & Strout, 2016). While the generally perceived quality of online courses is now on par with that of on-ground courses, online students continue to lag in terms of overall retention and completion when compared to on-ground students (Shea & Bidjerano, 2014). Additionally, many reports are highlighting that fully online students fare poorly in their academic pursuits (Bettinger & Loeb, 2017). But what about students who take both online and on-ground courses? Are they at elevated retention and completion risk due to the inclusion of online courses in their curriculum? Do online course, in and of themselves, place student at risk of dropping out?

Review of Relevant Literature

Assumptions and literature about online students having worse outcomes than on-ground students abound, yet studies show seemingly conflicting findings—the individual course outcomes are comparable between online and on-ground, but students with a fully online curriculum tend to persist and graduate at a lower rate than on-ground students. Many of the analyses comparing the outcomes of different learning modalities have been focused either on course-level outcomes or on complete program modality, e.g. fully online or fully classroom based. A recent study from the Brookings Institute (Bettinger & Loeb, 2017), for example, concludes that for the most at-risk students, taking online courses hinders their academic success and progress.

Many findings show that specific course outcomes are on par with those

of similar on-ground courses. Notably, most of these studies tend to be small-N, non-reproducible assessments, the largest collection of which can be found at the *No Significant Difference* website (http://www.nosignificantdifference.org/). A more recent meta-analysis by the Ithaka S+R group (Wu, 2015) confirms both the lack of methodological rigor and the finding of no significant difference in student outcomes between online and on-ground courses. Perhaps the most referenced meta-analysis in recent years was produced by the U.S. Department of Education in 2010 (Means, Toyama, Murphy, Bakia, & Jones, 2010), in which they found that "blended and purely online learning conditions implemented within a single study generally result in similar student learning outcomes. When a study contrasts blended and purely online conditions, student learning is usually comparable across the two conditions" (p. xvi). The general finding of this meta-analysis is that blended and online learning outcomes are comparable to classroom instructions, yet where statistically significant differences do exist between modalities, blended learning tends to produce superior outcomes.

When discussing blended or hybrid learning, it is important to understand the terminology being used. There have been multiple definitions put forth to capture the terms *blended courses* or *hybrid courses*, with the majority of those definitions predicated on the amount of classroom seat-time that is replaced with online instruction. For example, the State of Texas adopted a reporting definition which states, "A hybrid/blended course is a course in which a majority (at least 50 percent but less than 85 percent) of the planned instruction occurs when the students and instructor(s) are not in the same place" (THECB, 2017). This operational definition is similar to others in use.

Blending or hybrid curricula can have multiple meanings, however. Moving beyond the concept of a blended course, we move to the idea of a blended curriculum. Kim (2007) offers a general definition, "A blended curriculum is a set of courses, where some of the courses are blended, some are purely e-learning courses, and others are purely traditional courses" (p. 4). The implication is that this curriculum has been blended by purpose or design and formally offered to the students. However, much of the emerging practice at institutions is *informal blending* of a curriculum. Bloemer and Swan (2013) inform us that informal blending is the phenomenon where "students [are] mixing on-ground and online courses to complete post-secondary programs" (p. 52). The growth of students mixing modality can be seen via the Civitas Learning data set across 72 different institutions and institutional types representing over 1.5 million students: fully 25% of those students have mixed modalities.

Recognition of the existence of informal blending has emerged relatively recently, and as such there has not been a significant amount of research published on the impact of informal blending on student progression, retention, or completion. A few notable recent papers highlight some of the ear-

ly findings. Swan and Bloemer (2013) discuss the growth of informal blending at a single institution and use descriptive statistics to assess its efficacy. Their research showed a positive correlation between blending curriculum and higher average course loads as well as early completion for some groups of students. They also showed that, for students who seem to prefer on-ground instruction, successful outcomes were lower when they blended.

A much deeper analysis was recently published in the journal *Online Learning*. Using the Predictive Analytics Reporting (PAR) data set consisting of 656,000 student records, James, Swan, and Daston (2016) were able to use logistic regression to assess the odds ratio of first-to-second year retention by institution type while controlling for a specific set of confounding variables for students who were (a) fully online; (b) fully on-ground; and (c) blended. The results clearly and consistently indicated that blending curriculum is correlated with higher overall retention rates than for fully on-ground or fully online curricula. The effect was more pronounced for students in community colleges. Little difference was seen between all on-ground student and all-online students.

Methodology

The work of James, Swan, and Daston provides an intriguing opportunity to verify those results using a different data set and different research method and to further explore some potential contributing factors. This study uses the multiple data sets and predictive models in production from the company Civitas Learning across a number of different institutions of higher education. The institutions that have deployed their predictive analytics infrastructure range across all sectors of U.S. higher education to include large R1 institutions, access-oriented 4-year universities, community colleges, private liberal arts institutions, as well as proprietary institutions. Ranging from enrollments of 2,500 to well over 80,000, these schools represent a good mix of urban and rural and have a variety of technical systems (i.e. student information systems (SISs) and learning management systems (LMS)). The online enrollments at these institutions also vary widely, with some being 100% online and some essentially offering no online courses. Within this mix of institutions, we are able to find a set of institutions that represent 4-year, 2-year, and proprietary sectors and which had significant populations of students who are taking courses exclusively on-ground, exclusively online, and who mix modalities.

The Civitas Learning predictive analytics process ingests large data sets from the SIS and from the LMS at each institution, which are federated, segmented, and clustered. This transformed data set is then used to produce a set of predictive models that have been shown to be highly accurate for predicting any given student's likelihood to persist. Persistence here is defined as re-enrolling in the next term or successfully completing their program of study at their enrolled institution in

the term being studied. Since the data are specific by institution and de-identified, we cannot track students who transfer to another institution prior to completing their credential.

The native SIS and LMS data, once ingested and federated, are then used to create an additional set of derived variables. Each of these variables, often well over 1,000, is then assessed for predictiveness via combinatorial feature optimization. The output of that process determines which features remain in the predictive models (Kil & Shin, 1996). The models thus built using the specific and unique set of institutional data create an analytics infrastructure which is then used to understand specific factors—in combination—and how those factors predict student persistence. Understanding both historical and predicted persistence rates by population sub-grouping creates the opportunity for pursuing specific research questions. It also creates the infrastructure on which to initiate direct student outreach, nudges, campaigns, policy or curriculum adjustments, with the goal of increasing student success. This process is repeated for each institution using the Civitas Learning product suite from the ground up, such that each institution's models are uniquely based on their data sources, data breadth, institutional mission, mix of students, available resources, and policies. A thorough explanation of this process can be found in Milliron, Malcom, and Kil (2014), and in McIntosh and Robinson (2016). With well over seven million enrolled students and over 20 million student records across the deployed set of Civitas Learning institutions, representing all sectors of U.S. higher education, we are able to use this platform as a research opportunity.

This study investigates the differences in persistence rates for students across three different course-taking behaviors: all classroom instruction (i.e. on-ground), all online instruction, and students who mix on-ground and online courses. These three student populations are examined across a set of institutions, and their historical persistence rates and top data features and feature values are compared. The set of institutions reviewed include four selective 4-year institutions, four access-oriented community colleges, and three proprietary primarily online institutions. This set of institutions was selected for their likelihood to have statistically significant numbers of students representing each of the three modalities of interest. For the primarily online institutions included in this study, on-ground courses were also offered and the number of students blending their curriculum was significant. The analysis conducted examines individual institutions' populations by course-taking behavior to understand correlations between those behaviors and the predicted persistence risk. Those individual institutions' persistence correlations are then compared among the set of institutions to highlight if the general findings hold across different student populations—understanding that fully online students may look very different than fully on-ground students at different colleges and universities.

Notably, the difference in the set of institutions examined is important, and is representative of the breadth of institutional types and settings in the U.S. Some of these are large urban, some are rural, some are multi-campus, and some are individual campus organizations. By examining historical persistence outcomes and data feature variance within individual institutions rather than across institutions, the differences in likely success rates between selective institutions and access-oriented institutions are eliminated.

Data Sources

Details on the institutions included in this study, including their overall student data count and historical overall undergraduate persistence rate, are shown in Table 1. The set of historical terms for each institution aligns with the 2016 calendar year and the semesters or quarters that would be so included. The overall undergraduate historical persistence rates range from 62.5% for one of the 2-year institutions to a high of 95.8% for one of

Table 1: Institution Detail

	Descriptor	Study N	Historical Persistence Rate
4-YEAR INSTITUTIONS	A	57,425	88.80%
	B	93,211	85.70%
	C	125,988	95.80%
	D	16,607	86.90%
	Descriptor	**Study N**	**Historical Persistence Rate**
2-YEAR INSTITUTIONS	A	82,000	62.5%
	B	48,812	64.9%
	C	17,908	67.9%
	D	77,455	74.3%
	Descriptor	**Study N**	**Historical Persistence Rate**
PROPRIETARY INSTITUTIONS	A	48,000	89.7%
	B	127,979	83.4%
	C	92,000	78.3%
TOTAL	11	787,385	

the selective 4-year institutions. The full set of student records included in this analysis is over 780,000 and represents only undergraduate data.

Findings

Echoing the base conclusions in James et al. (2016), our analysis across historical persistence rates by student course-taking populations and by institution reveals that students who blend on-ground and online courses within terms have a consistently higher persistence rate than students who take all on-ground or all online courses. The group with the lowest historical persistence rate are those taking all courses online. Students taking all of their courses in the classroom fare better than all online students. Blending course modalities is correlated with a higher overall persistence rate across all institutional types.

In the charts below, each of the institutions indicated by Label (i.e. A, B, C, etc.) and by institution type are broken out by the three modalities examined: all online, all on-ground, and mixed or blended. The average historical persistence rates are highest for the 4-year institutions (average of 89.3%), followed by the proprietary institutions (average of 83.8%) and then the 2-year, access-oriented institutions (67.4%). For each institution shown by type, there are three bars, each representing the course-taking modality. The historical persistence rate is indicated, and for ease of understanding, the *mixed or blended* bar is colored green.

