Supporting Student Success at the Course Level

Lessons from Change Efforts During a Pandemic

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every learner everywhere

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The Every Learner Everywhere network was established to help institutions of higher education improve course success rates for racially minoritized and poverty-impacted students by improving teaching and learning with the support of digital learning tools. Starting in 2019, network members Achieving the Dream (ATD) and the Association of Public and Land-grant Universities (APLU) worked with a set of two-year colleges and four-year universities, respectively, to support these "lighthouse" institutions as they implemented adaptive courseware into selected gateway courses. Digital Promise supported these activities by collecting and analyzing data on student characteristics and course outcomes for the courses trying out adaptive courseware and conducting instructor surveys (in fall 2019 and 2020) and student and instructor interviews (in spring 2020). This report describes the Every Learner Everywhere supports for lighthouse institutions, the experiences and accomplishments of course improvement teams at those institutions, and implications for future efforts to improve teaching and learning practices in higher education.

Report Highlights

- Each of the lighthouse institutions had a project lead who assembled a team with all or most of the kinds of expertise necessary to redesign their selected gateway courses to incorporate adaptive learning.
- Most lighthouse institutions had staff with instructional design expertise but prior to the collaboration with Every Learner Everywhere, these teaching and learning staff had worked with individual faculty members rather than teams of faculty teaching a common course.
- At the start of the engagement with Every Learner Everywhere, participating faculty typically were aware of the proportion of students succeeding in their course overall but did not know the success rates for specific racial/ethnic subgroups and were not engaged in a systematic process of reviewing student outcome data for their courses.
- Planning templates and convenings supported similar course redesign and data use processes and knowledge sharing across lighthouse institutions while coaching and project timelines were customized to fit each institution's capacity and objectives.
- A fall 2019 survey of participating lighthouse instructors found that two-thirds of them felt adequately or very well prepared to implement the adaptive learning courseware they had selected with their fall 2019 classes.

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- A second instructor survey administered in fall 2020 found that almost 90 percent of instructors felt so prepared to implement adaptive learning courseware that term, with 56 percent describing themselves as very well prepared.
- Fall 2020 instructor survey responses suggested that lighthouse instructors using adaptive courseware implemented many research-based instructional practices including low-stakes formative assessments, feedback providing students with information on how to improve, examination of learning system data dashboards, sending personalized messages to students, incorporating real-world relevant content, and opportunities for students to reflect on their own learning.
- Lighthouse institutions provided Digital Promise with de-identified student-level data for 193 adaptive courseware implementations in 62 different courses experienced by 26,400 students, of whom 11,223 were taking the course at a two-year college and 15,177 at a four-year institution.
- Students in courses that were implementing adaptive courseware in spring 2020 before and after the shift to remote instruction in response to COVID-19 felt that the transition was less disruptive than in their courses that did not use courseware.
- By fall 2020 an overwhelming 96 percent of faculty agreed that adaptive courseware improves student learning and that it helps them monitor student progress and hold students accountable; 93 percent agreed that courseware helps them present course material more effectively, increases student engagement, provides students with timely feedback, and helps instructors monitor the progress of the class as a whole.
- The average net promoter score (NPS) among lighthouse faculty for the adaptive courseware products they were using rose from +23 in fall 2019 to +46 in fall 2020.
- Prior to engagement with Every Learner Everywhere, the fall 2018 course success rates for 41 courses that subsequently underwent redesign for fall 2019 was 60 percent for Black, Latinx and Indigenous students compared to 74 percent for White and Asian students — a gap of 14 percent. During the first term of implementing adaptive courseware (fall 2019) the course success rate gap was essentially unchanged. In fall 2020, however, when most instructors were on their third or fourth semester of courseware implementation, the gap between course success rates for racially-minoritized students compared to non-racially minoritized students in these 41 courses was roughly 10 percent.
- The Every Learner Everywhere engagement with lighthouse institutions appeared to strengthen the perspective within participating departments that the quality of gateway courses is a mutual responsibility that should be addressed by collaborative teams of instructors, instructional designers, and academic leaders working together.
- Overall, the lighthouse activities catalyzed and supported by Every Learner Everywhere appeared to be sufficiently intensive and sustained to increase institutional capacity for using digital learning tools and data analytics to improve the quality of their gateway courses.

Contents

Context: The Bill & Melinda Gates Foundation's Postsecondary Success Strategy and Every Learner Everywhere

Funded by the Postsecondary Success Strategy of the Bill & Melinda Gates Foundation, the Every Learner Everywhere Network of 12 partner organizations was established in 2018 to help colleges and universities improve student outcomes through innovative teaching strategies, including the adoption of adaptive digital learning tools. The network's mission is to enable colleges serving large numbers and proportions of students of color and those impacted by poverty to improve the quality of gateway college courses so that course success rates rise and are no longer correlated with income level or race/ethnicity. Network partners provide professional development services, practice guides, and toolkits as well as customized consulting services to help higher education institutions implement more equitable and effective teaching practices supported by learning technology.