Chart 1: Persistence Rates by Institution and Modality, 4-Year

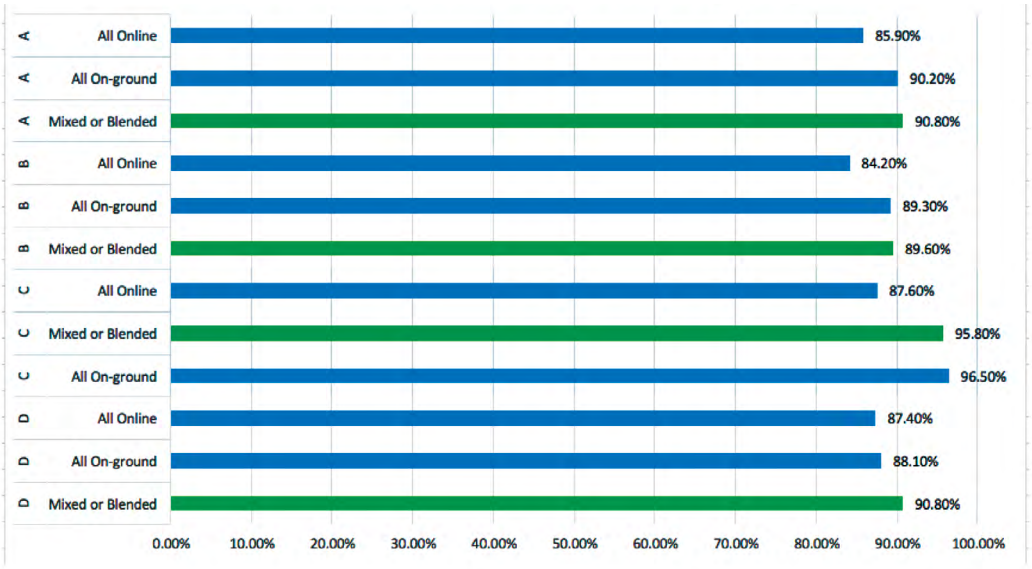


Chart 2: Persistence Rates by Institution and Modality, 2-Year

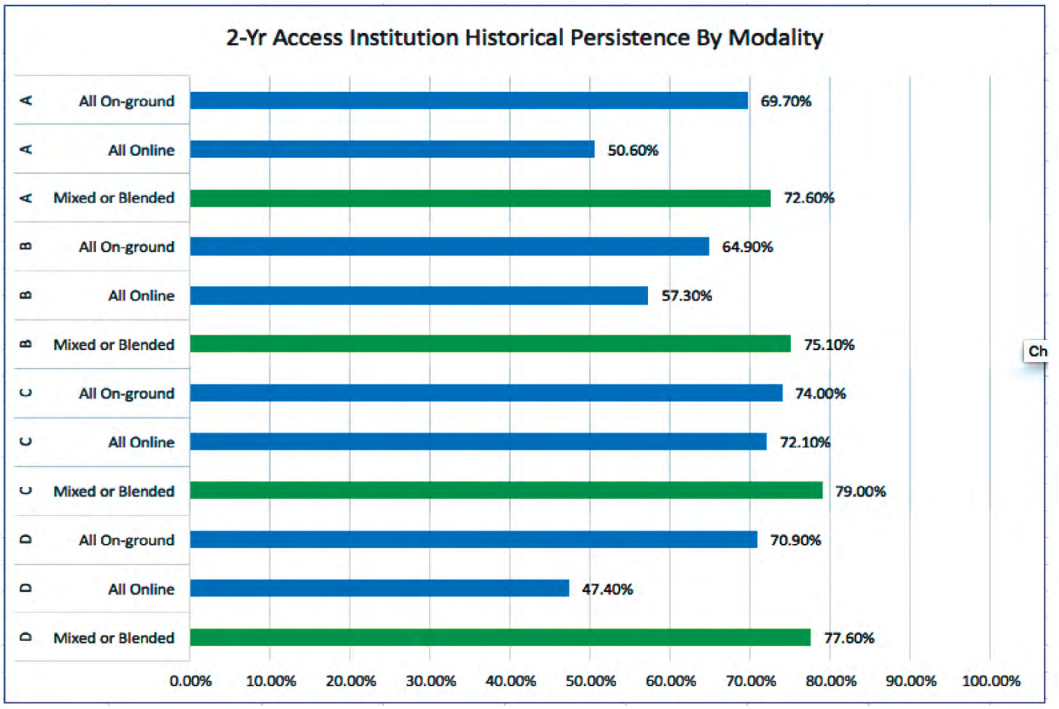
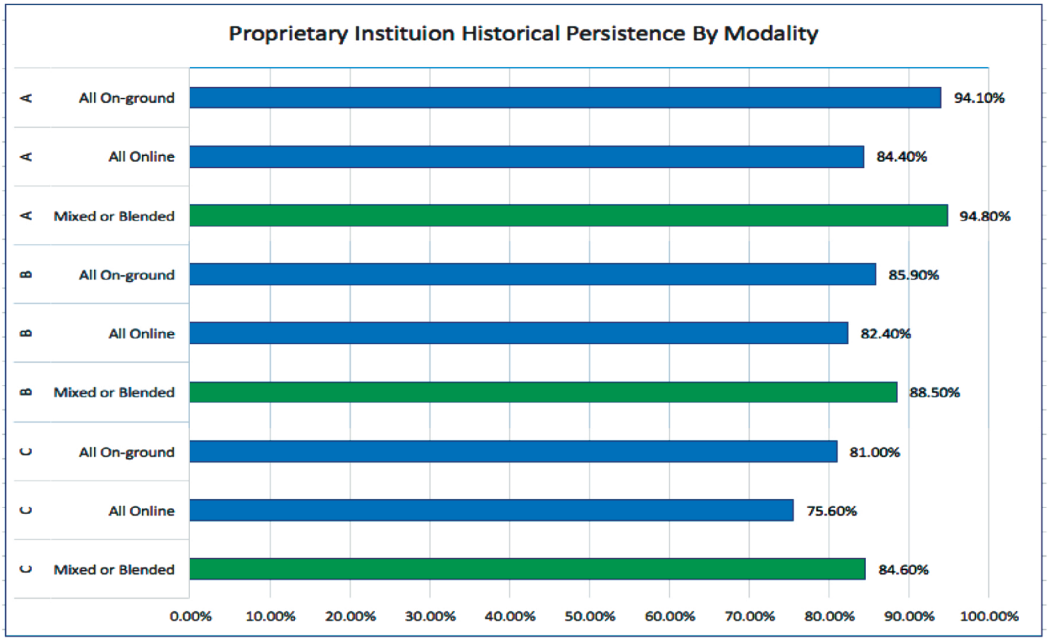


Chart 3: Persistence Rates by Institution and Modality, Proprietary



It is striking how consistent these findings are, showing clearly first, that online courses—in and of themselves—do not have a negative impact on student persistence. Second, while students who take all of their courses online show the lowest historical persistence rate, those who are mixing modalities show superior persistence rates than either fully online or fully on-ground. The differences between groups are quite interesting as well:

- For 4-Year institutions, students who blend showed:
  - 5.65% higher average persistence than online students
  - 1.08% higher average persistence than on-ground students
- For 2-Year institutions, students who blend showed:
  - 19.23% higher average persistence than online students
  - 6.2% higher average persistence than on-ground students
- For the Proprietary institutions, students who blend showed:
  - 9.7% higher average persistence than online students
  - 2.3% higher average persistence than on-ground students

The pattern is clear within the set of studied institutions—blending students persist at a far higher rate than fully online students and have modestly higher persistence rates than fully on-ground students.

This begs the question of why this is so. In order to move beyond persistence outcomes by course-taking patterns and begin to investigate the characteristics of these different student groups, we can further leverage the Civitas Learning predictive modeling platform to identify the particular mix of data variables for each student course-taking population.

The most predictive of the several hundred data elements in the specific models for each institution can be surfaced. These variables, both raw and derived, represent different aspects of the student's data record: some are demographic variables, some are enrollment patterns such as how close to the start of the term did the student enroll, financial aid, etc. Comparing these variable types—and their predictive rank—can improve our insight into differences between course-taking populations. By way of illustration, Table 2 shows the top-ranked data features for one of the study institutions, looking across three different course-taking populations. As can be seen, while there is some variability in the set of features, most of the difference comes via their ranked position in the list. For example, *Change in GPA* is fourth on the list for the on-ground population, but does not appear in the list for the other two groups. Yet, *Age* is on all three lists, but in varying positions.

Table 2: Sample Data Feature List, by Modality

On-Ground	
Predictor	**Type**
Average Number of Days Enrolled Before Start (Current Term)	Enrollment
GPA (Prior Term)	Enrollment
High School GPA	High School
Change in GPA	Enrollment
Age	Demographic
Average Count of Discrete Days of Any LMS Activity	LMS data features
Average Count of LMS Course Material Activities	LMS data features
Average Count of LMS Discussion Board Activities	LMS data features
Average Count of LMS Gradebook Activities	LMS data features
Average Credits Attempted (Cumulative)	Enrollment
Average Disbursed Financial Aid Per Term (Cumulative)	Financial Aid
Average Grade (Per Day)	LMS data features
Avg Credits Attempted Per Term (Prior Year)	Enrollment
Avg Credits Earned Per Term (Cumulative)	Enrollment

Online	
Predictor	**Type**
GPA (Prior Term)	Enrollment
Average Number of Days Enrolled Before Start (Current Term)	Enrollment
Degree Program Alignment Score (Cumulative)	Student Plan
Age	Demographic
Average Count of Discrete Days of Any LMS Activity	LMS data features
Average Count of LMS Course Material Activities	LMS data features
Average Count of LMS Discussion Board Activities	LMS data features
Average Count of LMS Gradebook Activities	LMS data features
Average Credits Attempted (Cumulative)	Enrollment
Average Disbursed Financial Aid Per Term (Cumulative)	Financial Aid
Average Grade (Per Day)	LMS data features
Avg Credits Attempted Per Term (Prior Year)	Enrollment
Avg Credits Earned Per Term (Cumulative)	Enrollment

Blended	
Predictor	**Type**
GPA (Cumulative)	Enrollment
Average Number of Days Enrolled Before Start (Current Term)	Enrollment
High School GPA	High School
Distance from Average in Count of Discrete Days of Any LMS Activity	LMS data features
Credits Attempted (Current Term)	Enrollment
Age	Demographic

Looking at the set of data features across populations is a simplistic but useful first step in understanding the differences between them.

Within the rank-ordered list of data features for each population at each institution, we can also search for any significant differences in feature values. In Table 3, four specific data features are compared across three different course-taking populations. For two 4-year, two 2-year, and one proprietary institution, we first compare students who are blending their course modality first with students who take all courses on-ground, we then compare students who are blending to students who take all online courses. The set of data features examined are *Average Credits Attempted (Cumulative), Average Number of Days Enrolled Before Start (Current Term)*, *Age*, and *GPA (Cumulative)*. They represent academic, behavioral, and demographic characteristics. For each population comparison, *Blended* is set as the baseline group, and either *Online* or *On-ground* is established as the comparator group. Feature values are shown for each group. The last column displays the *Normalized Difference* value which is difference between the two population means, divided by the pooled standard deviation.

What can be seen from the table is first, that students who blend their curricula have consistently higher credit hour loads than either fully on-ground or fully online students. This is seen across all the institutions examined, and holds even for the proprietary institutions where the majority of courses are offered online. The *Average Number of Days Enrolled Before Start* data feature is a measure of when the student enrolled for the term, where larger values represent perhaps a more purposeful approach to their academic career. With one exception, the blended students are enrolling earlier than the other student populations. *Age* and *Cumulative GPA* have less consistency in terms of predictiveness among the student course-taking populations, with some groups having a normalized difference above that of the *Blended* group, and some below.

Discussion

Before summarizing the findings above, we need to review the approach taken in the study. We are examining the differences between populations of students within individual institutions by course-taking modality. By looking at the delta of persistence risk among the populations on an institution-by-institution basis, rather than in aggregate, we can reduce concerns about apples to oranges comparisons. While there are certainly differences in the populations that typically take different course modalities, for example, fully online students tend to be older than fully on-ground students, this approach accounts for differences in students that are attending a public 4-year institution when compared to a proprietary institution.

Table 3: Data Feature Values and Comparisons

4 YEAR B	FEATURE NAME	BLENDED	ONGROUND	NORMALIZED DIFFERENCE
BLENDED vs ONGROUND	Average Credits Attempted (Cumulative)	10.99	10.75	0.06
	Average Number of Days Enrolled Before Start (Current Term)	55.49	50.97	0.13
	Age	25.02	24.46	0.09
	GPA (Cumulative)	2.88	2.9	-0.04
	FEATURE NAME	BLENDED	ONLINE	NORMALIZED DIFFERENCE
BLENDED vs ONLINE	Average Credits Attempted (Cumulative)	10.99	5.72	1.53
	Average Number of Days Enrolled Before Start (Current Term)	55.49	40.64	0.39
	Age	25.02	37.05	-1.34
	GPA (Cumulative)	2.88	3.36	-0.75
4 YEAR C	FEATURE NAME	BLENDED	ONGROUND	NORMALIZED DIFFERENCE
BLENDED vs ONGROUND	Average Credits Attempted (Cumulative)	14.36	14.01	0.17
	Average Number of Days Enrolled Before Start (Current Term)	42.21	46.68	-0.13
	Age	22.09	22.25	-0.03
	GPA (Cumulative)	3.19	3.25	-0.11
	FEATURE NAME	BLENDED	ONLINE	NORMALIZED DIFFERENCE
BLENDED vs ONLINE	Average Credits Attempted (Cumulative)	14.36	10.98	1.68
	Average Number of Days Enrolled Before Start (Current Term)	42.21	28.58	0.44
	Age	22.09	31.47	-1.73
	GPA (Cumulative)	3.19	3.24	-0.08
2 YEAR A	FEATURE NAME	BLENDED	ONGROUND	NORMALIZED DIFFERENCE
BLENDED vs ONGROUND	Average Credits Attempted (Cumulative)	8.48	7.11	0.45
	Average Number of Days Enrolled Before Start (Current Term)	43.95	46.62	-0.08
	Age	25.42	23.2	0.28
	GPA (Cumulative)	2.84	2.81	0.04

When examining the findings, we first see that students who choose to blend their curriculum—mix both online and on-ground courses within a term—have a higher historical persistence rate than those students who take all of their courses in the classroom or all online. This effect holds across different types and sizes of institutions. This leads us to the question of why this might be so—why are students who blend their curriculum persisting at a

	FEATURE NAME	BLENDED	ONLINE	NORMALIZED DIFFERENCE
BLENDED vs ONLINE	Average Credits Attempted (Cumulative)	8.48	6.42	0.7
	Average Number of Days Enrolled Before Start (Current Term)	43.95	38.05	0.18
	Age	25.42	27.71	-0.27
	GPA (Cumulative)	2.84	2.84	0
2 YEAR D	FEATURE NAME	BLENDED	ONGROUND	NORMALIZED DIFFERENCE
BLENDED vs ONGROUND	Average Credits Attempted (Cumulative)	7.16	6.11	0.34
	Average Number of Days Enrolled Before Start (Current Term)	48.51	40.32	0.26
	Age	28.31	26.66	0.16
	GPA (Cumulative)	3.02	2.98	0.05
	FEATURE NAME	BLENDED	ONLINE	NORMALIZED DIFFERENCE
BLENDED vs ONLINE	Average Credits Attempted (Cumulative)	7.16	6.03	0.41
	Average Number of Days Enrolled Before Start (Current Term)	48.51	45.96	0.18
	Age	28.31	32.37	-0.39
	GPA (Cumulative)	3.02	3.05	-0.04
PROPRIETARY C	FEATURE NAME	BLENDED	ONGROUND	NORMALIZED DIFFERENCE
BLENDED vs ONGROUND	Average Credits Attempted (Cumulative)	10.47	7.94	0.95
	Average Number of Days Enrolled Before Start (Current Term)	54.43	58.56	-0.1
	Age	37.06	37.93	-0.08
	GPA (Cumulative)	3	3.07	-0.09
	FEATURE NAME	BLENDED	ONLINE	NORMALIZED DIFFERENCE
BLENDED vs ONLINE	Average Credits Attempted (Cumulative)	10.47	7.88	1.11
	Average Number of Days Enrolled Before Start (Current Term)	54.43	52.16	0.05
	Age	37.06	35.5	0.16
	GPA (Cumulative)	3	2.94	0.06

higher rate than other course-taking patterns?

Examining the most predictive of the several hundred data features for each population within each institution did not show significant variance across the rank-ordered lists. This is not unexpected and lack of significant variation in the feature set primarily indicates that it is not the particular data features, but rather the values of those features,

that are distinguishing the student populations persistence from one another. This led us to compare some of the most common data feature values shown in Table 2.

The finding that modality-blending students consistently have larger credit hour loads, and enroll a bit earlier than other groups may be important indicators pointing us in the direction of addressing the *why* question. One hypothesis is that students who blend modalities tend to be those who are strategic and planful in their academic career, where taking advantage of online offerings helps them get the courses they need when they need them, or work around scheduling conflicts due to the asynchronous nature of most online courses. The question then arises as to whether what we are seeing is simply an attribute of good students taking advantage of online course offerings or whether the availability of online courses could potentially help more marginal students improve their persistence, credit loads, or enrollment behaviors.

Based on these findings, a clear area for further research is to investigate if the results shown hold for students across a range of prediction scores. In other words, do students who are predicted to have a lower likelihood of persistence also benefit from taking a blended set of courses, or is this an effect isolated to high-performing students? It is possible to match on prediction scores to build that analysis, and that may be a fertile ground for future exploration.

Another research area is to perform causal impact analysis with modality as the treatment variable to understand what types of students benefit from different modality options for more personalized learning by holding the rest of the success factors and prediction scores identical between students of different modalities. Future work includes examining social psychological factors to isolate and disambiguate the effects of financial aid, academic factors, and non-academic factors on student success as a function of modality.

Moving beyond the somewhat simplistic findings above, it is possible to go deeper by examining the populations not only by course modality, but then comparing those by persistence scores. In other words, looking at the differences between students taking fully on-ground, fully-online, and blended curriculums for the lowest quartile of persistence predictions, then the next quartile and so on. In pilot analyses conducted by the data scientists at Civitas Learning, they have confirmed the trends detailed in this paper, but the persistence gaps are smaller, which is to be expected.

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Dr. Robert Robinson is a Senior Solutions Consultant at Civitas Learning. Prior, Rob was a Principal Strategist at Blackboard, an Assistant Vice Provost for Educational Technology at the University of Texas at San Antonio, and a key leader with the University of Texas TeleCampus. Rob holds a B.S. and a Ph.D. from the University of Texas at Austin and an MBA from St. Edward's University. His areas of expertise include online education, analytics maturity assessments, resource allocation, and public speaking.

David Kil is currently the Chief Data Scientist at Civitas Learning. Prior to Civitas Learning, he was the Chief Science Officer at Humana and SKT Americas, building both enterprise and consumer health applications leveraging big data, social network, and networked sensors. That work led to a 3-year NIH grant on building social networks to help spread good health behaviors. His research interests encompass all aspects of data processing, machine learning, complex event processing, nudging, behavior science, and multi-level impact analysis. He has published over 40 papers in various journals and conferences, as well as a book entitled (with Frances Shin) *Pattern Recognition and Prediction with Applications to Signal Characterization* by Springer-Verlag. He holds 14 U.S. and international patents and is active as a reviewer for journals and grant agencies. He received a B.S.E.E. and Chemistry from the University of Illinois at Urbana-Champaign (Highest Honor); M.S.E.E. from NYU; and M.B.A. from Arizona State University.

Dr. Mark Milliron is the Co-Founder and Chief Learning Officer at Civitas Learning. He has worked with universities, community colleges, K-12 schools, foundations, corporations, associations, and government agencies across the country and around the world. In previous roles, Mark served as the Deputy Director for Postsecondary Improvement with the Bill & Melinda Gates Foundation; the founding Chancellor of WGU Texas; Endowed Fellow and Director of the National Institute of Staff and Organizational Development at The University of Texas at Austin; Vice President for Education and Medical Practice with SAS; and President and CEO of the League for Innovation in the Community College.

The Effect of Term Length on Student Achievement in Online College Algebra

Tiffany N. DePriter, Ed.D., *American Public University System*

Abstract

Accelerated term lengths are becoming increasingly popular among online colleges. Students can now complete a college course in as little as 4 weeks. Accelerated term lengths can be attractive to students, but it is important to determine the effect of term length on student achievement. This study, grounded in the adult learning theories of andragogy, self-directed learning, and transformational learning, sought to understand the nature of the relation between term length and student achievement in an online college algebra class. A Mann–Whitney *U*-test was performed with a sample of 812 students from the researcher's 8-week and 16-week online college algebra classes. Findings indicated no statistically significant difference in achievement, as measured by the course final exam, between the two groups. This suggests that accelerated term lengths in mathematics are a viable choice for online students.

Keywords: *term length, online learning, mathematics, college algebra*

El efecto de la duración de términos en el éxito estudiantil en clases de álgebra por internet

Resumen

Las duraciones de término aceleradas están siendo cada vez más populares en las universidades en línea. Los estudiantes ahora pueden terminar una clase de universidad en tan solo cuatro semanas. Los términos acelerados pueden ser atractivos para los estudiantes, pero es importante determinar el efecto de la duración de los términos para el éxito estudiantil. Este estudio, basado en las teorías de aprendizaje de adultos (andragogía, aprendizaje autodirigido y aprendizaje transformacional) buscó comprender la naturaleza de la relación entre la duración de los términos y el éxito estudiantil en una clase de álgebra por internet. Una prueba U de Mann-Whitney

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fue llevada a cabo con una muestra de 812 estudiantes de las clases de álgebra en internet de la investigadora en periodos de 8 semanas y 16 semanas. Los hallazgos indicaron que no hay una diferencia estadísticamente significativa de éxito entre los dos grupos, como fue medido a través del examen final de la clase. Esto sugiere que los términos acelerados en matemáticas son una elección válida para los que estudian por internet.

***Palabras clave**: duración de términos, aprendizaje por internet, matemáticas, álgebra de universidad*

学期长短对在线大学代数课程学生成绩的影响 美国公立大学系统

摘要

缩短学期在在线高校教育中变得越来越受欢迎。现在学生只需4周就可以完成大学课程。缩短学期对学生很有吸引力，但明确学期长短对学生成绩的影响非常重要。本研究以成人学习理论、自我导向学习理论和转型学习理论为基础，寻求了解在线大学代数课程学期长短与学生成绩关系的本质。该研究对由812个学生组成的样本进行了曼-惠特尼秩和检验(Mann－Whitney *U*-test)。这些学生来自研究人员所在的在线大学，分为两组参与了为期8周和16周的代数课程。结果显示，两组学生期末考试成绩数据并无显著差异。这表明从数学分析，缩短学期对在线学生而言是一个可行选择。
关键词：学期，在线学习，数学，大学代数

关键词：学期，在线学习，数学，大学代数

There is a trend among online higher learning institutions toward accelerated courses (Collins, Hay, & Heiner, 2013; Rodrigue, Fanguy, Soule, & Kleen, 2016). With courses commonly offered over 11, 8, or even 4 weeks, earning a degree can now be done in a fraction of the time. While this might have great appeal for students, how does it affect their achievement? More specifically, what is the impact of term length on student achievement in online college-level mathematics?

This study sought to determine if students who complete a 16-week online college algebra course have different levels of achievement than students who complete an equivalent 8-week online college algebra course. Final exam scores from students taking college algebra at a large online university were analyzed to compare achievement levels as they relate to term length. Descriptive statistics were generated, and a Mann–Whitney *U*-test was used to compare the final exam scores for the two groups.

For many undergraduate degree programs, three credit hours in mathematics are required for graduation, yet students often struggle to meet this prerequisite. It is not uncommon for students to wait until the end of their degree program to complete the mathematics requirements. Mathematics can become the gateway to graduation; therefore, is important to determine how best to meet students' needs. If there is a significant difference in achievement levels by term length, then further research can be conducted to identify other factors that impact achievement and proactively help students determine the best path toward success.

Literature Review

It stands to reason that an understanding of mathematics stems from sufficient time to learn the material and opportunities for practice, among other factors (Vilardi & Rice, 2014). In the case of mathematics that is learned online, there is an extra layer of consideration, such as strong time management skills (Bonk, Lee, Kou, Xu, & Sheu, 2015). In addition, Mensch (2013, 2015) notes the important role of student learning style in the online classroom and recommends that developers of online mathematics classes incorporate content that supports multiple learning styles. It should be noted, however, that some researchers disagree with the effectiveness of instruction that is based on learning styles. In a review of multiple such studies, Cuevas (2015) found that learning styles-based instruction is commonly used in practice, but does not offer specific benefits to student learning.

Research in the area of student achievement in the online mathematics class is plentiful, albeit contradictory. In a study of mathematics students, Kavitha and Sundharavadivel (2012) found that the students who were taught via online methods scored higher on an achievement post-test than the students who were taught under a traditional classroom model. Dissimilarly, Vilardi and Rice (2014) determined that online mathematics students had significantly lower achievement scores (as measured by final course grades) than students in a face-to-face setting. Furthermore, students in the face-to-face classroom had a significantly higher proportion of A grades as compared to the significantly higher proportion of F grades in the online classroom (Vilardi & Rice, 2014).

In addition to the course delivery format, other factors affect student achievement in mathematics. Kim, Park, and Cozart (2014) identified stu-

dent motivation, achievement emotions, and self-efficacy as factors that influence achievement in online mathematics courses. With the goal of determining why some students succeed in online mathematics classes while others do not, the researchers found that achievement emotions (i.e. boredom, anger, and enjoyment) were the most significant predictors of student achievement (Kim et al., 2014). The findings suggest that self-efficacy can be moderated by emotional experiences and that a focus on improving students' motivational experiences could lead to increased achievement (Kim et al., 2014).

In a similar study, Hodges and Kim (2010) used email to deliver self-regulation strategies to students and sought to determine if a relation exists between achievement and the use of self-regulation strategies or self-efficacy. Zimmerman (as cited in Hodges & Kim, 2010) lists the three components of self-regulation as behavioral, environmental, and personal. Studying college students enrolled in an asynchronous, online mathematics class, the researchers grouped the students into three categories where one group received self-regulation strategies with personalized email messages, one group received the same emailed strategies without personalization, and the third group did not receive any strategies (Hodges & Kim, 2010). The personalized email messages embedded self-regulation strategies to help students plan, set goals, and self-monitor their learning (Hodges & Kim, 2010). They found that although the email messages did not lead to a positive change in self-efficacy or self-regulation, there was a positive relation between students' self-efficacy and achievement (Hodges & Kim, 2010). Given that the course was a university requirement and not in the majors of most students, there may have been a lack of self-efficacy among the students which led to a lack of implementation of the self-regulation strategies (Hodges & Kim, 2010).

Term Length

While studies abound on topics such as learning preferences (Bonk et al., 2015), motivation (Kim et al., 2014), persistence (Kranzow, 2013), grit (Duckworth, Peterson, Matthews, & Kelly, 2007; Smilie & Smilie, 2017), and the aforementioned achievement (Hodges & Kim, 2010; Kavitha & Sundharavadivel, 2012; Vilardi & Rice, 2014) in online education, the literature on term length in the online classroom is limited (Rodrigue et al., 2016). Even more limited is the literature on the role of term length in online mathematics classes. Term length has been the subject of research in the face-to-face classroom with findings relevant to the online setting. Both Murphy (2010) and Anderson and Anderson (2012) examined the impact of accelerated terms on student achievement in quantitative-based classes. Murphy (2010) used a content-specific exam to compare the achievement of Master of Business Administration (MBA) students in 8-week and 16-week microeconomics classes and found a minimal difference in achievement between the two groups.

It was noted, however, that a student's ability to maintain an accelerated pace over time may be questionable. In a review of undergraduate students in an inferential statistics class, Anderson and Anderson (2012) found that a compressed semester with longer class meetings resulted in higher final exam scores and overall course grade point averages than students in non-accelerated inferential statistics courses. These findings indicate that an accelerated model can be successfully applied in face-to-face settings. Can the same be true of online classrooms?