The foundation and Every Learner Everywhere network member organizations share an interest in leveraging adaptive learning tools to improve gateway college courses in ways that enhance engagement, learning and course success. Recognizing the increasing diversity of the college student population, adaptive instruction provides students with learning experiences tailored to their particular needs. Prior research suggests that student learning is enhanced when instruction adapts to differences in students' (1) prior knowledge levels, (2) learning strategies and error patterns, (3) affect and motivation, and (4) ability to regulate their own learning.[1] Digital learning systems providing full coverage of course content, called "courseware," can provide adaptive learning experiences to different learners and also give instructors near real-time access to student learning data. Instructors can use these data to identify students who need additional support and to identify those concepts their students already understand and those with which many students are struggling so that class time can be used more productively.

Every Learner Everywhere Lighthouse Institutions

A major undertaking during the first year of the Every Learner Everywhere network was the recruitment of 12 "lighthouse" institutions from three states selected by the foundation (Florida, Ohio and Texas) as the proving ground for this work. These lighthouse institutions would work with Every Learner Everywhere network members Achieving the Dream (ATD) and the Association of Public and Land-grant Universities (APLU), with support from Digital Promise, to redesign gateway courses to incorporate adaptive learning courseware.[2] Institutions were recruited from the pool of community colleges and broad-access four-year institutions in these states that serve high numbers of racially minoritized, first-generation, and low-income students. Specific institutions were selected on the basis of prior demonstration of leadership and course-level projects around the incorporation of digital learning and student-centered pedagogy. Within each selected institution, one or more lower-division courses were identified for the redesign work on the basis of having high enrollments; high proportions of students earning Ds, Fs, or withdrawing from the course (i.e., a high DFW rate); equity gaps in terms of DFW rates for different kinds of students; and/or demonstrated relationships with student retention and completion. The support activities supplied by Every Learner Everywhere network members were designed to help this initial cohort of institutions become "lighthouses" in the sense that their experiences would guide the way for additional institutions to make the journey more smoothly and efficiently. Additional goals were for the network to learn more about how to support college course redesign teams and to provide some proofs of concept for the value of the supports the Every Learner Everywhere network could provide.

To participate as a lighthouse institution, colleges were required to identify a senior administrator (such as a dean or vice provost) to act as project lead and convene a cross-functional project team to redesign one or more gateway courses to include adaptive courseware. Additional requirements included sending 3 or 4 participants to a series of network events, participating in an online multi-institution community of practice around teaching and adaptive courseware, and engaging in research activities with network partners. Key characteristics of the 12 lighthouse institutions are shown in Table 1.

Table 1. Characteristics of Every Learner Everywhere lighthouse institutions

Institution	Type	Enrollment[a]	% Students of Color[b]	% Pell Grant[c]	Prior Experience with Adaptive Courseware
Amarillo College[d]	2-year	9,854	47%	58%	Some staff are familiar with adaptive learning products, but lack deep understanding.
Broward College	2-year	40,784	63%	68%	Broward had used ALEKS for the first 6 weeks of a course to get students "up to speed."
Cleveland State University	4-year	11,999	22%	46%	Adaptive courseware had been used in undergraduate mathematics and chemistry instruction, and the College of Science and Health Professions had indicated interest in broadening use beyond these departments. The Math Emporium, which uses courseware, raised pass rates in developmental courses from 48% to 70%.
Cuyahoga Community College	2-year	23,440	32%	61%	One faculty member had extensive experience using different adaptive courseware products, and several others had some experience but needed more information about products available and their quality.
Florida International University[e]	4-year	48,818	87%	51%	Multiple course-level projects using adaptive systems such as ALEKS and Realizeit.
Houston Community College	2-year	57,200	63%	53%	A few individual instructors had used adaptive courseware as one-offs, but no systematic or large-scale implementation.
Indian River State College*	2-year	16,686	41%	60%	Not familiar with adaptive course products beyond ALEKS (where they weren't using the adaptive component). No systematic process for selecting courseware or digital learning tools.
Lorain County Community College*	2-year	10,644	20%	52%	No systematic process for selecting digital learning tools. Any course revisions and use of adaptive courseware were isolated and individual faculty-driven. Had used other adaptive software in the past, but with ending of that software contract, did not work to update use with new software.
Miami Dade College*	2-year	54,973	84%	74%	Use of adaptive software or other technology to some degree was common but varied greatly based on the faculty member.