The work of Diaz and Cartnal (2006), while dated, does offer a glimpse into the connection between academic term length and attrition and suggests that term length has been a significant factor in online learning for some time. Citing the literature that suggests the high dropout rates commonly seen in online education, Diaz and Cartnal (2006) offer the argument that dropout rates are not indicative of a student's lack of academic success. On the contrary, Diaz and Cartnal propose that adult learners may choose to drop a class as a strategic educational maneuver that would allow them to retake the class at a more opportune time without negatively impacting their GPA.

Recently, there has been a rise in the number of studies that address the issue of term length specifically in the online setting. Collins et al. (2013) note a paradigm shift in course development that is the result of changes in market demand. Through a mixed methods study, they sought to understand the experiences and expectations of preservice teachers completing coursework under a compressed model and found that some students take accelerated courses to complete a degree sooner and often for financial reasons (Collins et al., 2013). It was noted that many students entered accelerated courses with the expectation that the experience would be challenging, yet rewarding; however, some students preferred face-to-face instruction, but chose online learning because of family and time constraints (Collins et al., 2013).

Collins, Kang, Biniecki, and Favor (2015) also noted potential barriers to success in accelerated courses. In a study of an accelerated Master's degree program for military officers, the authors found that students who get behind in course work due to deployment, connectivity issues, or other life circumstances often struggle to catch up before the course ends (Collins et al., 2015). An accelerated program format does not work for every learner and for some military officers the pace is just too fast (Collins et al., 2015).

Rodrigue et al. (2016) studied student perceptions of term length in online business classes. The researchers' university offered both 8-week and 16-week term lengths for online courses, and faculty noted concerns not only with the practicality of teaching the same course over two different term lengths but also in the viability of teaching a quality course in just 8 weeks (Rodrigue et al., 2016). Using a five-point Likert scale, the researchers surveyed the 463 students enrolled in the

program, receiving responses from 95 students (Rodrigue et al., 2016). When asked if they preferred one term length over the other, 90% of students responded that they preferred the 8-week term or a mix of 8-week and 16-week classes (Rodrigue et al., 2016). The researchers then asked about student preferences of term length for different academic content areas (specifically reading, writing, and mathematics), finding that fewer students chose an 8-week term for mathematics than for any other content type (Rodrigue et al., 2016). This finding is tremendously important because it sheds light on how students perceive time in relation to learning mathematics. The authors suggest that students feel challenged to complete their mathematics work in a shortened term and that "students perceive that having more time to process and apply mathematical concepts is beneficial to them" (Rodrigue et al., 2016, p. 227). It should be noted, however, that it is not made clear within the paper whether the 95 survey respondents actually took an online mathematics class, or if their responses were merely how they *thought* term length would impact their studies in a mathematics class.

Mensch (2013) has produced a very interesting descriptive study of the impact of term length on grades in online number-based classes, specifically 100 and 200 level accounting and mathematics/statistics classes. In comparing 5-week and 14-week terms, Mensch (2013) found that 54.5% of students in 5-week courses had final course grades of A or B, whereas only 45.7% of students in 14-week courses had such final grades. Interestingly, it was noted that students in the 14-week classes were twice as likely to withdraw and also had higher fail rates (Mensch, 2013). When compared to non-numeric courses, students in numeric-based courses had lower grades and lower retention rates (Mensch, 2013). These findings are quite relevant to the current study in that the students are taking lower level numeric-based courses. Mensch (2013) uses descriptive statistics for a preliminary review of the course data, but does not dig deep into the findings. What factors cause students in the shorter term length to have higher achievement? Are students going into the shorter term class with the expectation that they will need to work harder since, as Collins et al. (2013) noted, students often perceive accelerated classes as being a challenge? The first step in addressing this question is to determine the nature of the relation between achievement and term length. From there, a deeper examination of relevant factors, such as those that pertain to adult learners, can be completed.

Supporting Theories

This study is grounded in the adult learning theories of andragogy, self-directed learning, and transformational learning. As noted by the American Institutes for Research (2011), these three components undergird the knowledge base that supports adult learning. To empower the adult learner, Giannoukos, Besas, Galiropoulos, and Hioctour (2015) also support a multifaceted approach through the use of andrago-

gy, social change, and transformative learning models.

Furthermore, according to Collins et al. (2013), adult learning theory underpins the success of accelerated learning programs.

Within the field of mathematics, Kleden and Adisucipto (2015) claim that students are highly dependent on teachers to identify learning goals. Given that the learning of mathematics encompasses precision, efficiency, and tenacity, Kleden and Adisucipto advocate for a self-learning approach in which students take ownership of their learning goals. The researchers recommend a metacognitive approach that supports a student's initiatives to learn.

Similarly, Rodrigues (2012) looked to the principles of andragogy to design and teach mathematics to adult learners. She believes that a student's self-concept shifts from being dependent on the teacher to becoming self-directed. To support her students as they learned mathematics, Rodrigues strove to increase their motivation through building self-esteem, lowering their math anxiety, and praising their efforts. Real-life applications of mathematics were also a foundation of the course. As a result of her students' successes, Rodrigues recommends incorporating adult learning principles into the design of similar courses.

Methodology

Since 2008, I have been teaching in the mathematics department at an online university. The university caters to adult learners, many of whom are active duty military, service professionals, or retired military members. The university hosts a comprehensive mathematics program, including a Bachelor of Science (B.S.) degree in mathematics with specializations in applied mathematics, operations research, and statistics. Even with a degree program in mathematics and degrees in other math-heavy disciplines such as engineering and astronomy, most students who enter the mathematics department at this university do so to complete their general education credits in mathematics. The vast majority of these students enroll in college algebra. Topics covered in college algebra include problem solving, basic linear equations, systems of equations, roots, and radicals. Students are presented with weekly lessons that include recorded lectures, slide shows, solved practice problems, and links to outside websites as additional resources. Students work sequentially through the lessons, participating in weekly interactive forums that require them to work through real-world problems and discuss the content as it relates to their daily lives. Connecting the course content with a student's daily life is an example of how adult learning theories, such as those noted in Rodrigues (2012), fit into the course framework. Furthermore, it is the hope that, through these activities, students will start to shift or transform their worldview of mathematics as a disconnected area of study to one that has true meaning and importance in their lives, thereby beginning the process of trans-

formational learning (American Institutes for Research, 2011).

In addition to forums, there are also weekly homework assignments and tests, all of which are completed in MyMathLab, an online educational platform, that directly aligns with the course textbook. In MyMathLab, students have the opportunity to practice problems, complete assignments, and review a variety of multimedia-based resources. The resources are specific to each section of the textbook, making it very simple for students to locate resources on a given topic. For example, if a student is struggling with how to solve a system of linear equations using the graphing method, she can easily search for this topic in MyMathLab and find videos, slide shows, and sample problems. By allowing students to seek out and choose resources that meet their needs, MyMathLab supports self-directed learning (American Institutes for Research, 2011) and offers students the opportunity to take ownership of their learning goals (Kleden & Adisucipto, 2015), which is a foundational component of adult learning theories.

Upon enrolling in the course, students have the option of either a 16-week term or an 8-week term. Both tracks are identical in the content that is covered, where the distinguishing factor is strictly that of term length. It is worthy to note that, at the time of enrollment, students self-select into one of the two course term lengths. In addition, students do not take a placement test prior to enrolling, which leads to some students being ill-prepared to tackle the course objectives and expectations. In teaching college algebra for 9 years, I wondered what differences exist between the two term lengths. Specifically, is there a difference in achievement levels between the two term lengths?

Setting and Sample

To address the research question, data were pulled from 35 past sections of my college algebra class from Summer 2011 to Winter 2014. These included 7 sections of the 16-week term, to include 121 students, and 28 sections of the 8-week term, to include 691 students. Eight-week classes are offered more frequently at the university, hence the higher distribution of shorter term classes than longer term. Of the 887 total scores for the 8-week sample, 196 (or approximately 22%) were zeros. Scores of 0 were removed from the data set before analysis for two reasons. First, a score of 0 most likely indicates that the student did not complete the final exam. Second, including the scores of 0 in the analysis would pull the mean down in the analysis, thereby resulting in a biased mean. Of the 151 total scores for the 16-week sample, 30 (or approximately 20%) were zeros. Again, scores of 0 were removed from the data set before analysis.

Basic descriptive statistics were used to learn more about the two samples. In addition, the Mann–Whitney *U*-test was used to compare the final exam scores of students in the two groups.

Test Instrument

Students complete assignments using a popular third-party online mathematical software program, MyMathLab. This program is produced by the textbook company and aligns with the course content. The software is robust and contains a very large bank of mathematical problems. For the final exam, a set of 25 problems are randomly pulled for each student. The final exam is cumulative, covering all major topics from the course. Students log into the software program and are given 2.5 h to complete the exam.

Upon completion of the final exam, the software program produces a score. While generally accurate, the scoring does benefit from additional instructor review. The software does not allow for variances in the formatting of the final answer. Even though a formatting note accompanies each problem (such as "Write the answer as a simplified fraction."), not all students adhere to the recommendation. When this happens, a problem can be mathematically accurate but marked as incorrect by the scoring system. An example is when the student computes the slope using two points on a line. Since the slope formula itself is in fraction form, students often leave the final answer in fraction form, such as $m = 5/1$, rather than merely writing the slope as $m = 5$. It is up to the instructor to determine whether full or partial credit should be awarded. Having multiple formatting issues, such as these, can greatly impact a student's final score.

Reliability and Validity

Test reliability is the amount of measurement error in the scores yielded by a test, where a reliability of at least 0.80 is generally considered acceptable for use in research (Gall, Gall, & Borg, 2003). Since the final exam is algorithmically randomized for every student, each test is different which, according to Hodges and Kim (2010), means that traditional measures of reliability are impossible to determine. When developing the tests, the lead course instructor constructs the test parameters in MyMathLab. Chapter and section coverage, assignment difficulty levels (i.e. easy, moderate, hard, and very hard question types), and the estimated time to complete the test are all selected. Given these parameters, MyMathLab will generate a unique test for each student. If the lead course instructor chose to include four moderate problems from Chapter 3 of the text, for instance, then each test would include four randomly generated problems from Chapter 3 that are considered of moderate difficulty.

Validity refers to the appropriateness of inferences made from test scores (Gall et al., 2003). Content-related evidence, through assessment by a mathematics content expert, was used to demonstrate the validity of a sample test. Through a review of the course learning objectives, it was determined that the sample test questions appropriately measure student understanding of the course content.

Data Analysis and Findings

A histogram and basic descriptive statistics for the 8-week sample are presented in Figure 1. The final exam scores in the sample range from 12 to 100. The histogram shows that the data are skewed to the left with a mean score of 78.87.

The histogram and basic descriptive statistics for the 16-week sample are presented in Figure 2. The final exam scores in the sample range from 20 to 100. The histogram shows that the data are slightly skewed to the left with a mean score of 75.81.

Preliminary inspection of the two data sets reveals that the difference of the means is 3.06 points, where the mean score of the 8-week group is slightly higher than that of the 16-week group. The standard deviation of the 16-week group is slightly higher than that of the 8-week group, indicating that the scores of the 8-week group are more closely clustered around the mean.

Possible outliers were determined at three standard deviations above or below the mean. In the 8-week group, this range was from 26.046 to 131.694. Clearly, there were no scores above 100, and there were 12 scores that fell below 26 points. In the 16-week group, the ±3 standard deviation range was from 16.92 to 134.7. No scores fell outside of this range.

It was decided to keep the twelve scores from the 8-week and not remove them as outliers. This decision was made because the scores represent content knowledge on the exam. While low, in terms of relation to the mean, the scores are still meaningful and inform the research question.

Originally, I planned to use an independent samples *t*-test to compare the mean final exam scores of the two groups. In order to conduct an independent samples *t*-test, multiple assumptions must be met. These assumptions include having a dependent variable that is measured on a continuous scale; an independent variable that contains two categorical, independent groups; independence of observations; no significant outliers; for each group of the independent variable, the dependent variable should be approximately normally distributed; and homogeneity of variance must be present (Gall et al., 2003). Each of these assumptions will be discussed in detail below.

For this study, the independent variable was the term length, either 8 weeks or 16 weeks. The dependent variable was the score on the final exam. Scores ranged from 0 to 100 (where partial credit in varying amounts could be awarded for each problem) and, as such, were measured on a continuous scale. There exists independence of observations since there was no relation between the participants in the two groups nor in their test scores. Possible outliers were discussed above. Multiple methods were used to test for normality of the data, all of which are described below.

Figure 1: Histogram of 8-week sample

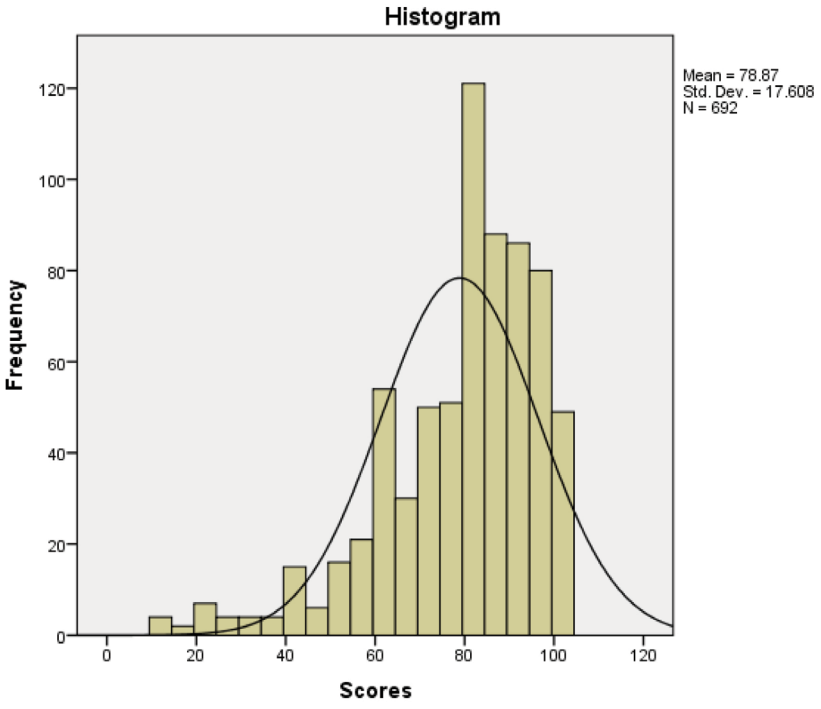
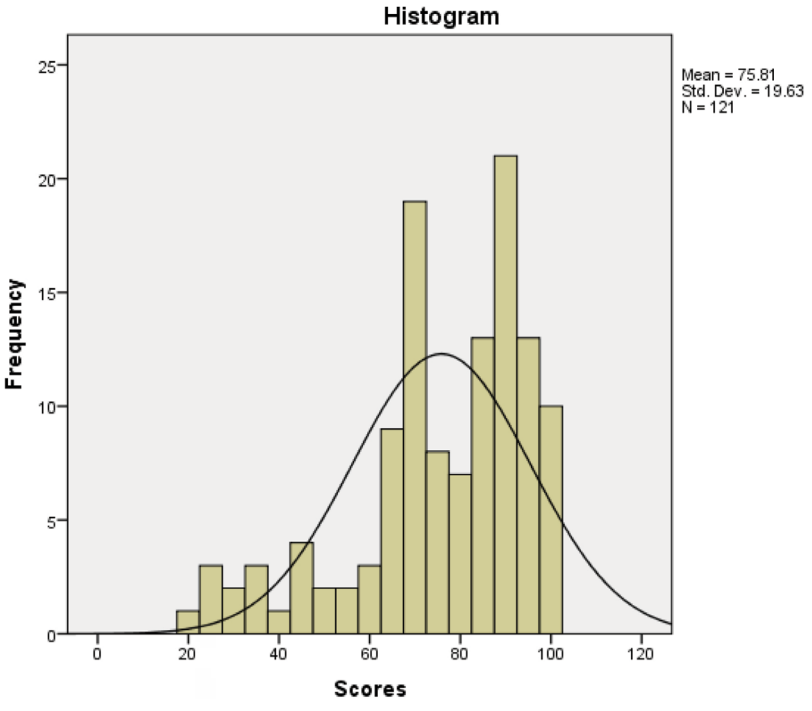


Figure 2: Histogram of 16-week sample



In Table 1, both the Kolmogorov–Smirnov and Shapiro–Wilk tests indicate that the sample data do not meet the normality assumption (Sig. <0.05).

Table 1: Tests of normality

Tests of Normality

Kolmogorov–Smirnov[a]			Shapiro–Wilk		
Statistic	df	Sig.	Statistic	df	Sig.
0.150	691	0.000	0.892	691	0.000
0.125	121	0.000	0.906	121	0.000

A visual inspection of the histograms shown in Figures 1 and 2 indicates that the data do not appear to follow the normal distribution. Furthermore, an examination of the skewness and kurtosis values can be used to determine if a sample approximates a normal distribution (Corder & Foreman, 2014). Table 2 shows the SPSS output table for the kurtosis and skewness of the test score data.

Table 2: Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Score	812	12	100	78.50	17.803	−1.242	0.086	1.468	0.171
Valid *N* (listwise)	812								

Corder and Foreman (2014) indicate that the *z*-scores for the kurtosis and skewness must be manually computed. The *z*-score for kurtosis is found by subtracting zero from the kurtosis statistic in SPSS and dividing the result by the standard error.

$$z_k = \frac{K - 0}{\mathrm{SE}_k} = \frac{1.468 - 0}{0.171} = 8.585$$

The *z*-score for skewness is found by subtracting zero from the skewness statistic in SPSS and dividing the result by the standard error.

$$z_{Sk} = \frac{S_k - 0}{\mathrm{SE}_{Sk}} = \frac{-1.242 - 0}{0.086} = -14.442$$

In order for the test score data to meet the normality assumption, the *z*-score values must fall between −1.96 and +1.96 (with α = 0.05). Neither values falls within this range, so we can

confirm that the sample data do not follow a normal distribution.

Since the data do not meet the assumption of normality for the parametric independent samples *t*-test, Corder and Foreman (2014) recommend turning to a non-parametric test. The non-parametric equivalent is the Mann–Whitney *U*-test. With this test, the samples are combined and rank-ordered together to see if the values are randomly mixed in the rank ordering or if they are clustered at opposite ends (Corder & Foreman, 2014). The null hypothesis is that there is no tendency of the ranks of one method to be systematically lower or higher than the other (Corder & Foreman, 2014). Table 3 shows the SPSS output for the Mann–Whitney *U*-test.

Table 3: Mann–Whitney *U*-test

Ranks

	Term	*N*	Mean rank	Sum of ranks
Score	0	691	411.69	284,481.00
	1	121	376.83	45,597.00
	Total	812		

Test Statistics[a]

	Score
Mann–Whitney *U*	38,216.000
Wilcoxon *W*	45,597.000
Z	−1.512
Asymp. Sig. (two-tailed)	0.131

Because the sig. value (0.131) is greater than the α value of 0.05, the null hypothesis fails to be rejected. This indicates that neither the 8-week term nor the 16-week term yields higher final exam scores.

To see if the inclusion of the outliers influenced the results, another Mann–Whitney *U*-test was performed with no outliers present. The results are presented in Table 4.

Table 4: Mann–Whitney *U*-test

Ranks

	Term	*N*	Mean rank	Sum of ranks
Score	0	679	406.84	276,245.00
	1	121	364.92	44,155.00
	Total	800		

Test Statistics[a]

	Score
Mann–Whitney *U*	36,774.000
Wilcoxon *W*	44,155.000
Z	−1.844
Asymp. Sig. (two-tailed)	.065

Again, the sig. value (0.065) is greater than the α value (0.05), which indicates that neither term length results in significantly higher final exam scores than the other. This aligns with the descriptive statistics, such that the mean final exam score in the 8-week class is slightly higher (78.87) than the mean final exam score in the 16-week class (75.81).

The purpose of this study was to determine if a significant difference in final exam scores exists between students in two different lengths of terms. Findings from the Mann–Whitney *U*-test indicate that there is not a statistically significant difference, which begs the question of why? What factors would lead to this finding? Furthermore, what are the implications for students and universities?

Perhaps, a key indicator is the fact that students self-select into the course, meaning that they choose whether to take a 16-week or 8-week class. An important consideration is *why* students choose one term over the other. Perhaps, it is due to their schedule, where one course fits in better (Diaz & Cartnal, 2006). Maybe it is because they perceive one term length to be a better fit for their current level of mathematical knowledge (Rodrigue, Fanguy, Soule, & Kleen, 2016). Particularly for those

students who wait to take their math credits at the very end of their academic program, grit, or the perseverance to push forth and reach the long-term goal of graduating (Duckworth et al., 2007) may be a factor. The self-selection process, in and of itself, supports the adult learning theory ideas of Kleden and Adisucipto (2015), who encourage students to take ownership of their learning goals. Choosing a term length that best meets their needs can help students feel empowered to reach their learning objectives, but is there an ideal term length that best suits the needs of most students? For the students who chose the longer 16-week term, they may have done so because they felt that more time with the content would help in their understanding. As Bonk et al. (2015) and Collins et al. (2015) noted, there are time management concerns, especially with adult learners who also have career and family responsibilities. For some, trying to fit a large amount of content into a short period of time is unreasonable.

From an administration perspective, these findings show that the current trend of offering shorter class terms does not inhibit a student's development of mathematical content knowledge. It also has potential cost savings because it allows students to move through their academic programs at a faster pace without a loss in student content knowledge (Mensch, 2013).

There are, of course, potential downsides to accelerated courses. Many students are hesitant to take a shorter term class because they are not confident in their abilities to succeed in mathematics. Vilardi and Rice (2014) and Rodrigue et al. (2016) noted students' perceptions that more time is necessary to practice mathematics. Similarly, Collins et al. (2015) reported that the pace of an accelerated course is too fast for some students and that, if students get behind in their course work, it is hard to catch up. Perhaps, a longer term allows students to feel more relaxed and confident while learning the content. This would be an area for future study.

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Dr. Tiffany N. DePriter is a School of STEM Associate Professor at the American Public University System (APUS). She received an Ed.D. in mathematics education from Morgan State University and a B.S. in mathematics and M.D.E. in distance education both from the University of Maryland University College. Her research focuses on adult learners who study mathematics online. For questions about her study, she can be reached by email at tiffany.depriter@mycampus.apus.edu

Access to Information Doesn't Have to Come with a Pretty Cover and a Price Tag

Kate Brannum and Nicole K. Drumhiller
American Public University System

Abstract

This article discusses the motivations, actions, and lessons learned from a project we undertook to transition from textbooks to Open Educational Resources (OERS) in all of the international relations and intelligence studies courses at our online university. While it was not difficult to convince some colleagues of the logic of our arguments, we received some resistance from others who felt the challenges were too great. However, we saw moving to OERs as an opportunity not only to help lower-income students receive the same access to course materials as wealthier classmates but also to teach life-long information literacy skills to all students. The impact of choosing OERs can go beyond the years students are at university. There is a more profound access issue at stake here. We do not know what the financial future of our students will be, but we can be certain that a reasonable number of them will face financial straits at some point. We need to teach and model ways for our students to access knowledge in the most affordable ways possible.

Keywords: *OERs, textbooks, informational literacy*

El acceso a la información no tiene que tener ni carátula bonita, ni etiqueta de precio

Resumen

Este artículo discute las motivaciones, acciones y lecciones aprendidas durante un proyecto que realizamos para la transición de libros de texto a Recursos Educativos Abiertos (OERS) en todas las clases de relaciones internacionales y de estudios de inteligencia en nuestra universidad en línea. Aunque no fue difícil convencer a al-

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gunos colegas de la lógica de nuestros argumentos, recibimos algo de resistencia de otros que pensaban que los desafíos eran demasiado significativos. Sin embargo, vimos que la transición a OERs era una oportunidad no solo para ayudar a los estudiantes de bajos recursos a recibir el mismo acceso a materiales de clase que los estudiantes más adinerados, sino que también para enseñar destrezas de alfabetización informacional para la vida de los estudiantes. El impacto de elegir OERs puede ir más allá de los años que los estudiantes estén en la universidad. Hay un problema de acceso más profundo que está en juego aquí. No sabemos cuál será el futuro financiero de nuestros estudiantes, pero podemos estar seguros que un número razonable de ellos enfrentará líos financieros en algún momento. Necesitamos enseñar y dar el ejemplo de formas en las que nuestros estudiantes tengan acceso al conocimiento de la forma más económica posible.

Palabras clave: *OERs, libros de texto, alfabetización informacional*

获取信息不一定要有一个漂亮封面和价格标签

摘要

本文讨论了所有在线大学国际关系和情报研究课程从教科书向开放教育资源（OERS）过渡而开展的项目中收获的动机、措施和经验教训。虽然说服一些同事相信我们论点的逻辑性并不难，但我们也感觉到其他同事认为挑战太大所产生的抵制情绪。然而，我们认为教科书向开放资源的过渡不仅能够帮助低收入家庭学生获得与家境更好学生同样的课程教材，而且能够向学生传授终身信息普及技能。选择开放教育资源不仅能够影响学生的几年在校生涯，更与信息获取这个重要问题息息相关。我们不知道学生的经济前景将会如何，但我们可以确定，按理来说总有学生会面临财政困难。我们需要向他们传授并演示获取知识的方法，并且让他们尽可能负担得起。

关键词：开放教育资源、教科书、信息普及

Over the last few years, we undertook a project to transition from textbooks to open educational resources (OERs) in all of the international relations and intelligence studies courses in our programs. Across the academy, there are increasing calls for greater use of OERs (Cox & Trotter, 2017; Jhangiani, 2017; Tuomi, 2013). One place that this can be seen is the numerous web pages posted by universities to highlight their OER initiatives.[1] According to the United Nations Educational, Scientific and Cultural Organization (UNESCO):

> Open Educational Resources (OERs) are any type of educational materials that are in the public domain or introduced with an open license. The nature of many of these open materials is such that anyone can legally and freely copy, use, adapt and re-share them. OERs range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation. (2017)

When conversations about OERs arise, the discussion frequently centers on monetary savings for students and/or universities, as expensive books are replaced with free materials. While many of the instructors we work with have been excited to move to OERs, others have demonstrated reluctance to embrace this trend even when it is feasible. One reason was because they believed that educational decisions should not be made based solely on financial imperatives. However, they may be missing the broader picture; for many of us, providing open educational resources is a matter of social justice. We want to make materials affordable now, and also want to model for students how to access information throughout their lives whatever their financial situation may be. The skill to find and draw from appropriate materials empowers people not only in their careers but also as citizens and leaders.

Textbook Costs

The focus of the academic discussions on OERs is frequently on the cost of textbooks and rightly so, given that it has skyrocketed (Jhangiani, 2017). A recent Government Accountability Office report (2013) demonstrated that while overall consumer prices had grown by 28% between 2002 and 2012, the cost of college textbooks had grown a staggering 82%. According to one account, the cost of college textbooks has risen 1,041% from January 1977 to June 2015 (Popken, 2015). With some books costing students as much as $400 each, it is not uncommon for many students to expect an annual $1,200 textbook bill (Weisbaum, 2016). Book costs are also largely dependent on one's area of study; so, $1,200 is only an average across majors. Perry (2015) lists some of the most expensive textbooks according to discipline: "for business students taking five classes per semester and paying an average of $250 per textbook, their textbook bill would be $2500 per year and

1 For more information on Intellus Learning, see: http://www.intelluslearning.com/

$10,000 over four years." Once adjusted for courses outside the major, it is likely that on average business students will spend around $8,000 on books across 4 years. (Perry, 2015). Among the primary reasons that textbooks cost students so much include the "ever increasing concentration of the textbook publishing industry through hundreds of acquisitions, resulting in the elimination of price competition, the established policies of schools that inhibit alternatives [sic] sources of textbooks, and somewhat lack of awareness of professors about the cost of college textbooks they adopt in their classes" (Textbook Equity, 2013).

While high textbook costs may seem trivial compared to the steep cost of tuition, the increasing cost of materials is another compounding factor that may cause students to delay or simply opt out of higher education (Buczynski, 2007; Jung, Bauer, & Heaps, 2017). The gap in student access to higher education has been lessened by access to financial aid, as well as employee and military benefits; however, studies continue to demonstrate that students are still struggling with the costs of classroom materials. Buczynski (2007) found that high textbook costs can result in students enrolling in fewer classes each term. This was further demonstrated in a Florida Virtual Campus student survey in 2012. While some students receive financial assistance with textbooks through Pell grants or scholarship monies, a $700 semester book bill may be out of reach for many students, let alone $1,200, or $2,500. This impacts not only student access to necessary materials but also student learning. It raises a series of ethical issues for students who try to obtain course materials without purchasing them. Students may consider violating copyright laws by picking up the book and rapidly returning it after making copies of the required material (depending on university book store policies there may be a short 7–14 day window to return the book for a full refund, after this date bookstores will then wait to do a buyback week at the end of the term where students sell back their books for a fraction of its worth, only to then have the store later sell it for a much higher used rate). For those lacking up-front book funds, another option has been to try to acquire the book from the university library. While course books may be available, there is often only one copy: creating competition among classmates to check it out first and attempt to keep it for the duration of the semester. Students may keep this to themselves, provide copies to classmates, or even post to an online book sharing site, once again violating copyright laws. Books on university campuses have also come to be viewed as a valuable and covetable resource worth stealing (Isaacs, 2013; McPhate, 2016; UVA Police Press Release, 2010).

Consequences of High Costs

Situations arise where students attempt to pass a class without ever accessing the material (Florida Virtual Campus, 2012). Students who cannot afford the course texts may search the web to fill in content gaps. In rare in-

stances, they might find the entire book available online; however, in many cases the material is not posted. So, students seek other material on the subject that may or may not be relevant or even accurate. The problem is that they may not have the information literacy skills needed to find appropriate academic material. A frustrated student may simply rely on Wikipedia or Yahoo Answers. As a community encyclopedia, Wikipedia even cautions on its website that the content contained therein may not be accurate, and information on Yahoo Answers may be taken out of context (Moran, 2011). That, of course, raises the question of whether those students are even getting the same education as those who can afford the texts. That is why we viewed moving to OERs as serving a greater purpose beyond saving the cost of textbooks. We saw it as an opportunity both to help lower-income students receive the same access to educational materials as wealthier classmates and to model information literacy skills for *all* students.

The impact of choosing OERs can go beyond the years students are at university. There is a more profound access issue at stake here. We do not know what the financial future of our students will be, but we can be certain that a reasonable number of them will face financial straits at some point. We need to teach our students to access knowledge in the most efficient and affordable ways possible so that they can be self-directed, lifelong learners. Our students have access to an enormous amount of material through both the internet and university library, but when they start their university careers, many do not have the information literacy skills necessary to access it. Our first task in the process of teaching our students these lifelong learning skills is to model them by culling the vast amount of information available to provide them solid course materials. They need to see that not all information comes neatly packaged in one book and that they can find creative ways to access information from various sources. Our second task is helping them learn to do this for themselves through the context of research courses and projects.

Collegial Resistance

While it was not difficult to convince some colleagues of the logic of our arguments, we received some resistance from others who felt the challenges of moving away from commercial textbooks were just too great. Some of the pushback we have received has revolved around the idea that students would be missing something crucial that they could only learn from textbooks. This prompted us to ponder about why textbooks would seem to be more useful than open educational resources to some students. Are textbooks automatically acceptable because of their familiarity, or is there really some inherent superiority aspect to the use of them? In many cases, such as when professors assign a book but only use a few chapters; use the book as a convenient organizing guide; or, when there are quality alternatives, the textbook probably adds little value for students.

When universities started using textbooks, there simply were not many alternatives or ways for students to access information. Yet, as technology and pathways to learning have changed, people's views have not always followed suit. Textbooks are frequently simply a synthesis of the major works in the field. So, does it matter whether the information is synthesized by a subject matter expert being paid by a publishing company or one being paid by a university?

Software Considerations

Colleagues outside of the social sciences purport that there are fields in which textbooks are essential; and we have no doubt that it is more difficult to find alternatives texts in some disciplines. OERs may not be the answer for every course. However, we have been able to replace costly materials in courses where we were told it would be infeasible. For instance, we had a lot of pushback against removing commercial software from language classes. We decided to have a colleague try it in an Arabic course. Not only was the professor able to replace the commercial software with her own audio files, video lessons, and use of library software, she was able to increase retention in the class significantly.

Time Concerns

Some of our colleagues also thought it was a waste of their time to reinvent the wheel, so to speak, when textbooks already exist. In some instances, book publishers will not only offer the textbooks themselves, but a whole host of other corresponding classroom materials that, in a way, takes some of the thought out of faculty curation of course materials. In such cases, the textbook is used as a framework for the course, and the publisher provides additional materials including supplemental articles, videos, etc. However, we are not reinventing the wheel. Rather, we are making our own custom-made one. There is a real advantage to students when professors purposefully select OERs because they can update and adjust readings in response to current events and student needs. Ultimately, OERs provide faculty members with an opportunity to change their teaching styles and create courses that better suit their students' learning styles (Haricombe, 2017). Graduate programs should require dynamic courses in which the currency of literature is paramount.

Seminal Thinkers

In fields like international relations and intelligence studies, in which we teach, this is especially true given the constantly evolving state of the discipline and external events that drive it. We should be changing content based on what is happening in the world, rather than the revision schedule of a textbook publisher. Textbooks can be obsolete as soon as they reach the market. In some cases, when an entire book is of high quality and worth reading, we list it as *recommended/optional* material so that students can decide if and when they read it. Some of our program's faculty members argued that students need textbooks in order to be exposed to

great thinkers in the field. And we agree that, particularly at the graduate level, there may be books that are crucial for students to read. However, these generally tend to be scholarly works with great historical influence as opposed to textbooks. Moreover, the argument for great thinkers may exaggerate the frequency of a great work's approach within courses. Actually, many times our students in OER classes have more access to the writings of important scholars than they would have in classes using purchased materials. Many traditional courses rely on the types of textbooks that only mention important thinkers in the field and provide a mere half-page excerpt about them. Just as our professors did with the copy store packets from back in the day, we can still provide chapters from books, so long as we follow copyright fair use guidelines.

Workload

The most frequent claim we tend to hear is that the workload is simply too heavy for professors to gather their own materials. This is one that we are particularly sympathetic to given the increasing demands on faculty time. There is no doubt that there is more work involved in gathering material when compared to simply using a textbook. The task of converting required reading lists to OERs for professors who have relied on not only textbooks but accompanying resources, test banks, and PowerPoints provided by some publishers, can at first seem overwhelming. However, in the long run, the transition is beneficial for both professors and students. Professors get to shape the material to the learning needs of their students; and the process of gathering ensures that we, as faculty members, stay up-to-date with the important teachings in the field in a way that we might not do so if we only focus on our narrow interests.

Newer Faculty Members

The challenges are, of course, greater with newer instructors. When we were doctoral students teaching our first classes, it was common to be advised to select one book for students and lecture from another. That does not work in our online teaching since the learning platform is much different than a lecture hall. However, this guidance really does not apply to a focus on OERs. Thus, this process may take more mentoring and guidance for junior faculty. But, as more doctoral students and faculty members come through a technologically-charged atmosphere of OERs and rapid access to information, the process should become simpler over time.

The Bottom Line

For schools and states that have made the transition to OERs, the financial savings to students have been staggering. For example, Rice University has saved its students $155 million since 2012, due to its use of OpenStax, a resource which provides students free access to peer-reviewed textbooks; and the University System of Georgia has "saved their students more than $16 million through expanding

the use of free and open course materials" (Haricombe, 2017). Additionally, some Rhode Island state colleges are estimating that they will save their students approximately $5 million over the next 5 years as they make the transition to open resources (Haricombe, 2017). Similar to the state of Texas' Senate Bill 810, "other states such as Florida, California, Minnesota, North Dakota, Oregon and Washington have enacted legislation that has expanded or stabilized open educational resources" (Haricombe, 2017).

Making the Transition

To remedy our own book dependency and reprogram the way we view classroom materials, we followed some very simple steps. We went into the project with some trepidation as we had seen how the process can go wrong without proper planning and appropriate implementation schedules. Fortunately, we have better tools available than in the past and a deeper understanding of how to avoid unintended consequences.

To start the project, we did the same type of benchmarking we would do with any class; but, with much more focus on course materials. We recommend the following five steps for OER integration.

Step One: Search the Web

The first step was to benchmark our current readings against similar classes across the academy by searching online for syllabi. While we were already aware of the major works in the field, this helped us to keep abreast of new resources and trends. This exercise is also helpful because the syllabi often provide links to unfamiliar open access sites. Fortunately, even classes that require textbooks tend to use at least some OERs.

Step Two: Try New Technologies

The second step was to experiment with new technologies, such as the Intellus Learning interface.[2] This tool is integrated within both our university's Learning Management System (LMS) and library system. It simply crawls though the web searching for OER content for the topic of focus. This allowed us to assemble many resources successfully within a compressed timeframe.

Getting accustomed to any new tool may be time-consuming and a bit frustrating at first, but in our case, it was worth it in the long run. As a smart system, Intellus Learning makes use of the learning objectives entered by the user to suggest material when conducting a search. An unanticipated advantage of using Intellus was that in the process of loading such course information into the tool, we noticed that some courses needed their learning objectives to be updated.

Step Three: Collaborate with University Librarians

We are fortunate at many universities to have librarians with subject matter expertise. Leveraging this can save a lot

2 For more information on Intellus Learning, see: http://www.intelluslearning.com/

of time when trying to find the most stable links and obscure resources. As Clobridge (2015) noted, "libraries at many universities and community colleges such as Arizona State University, the Washtenaw Community College in Michigan, and Temple University provide resources to help faculty find OERs to use in their courses and are including LibGuides and websites about OERs and open textbooks" (p. 69). Often, librarians can assume some of the burden and responsibility of searches for us.

Step Four: Work with the Copyright Team

Copyright is frequently more complicated than it first seems. Working with a copyright team is a crucial step in the OER transition process. Different copyright rules, or the way the government and courts interpret those rules, seems to change fairly frequently. In addition, there are different types of Creative Commons licenses: some allow modifications, and others do not. Rather than trying to figure out whether we can use ten pages, an entire chapter, or 10% of a particular book, we defer to the experts on these issues. We prefer to follow the letter of the law and avoid making any mistakes. For example, it can be tempting to link to another page that has scholarly works available for download. However, we avoid linking to any page that could possibly lead to copyright violations.

Step Five: Adjust Lessons

The last major step was to revisit and review course lessons within the LMS to make sure any gaps created as a result of removing textbooks were addressed with new content accordingly. We were fortunate that we had removed publisher test banks and presentations years ago from courses that had them. Most of our lessons were already written in a way that laid out the fundamental information students need to meet course objectives. For example, our theory class has lesson content that reviews major theories in the field. Now, rather than having students read a textbook chapter about major theorists, students read works authored by them. This is an improvement since we want our students to learn to engage with the literature.

We did, however, have to focus more on connecting the readings within the lessons in a way that we would not have had to previously with a packaged textbook. In other words, we put a great deal more time into writing the lectures/lessons. Some professors complain that writing lessons within the online class without being able to depend on a text is as much work as writing their own textbook. However, we have not found that to be the case. The way that professors design their lessons depends on the learning platform in use and could range from a PowerPoint presentation to something more engaging such as an interactive website. While this may require more upfront work in the initial course design, well-chosen materials and subject matter expertise provide dynamic presentation of information that enhances students' understanding of course content.

Collaborate with a media team.

To ensure lessons are of the highest quality and provide more pathways for learners, it is important that those who incorporate more OER materials into courses have a well-staffed and resourced media team. As colorful textbooks are replaced with colorless journal articles, the media team helps ensure that lesson content is not only more visually engaging—but that lessons are organized with elements that better reinforce student learning. Fortunately, we were able to work with instructional designers and a media team who could make sure courses included the infographics, pictures, and visual information to prompt effective student engagement with the materials. This student-centered approach attends to research about the ways this generation consumes information. (Blue, 2015; Clayn et al., 2014; Matrix, 2015; Matrix & Hodson, 2014; Novotney, 2010) Furthermore, this process requires learners to still read a substantial amount of journal articles and book chapters.

As steps are completed, OERs selected, and lessons are updated, we recommend communicating to students. Once students are in the classroom, consider explaining why certain resources were selected for them. Discussing the process of locating and narrowing information for their consumption attends to information literacy expectations. The American Library Association (ALA) (n.d.) provides a definition of and standards for information literacy competency in higher education, recommending that an information literate individual is able to:

> ... determine the extent of information needed; access the needed information effectively and efficiently; evaluate information and its sources critically; incorporate selected information into one's knowledge base; use information effectively to accomplish a specific purpose; understand the economic, legal, and social issues surrounding the use of information; and access and use information ethically and legally. (para. 2)

We include screencasts in our classes that demonstrate how to find and use research institutes and open databases available through international organizations such as the World Bank. When we provide students information from our university library, we remind them that there are ways to access databases even when they are not part of a university. If their local public library appears not to have access to appropriate databases, it is probable that the library is part of an inter-library loan program with at least one academic library, which allows for more rapid access to scholarly articles.

Lessons Learned

As with any major project, there are pitfalls or unintended consequences to avoid. First, expect that there classes with OER materials will need adjustments. Then,

consider whether any failure has to do with a flawed implementation of OERs or the use of OERs in general.

Appropriate Materials

Make sure course material is at the appropriate level. For example, avoid creating a required reading list comprised of scholarly articles for a 200 level undergraduate course as the students are not likely cognitively ready for such dense material. This may seem like an obvious consideration, but it is overlooked more often than one might think. Some professors get excited about choosing new materials, yet do not consider how overwhelming they might be for a learner. Likewise, a graduate-level course relying on websites, newspapers, or popular magazines is not going to help students meet course objectives or become masters of their discipline.

Our most significant early setback in this process involved an introduction to world politics class that had withdrawals and failures rise sharply after switching from a textbook to OERs. We resisted the temptation to simply insert the textbook back into the class and instead looked for more appropriate OERs. The effort and OER updates were successful, as the decline in retention reversed.

Minimizing Issues with Links

We learned to find the most stable web links and create a repository of backup sources for them. We encountered tremendous difficulties with nonworking and changing links at the beginning of the OER transition process. But, we learned to minimize these problems by being proactive in the use of resources. Librarians effectively maintain stable links when the process is approached with forethought. For example, adding resources through Intellus Learning allows librarians to monitor links.

If sources from the open web are needed, there are several options. But it is crucial to think about which will be the most reliable over time. For example, a stable website sustained by a research institute for 5 years is likely a better source for material than an individual scholar's university page that may be removed due to resignation or retirement. Even when selecting seemingly higher quality, stable websites for readings, we have learned to check the links to them frequently. With technological advances, there are now programs available to help resolve broken link issues much more rapidly, and they can be embedded into the course learning platform, or learning management system. This resource is a budget consideration, but is worth the cost. Finally, note that to prevent copyright infringement, linking out to resources is preferable to making electronic copies of them.

Leadership Support

Like so much of what is done in academia, this is a creative, intellectual, and fluid process. While administration may be focused on achieving strategic objectives, the OER process is nonlinear with many challenges along the way. No two courses have the same needs, and as mentioned previously, there are some fields in which textbooks might

be necessary. Depending on when an OER project is implemented, faculty members will likely have competing demands for their time. A well-implemented OER project considers competing faculty priorities and allots resources and time to be creative in the classroom. Otherwise faculty members, like students, will possibly take inappropriate shortcuts to meet deadlines.

Communication

Remaining in contact with internal media development and classroom support experts saves time and helps diminish problems in the long run. We learned this when replacing commercial language software in an Arabic class. The class our colleague created was greatly improved, except that the Arabic font and media files made did not work well with the university's learning management system. Expeditious assistance was needed, which caused some major disruptions to program management schedules. In the end, the class was far superior, with the retention rate improving significantly. However, the process was not smooth or ideal. More communication about planning and proactive steps is recommended.

508 Compliance

Faculty members need to develop American with Disabilities Act (ADA) as well as copyright literacy to successfully make the transition to OERs. Interactive Accessibility (n.d.) explains that:

> ... the Department of Justice (DOJ) published the Americans with Disabilities Act (ADA) Standards for Accessible Design in September 2010. These standards state that all electronic and information technology must be accessible to people with disabilities.
>
> The ADA differs from Section 508 regulations, which are an amendment to the Rehabilitation Act of 1973 and apply to all information technology, including computer hardware, software and documentation. (para. 1)

ADA regulations can be quite complex, and guidelines seem to change frequently. Therefore, it is incumbent upon administration to provide both training and knowledgeable support staff for faculties.

When viewing potential OER material, we had to constantly think about accessibility issues. For instance, there are some excellent resources available at the UN Women Training Centre website (i.e. its self-paced modules). However, we could not use many of these resources because they are not 508 compliant. In this regard, while the material might be *free*, it is not completely *accessible*. As a solution, when we chose an OER that lacked, for instance, a script or closed captioning, our internal instructional designers and media team would create one. Then, we offered the script to the original creator of the resource. Such accommodations are crucial in both online and brick and mortar instructional environments.

The Syllabus

Last, we learned to establish time to simultaneously work through course lessons and the syllabus. When we began the OER transition process, we did not realize how important it was to carefully review the LMS weekly lesson content and course syllabus for references to previously required readings, while changing those readings. It is easy to overlook needed updates and brief references to items that are no longer present in the course. This may seem like minor work compared to attending to copyright or ADA compliance. However, it is tedious work and oversights led to one of the major complaints we received from students.

Conclusion

Making the transition to OERs is both an important and worthwhile effort. It requires a serious time commitment and proper planning, coordination, and rollout. However, the process is worth it because beyond the lower price tag, it provides students with the knowledge and information literacy skills they need to access information that might otherwise be out of their reach. The way that people access information will certainly evolve as technology and internet access rules change. We cannot anticipate the details of that for our students. But, what we can do is teach habits and strategies that will help empower them find a way to gain knowledge throughout their lives.

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Dr. Kate Brannum is Professor and Program Director of the International Relations & Conflict Resolution and Middle Eastern Studies programs at American Public University System. Kate received a B.A. in Social Science—International Relations from Michigan State University and Ph.D. in Political Science with concentrations in international relations, comparative politics and public administration from the University of Massachusetts at Amherst. Her recent research focuses on human security and women's health.

Dr. Nicole K. Drumhiller is Program Director for the Intelligence Studies program at American Public University System. Nicole received a B.A. in Political Science, B.A. in Criminal Justice, M.A. in Political Science, and Ph.D. in Political Science from Washington State University. She serves as an editorial board member for the *Journal of Global Security and Intelligence Studies.* Her recent research focuses on radical environmental and animal rights extremism.

3 Questions for an Online Learning Leader

Featuring Robbie K. Melton, Ph.D.
Emerging Technology Consultant for Tennessee Board of Regents (40 campuses) and Professor at Tennessee State University

Dr. Robbie Melton formerly served as director for the strategic planning-implementation of Tennessee's System Wide Regents Online Degree Programs. Her tributes include: 2016 OLC Leadership, WCET Life Time Achievement, 2014 Top 30 Technologists, 2013 Apple Distinguished Educator, 2012 Top Fifty Technology Innovator; and 2012 WOW EdTechnology Awards. She was a featured speaker at the UNESCO Mobile Learning Symposium. She is known as an *Appologist* for her extensive research of best practices with mobile devices (i.e. smart phones, tablets, wearables, and the creation of a Mobile App Resource Center). Her current research includes *The Internet of Everything—Smart Connected Devices and Mixed Reality* and her mission is digital equity.

3 preguntas para los líderes de los estudios por internet

Dr. Robbie Melton antes fungía como directora de planeación-implementación estratégica para los programas por internet de Tennessee System Wide Regents. Sus contribuciones incluyen: liderazgo de OLC en 2016, WCET logro de toda la vida, educadora distinguida de Apple en 2013, innovadora tecnológica de los primeros cincuenta de 2012 y premios WOW EdTechnology de 2012. fue una poniente destacada en el Simposio de Aprendizaje Móvil de la UNESCO. Se le conoce como una *Appologista* por su investigación exhaustiva de las mejores prácticas con dispositivos móviles (por ejemplo, smart phones, tabletas, aparatos llevables en forma de accesorio y la creación de un Centro de Recursos de Apps Móviles). Su investigación actual incluye *El Internet de Todo—Dispositivos Inteligentes Conectados y Realidad Mixta* y su misión es la igualdad digital.

doi: 10.18278/il.6.2.5

在线学习领导者需要回答的三个问题
专访罗比·K·梅尔顿博士
田纳西州委员会(40个校区)新兴技术顾问和田纳西州立大学教授

罗比·梅尔顿博士曾担任田纳西州全系统管理在线学位项目的战略规划执行主任。她荣获多项称号和奖项，包括2016年度在线学习社团领导人物，WCET终身成就奖，2014年度30佳技术专家，2013年度苹果杰出教育家，2012年度五十强技术创新者及2012年度WOW编辑技术奖。她曾作为专题演讲嘉宾参与联合国教科文组织移动学习研讨会。她因广泛研究各大移动设备上软件的最佳运用(如智能手机、平板电脑、可穿戴设备和移动应用程序资源中心创建)誉为软件专家。她目前的研究课题之一为《物联网-智能连接设备与混合现实》。她的使命是致力于实现数字公平。

1 What are some of your favorite apps for university instructors and students and why?

I am known as an ***Appologist***. A title that I coined to indicate the curation and evaluation of mobile apps for education and workforce programs for teaching, learning, and training. I coordinate a team from around the world (i.e. discipline experts) to determine the content, ease of use, interactions, cost effectiveness, and most importantly, student outcomes such as attention, retention, time on task, and alignment to curriculum standards.

I have been curating apps from all devices and disciplines since 2009. Owing to so many dynamic apps, I created a site called *Appapedia*' (www.appapedia.org) dedicated to educators for mobile apps that have been tried by other educators and students, in which you can search for mobile apps by over seventy-five discipline areas from PreK-Workforce Careers and by devices; educational levels; and a new category of searching by disability.

App-A-Pedia—RKM

www.appapedia.org

Database of educational and workforce mobile apps for all devices, grade levels, colleges, and careers in over 150 program areas; PreK-Workforce Careers

This site is home-grown and not sponsored by any company. Again, these are tried and true results from the trenches in the classroom. Teachers want FREE, easy-to-use content and productivity apps that can be used on ALL devices. Owing to the growth of my *appy reviews,* **MERLOT.org** has designed an Open Education Resource (OER) (i.e. free) portal to curate this site and other educational apps for a more effective and productive method for submitting apps, peer review of apps, and categorizing apps for the entire international educational community. Visit http://mobileapps.merlot.org

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ADD Mobile Apps You're Using or Created Into MERLOT. Are you using free mobile apps in your teaching or your learning? Have you created free mobile apps?

This site is a collection of apps that educators have recommended and found to be effective in meeting student outcomes. Yes, educators who submit these apps are happy to share their experiences and methods in using the apps.

Again, I have been reviewing apps from around the world every morning during my *Appy Time* of 4:00 AM.

I also examine apps for their technology potential and possibilities for innovations. There are a couple of apps that might not have good content but have the type of technology that can be adopted for a better use in education. Check out the technology in terms of interaction, problem solving, creativity, and engagement of apps such as,

- Game of Thrones: A Telltale Game Series
- HealthMap: Outbreaks Near Me

Yes, I do have some favorite apps that have been reviewed and are currently used in higher education:

- (used most often across all devices and all around the world) **Google Suite of Apps** (these are web-based digital apps such as Search, Calendar, Cloud, Cardboard, Docs, eMail, Earth, Chrome, Translation, Hangouts, and YouTube)
- Prognosis (Allied Health Disciplines)
- Video Time Machine (Humanities/ Journalism/Communication)
- The Elements (STEM)
- In Action (STEM)
- Sign4Me (Sign Language)
- The Pyramids (History)
- Symphony Pro (Music)
- Art Authority (Art History)
- The Book of Negroes Historical Guide (Black History
- iJazz (Music)
- Procreate (Art)
- Algebra Explained (by iLearnFastSoftware)
- Back in Time (History)
- ROMA (Virtual History)
- Heart Pro III (Medical)
- iMuscle (Fitness)

- Bible Is (Religion)
- Smithsonian Channel (all disciplines)
- Solar Walk (Astronomy)
- Explain Everything (all disciplines)
- iDance (Health and Fitness)
- Cell and cell Structure
- Flipboard (news)
- KOBO (over 2.5 free million apps)
- Audio Bookshelf

2 What are your recommendations for administrators and instructors at universities and other organizations with mobile technology in classrooms?

My recommendation is to explore the untapped resources of web-based apps, websites, and content that can be downloaded on all devices. The majority of the web-based apps and tools are free. Plus, it is easy for instructors to create their own web-based mobile apps.

3 Which technologies, mobile devices, and apps do you think tend to be underused in universities and other adult learning environments and if integrated more, could help with student engagement and retention?

I highly recommend a couple Web 2.0 Technologies that we have piloted with great success:

NearPod (www.nearpod.com)

Nearpod—Create, Engage, Assess through Mobile Devices

www.nearpod.com

Nearpod is an interactive classroom tool for teachers to engage students with interactive lessons

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QUIZIZZ https://quizizz.com/join/

Quizizz

quizizz.com

Join a Quizizz game here! Multiplayer classroom quizzes that make formative assessments fun!

A Review of *Typography to Improve Your E-Learning*

Kinder, H., & Articulate. (2015). Retrieved from http://www.helokinder.com/Typography_E-Book.pdf

By Erik Bean, *American Public University System*

Abstract

A review of *Typography to Improve Your E-Learning,* a 42-page PDF eBook by Heloisa Kinder and Articulate.com, features a documented look at the importance of proper typography style, size, and uses to support attentive student engagement in E-Learning platforms.

Keywords: *Typography, E-Learning, platforms, usage, purpose, resources*

Una reseña de *Tipografía para mejorar su aprendizaje en línea*

Kinder, H., & Articulate. (2015). Extraído de http://www.helokinder.com/Typography_E-Book.pdf

Resumen

Una reseña de *Tipografía para mejorar su aprendizaje en línea,* un eBook de Helosia Kinder y Articulate.com, contiene un vistazo documentado de la importancia del estilo, tamaño y usos de tipografía adecuados para apoyar la participación del estudiante atento en plataformas de aprendizaje por internet.

Palabras clave: *Tipografía, aprendizaje por internet, plataformas, uso, propósito, recursos*

doi: 10.18278/il.6.2.6

书评：《使用文字设计提高你的在线学习》

Kinder, H., & Articulate. (2015). 著作来源：
http://www.helokinder.com/Typography_E-Book.pdf

摘要

本文评论了由Heloisa Kinder和Articulate.com网站共同创作的42页PDF电子书《使用文字设计提高你的在线学习》。通过文献资料审视了正确的文字设计风格、字体大小以及字体使用的重要性，从而支持学生认真参与在线学习平台。

关键词：文字设计，在线学习，平台，用途，目的，资源

Many of life's greatest experiences seem to go better when pairs complement one another, for example, great marriages, company mergers, and tasty food like peanut butter and jelly. The same can be said for what helps make E-Learning more engaging: E-Learning and active faculty, E-Learning and the software modality, E-Learning and interactive activities. One ***type*** of pairing that appears to receive little accolades is E-Learning and topography, but not anymore. A 2015 eBook (A 42-page downloadable PDF) entitled, *Typography to Improve Your E-Learning* by Heloisa Kinder and Articulate.com deconstructs how the proper use of fonts, colors, size, and positioning, can act like fengshui enticing students to feel more comfortable, partake more, engage more, and more actively feel connected to class requirements.

Mostly drawn from idiosyncratic and empirical experience, Kinder does defend several recommended typography strategies via hyperlinked sources. The overarching premise is to use the right choice of fonts to set the mood and for readability. Chapter 1 discusses first impressions and uses a hyperlinked demonstration that shows how different fonts can be used to match different images such as the personas of various professionals, models, and business people. The examples are striking.

A review of a *New York Times* study shows how fonts help to achieve discussion credibility, a trait that most E-Learning instructors hope to instill. Certain fonts, Kinder (2015) maintains, are better matched for certain course disciplines. "Let's say you're creating a course on financial security. You'll probably want your typeface to convey a sense of security and protection.

In other words, you don't want to use a fun, silly font such as Taco Modern" (p. 11). Immediately following this otherwise little-known enigma is an explanation between the definitions of typeface and font, Serif and Sans Serif. Contrary to most, the terms are distinctively different.

Other critical constructs to be followed include the Rule of Three, choosing typeface that your students may already be familiar, the aperture setting of the words, and the importance of utilizing the best tracking otherwise known as kerning. The book also discusses why size matters, the proper usage of lines to compartmentalize information, and how leading (the space between sentences) can add much to best placement of lessons. By Section 5, most readers will be drawn to the many useful tips and reminders about how to create a visual hierarchy, and planning layout using grids and a hyperlink to a professional grid website. Kinder wraps up the purpose of the book best, "This e-book focuses on how your typography decisions can make or break the visual design and tone of your course" (p. 42). To that end, most will agree this little book is chock-full of tips and tricks that, if employed, can help add much value to any online course.

Ultimately, the advice can help to achieve more student engagement and that in of itself is worth pointing one's browser to tinyurl.com/yb4m7scr. First time users will have to create a user ID and password before downloading the free PDF book. Best wishes to all course developers, regardless of the discipline, and faculty who should agree these tips can help enrich the student experience lesson after lesson and week after week.

Dr. Erik Bean is currently an Associate Professor in the School of Arts and Humanities at American Public University System. Erik has a bachelor's degree in psychology from Grand Valley State University and a master's degree in journalism from Michigan State University. He holds an Ed.D. in educational leadership from the University of Phoenix School of Advanced Studies, where he also serves as a Research Chair at the Center for Leadership Studies and Educational Research studying immediacy and the customer experience (CX) of students and faculty.

Helping Students Close the Demonstration Gap: Portfolium

Cali Morrison, *American Public University System*

Abstract

E-Portfolios of the past have limitations. Portfolium is an e-Portfolio network that allows for greater sharing of knowledge, skills, work, and projects to match students with potential employers with a lifelong platform.

Keywords: *e-Portfolio, Portfolium, demonstration gap*

Ayudando a los estudiantes a cerrar la brecha de la demostración: Portfolium

Cali Morrison, *American Public University System*

Resumen

Los portafolios en línea del pasado tienen sus limitaciones. Portfolium es un portafolio en línea que permite compartir mejor el conocimiento, las destrezas, el trabajo y los proyectos para emparejar a los estudiantes con potenciales empleadores a través de una plataforma que dura toda la vida.

Palabras clave: *portafolio en línea, Portfolium, brecha de la demostración*

Portfolium：帮助学生缩小表现差距

摘要

过去的电子档案袋有其局限性。而Portfolium这个电子档案袋网络平台，通过共享更多的知识、技能、工作和项目机会帮

doi: 10.18278/il.6.2.7

助学生找到拥有终身平台的潜在雇主。

关键词：电子档案袋，Portfolium，表现差距

Employers suggest that recent college graduates do not have the skills and knowledge necessary to fill their jobs, even entry-level positions (Bessen, 2014). However, as educators we design learning outcomes, courses, and even entire degree programs to meet the needs of the modern workforce. So, where is the disconnect? Borrowing terminology from Portfolium founder, Adam Markowitz, this disconnect is the demonstration gap, where recent graduates are not able to articulate, and therefore employers are not able to see, what these graduates know and can do. Frustrated by this situation, Markowitz left a promising career as a rocket scientist to help build a system that goes beyond legacy e-portfolios to connect learners with employers in new ways.

Portfolium bills itself as an e-Portfolio network, which "partners with colleges and universities to help students connect learning with opportunity" (Portfolium, n.d.). Portfolium provides a solution and benefits for higher education stakeholders, yet does involve some challenges. For successful implementation, there are practical steps to consider.

Learner Benefits

The use of e-Portfolios, or digital portfolios, is not new. So, what makes Portfolium different from other e-Portfolio systems? First, Portfolium is free for the end user (i.e. the student or learner) always and forever. Anyone can start their own Portfolium page to share or highlight their skills and knowledge. Institutions do pay a fee to create a network of learners, faculty members, staff, and alumni; however, even when learners leave the institution, they maintain the rights and access to their Portfolium. So, in addition to being free for learners, it is portable: meaning they can take Portfolium with them from institution to institution and job to job. This is a direct contrast to legacy e-Portfolios, which live in the walled gardens of learning management systems. Portfolium also gives learners the ability to control the privacy settings on each artifact they upload, deciding whether it will be publicly accessible or only accessible by themselves, or to pertinent faculty members.

Employer Benefits

Portfolium acts as a conduit for career matching for its users. Employers are able to search the site by the skills and knowledge required for a position they wish to fill, review candidates' evidence, and even reach out to discuss opportunities—all without posting a single help wanted ad. Networks can connect and overlap. For example, institutions can invite employers they

work with on a regular basis to interact within their network in addition to the greater Portfolium network, giving employers targeted access to students who have the skills they need. The system contains rich data tools, making it useful for career services professionals to help advise learners.

Challenges

Like any social network, even a learning demonstration network, Portfolium requires being tended to in order to reach optimal performance. The Portfolium network is growing for learners, institutions, and employers, but it is not ubiquitous yet. While it integrates with LinkedIn, it does not yet have the market recognition that LinkedIn or other social media do. Therefore, institutions taking the plunge to build a network need to maintain it as well. Portfolium offers tools to help do this: from integrating it into the classroom to providing tools for institutions to host challenges. Challenges are specific tasks posed that prompt learners to create projects hosted on Portfolium. Running challenges requires some resources in the way of time and people, but the results seem to be worth the effort from what I have observed at institutions.

In Practice

Here at American Public University System, we recently launched our Portfolium network. We invited our students, faculty, and alumni to share accomplishments through their Portfolium pages. Within the first several months after launch, we have had nearly 20,000 users (i.e. students, alumni, and faculty) onboard, showcasing nearly 90,000 skills across more than 2,000 projects. We have had five student projects *featured* in the entire Portfolium network. For context, a university partner typically has zero to one featured projects within the first few months of launch. Featured projects are selected by a team of experts at Portfolium and their partnered employers.

We extended the opportunity to our own institutional employer partners to engage in our network and anticipate positive results. In the future, we look to deepen our engagement by embedding Portfolium within courses in our learning management system. We will use it as well to enhance career services provided for students and alumni.

From our first conversation with Portfolium to our growing use, we have had positive interactions with the Portfolium team. They imbue the tenants of customer service throughout the onboarding process. If your institution is considering how to extend the use of e-Portfolios, whether for accreditation or to help students meet their professional goals, I highly encourage considering Portfolium as a solution.

References

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Cali Morrison is the Director of Alternative Learning at American Public University System (APUS). Formerly, she was the Assistant director of Communications and Analysis at the WICHE Cooperative for Educational Technologies (WCET) and Project Director of Transparency by Design at WCET, where she became interested in studying adult learners and accountability. Cali holds a B.A. in Public Relations from Western Kentucky University, M.Ed. in Adult and Higher Education from Montana State University, an online graduate certificate in Women's Studies from Western Kentucky University. She is currently an Ed.D. candidate in higher education administration at Montana State University.