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Institution	Type	Enrollment[a]	% Students of Color[b]	% Pell Grant[c]	Prior Experience with Adaptive Courseware
University of Central Florida*	4-year	58,821	38%	32%	Experience using adaptive courseware in fully online courses. Faculty wanted to expand courseware offerings to in-person courses and explore different courseware products.
University of Texas at El Paso	4-year	21,464	85%	68%	Only a handful of instructors used adaptive learning (Business). No systematic process for selecting courseware and other digital learning tools.
University of Texas Rio Grande Valley*	4-year	24,678	90%	71%	Adaptive courseware had been used in mathematics and chemistry. Use of courseware mainly to create more consistency across sections.
University of Toledo	4-year	16,065	16%	36%	Adaptive courseware (ALEKS) used in first-year mathematics sequence as part of a state-supported initiative to use co-requisites rather than remediation in math. Adaptive courseware used for placement in chemistry, and to some extent in an optional co-requisite course, but not in the gateway courses themselves. Faculty using adaptive courseware were not fully utilizing its capabilities.
LIGHTHOUSE TOTAL		**346,608**	**57%**	**57%**	

* Member of the foundation's Frontier Set

[a] Total undergraduate enrollment in fall 2018 from the Integrated Postsecondary Education Data System (IPEDS).

[b] Percentage of African American, Hispanic, Native American and Pacific Islander students in fall 2018 enrollment from IPEDS.

[c] Percentage of full-time, first-time, degree/certificate-seeking undergraduate students receiving Pell grants in 2017–18 from IPEDS.

[d] Amarillo Community College was inactive after the first year.

[e] FIU was not one of the initial 12 lighthouse institutions; it began working with APLU in 2020.

Terminology Used in This Report

Adaptive learning

Learning experiences tailored to the individual needs of students. Adaptive learning seeks to deliver custom learning experiences that address the unique needs of an individual through just-in-time feedback, learning pathways, and resources. Instructors may take steps to adapt learning experiences to each student's current state, but systematically providing adaptive learning to all students in a large class is feasible only with digital learning systems. Adaptive learning systems are designed using information about common misconceptions in the target subject matter, psychological measures of individual learners, and data from learners' actions within the system. Learning experiences can also be guided by algorithms that estimate the rate of learning and that model learners' interactions with specific content items. In addition to providing differentiated experiences to different learners, adaptive learning systems provide learning data to instructors about individual students and about the class as a whole. Many systems also provide learners with data about their progress.

Community of practice (COP)

Groups of people who wish to learn by collaborating with other members of the group, whether in real or virtual settings. The group shares a goal or interest and individuals learn from sharing information and experiences with each other. The term originated with Lave and Wenger (1991) who described naturally occurring COPs in which new members engage in "legitimate peripheral participation" and then gradually transform into practitioners and mentors.

Competency-based learning

Competency-based learning is organized around the acquisition and demonstration of skills rather than the accumulation of courses or credit hours. Students are evaluated and earn credentials based on the completion of a project or other product demonstrating the target competencies. Typically, the only assessment is the direct measure of the project which is evaluated by a determination of whether or not a competency goal has been met. Many competency-based learning programs also use mastery-based pacing, with the time students are given to work on a competency allowed to vary as needed.

Courseware

Digital courseware is instructional content that is scoped and sequenced to support delivery of an entire course through software built specifically for educational purposes. It includes assessment to inform personalization of instruction and is equipped for adoption across a range of institutional types and platforms.

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Flipped classroom	An instructional approach that "flips" the typical context of content acquisition and practice. Rather than listening to lectures as a group, students in flipped classrooms review lecture materials and readings outside of class time. Students' in-class time is then spent on problem-solving or other higher-order thinking activities, often in collaborative groups. Flipped classroom methods can help instructors prioritize active learning by guiding students to actively and interactively apply content knowledge during class.
Gateway course	The first credit-bearing college-level course in a program of study. These courses generally apply to the requirements of a degree program and may also be called introductory courses or prerequisites. Typically, every student majoring in a given discipline must pass through one or more gateway courses. Common examples of gateway courses include introductory courses in Business, Chemistry, and Psychology as well as Anatomy & Physiology and college-level English and mathematics.
Mastery learning	In mastery learning, content is organized into learning units that contain the concepts that students need to acquire and demonstrate. Mastery learning requires students to demonstrate a specified level of mastery on a knowledge test (e.g., 80% correct) before moving forward to learn subsequent content. If a student does not achieve mastery on the test, they are given additional support and then tested again. Typically, some students move quickly through mastery learning modules while others have to spend more time, and some may have difficulty finishing all course modules within one academic term.
Net Promoter Score (NPS)	A widely used metric for measuring customers' satisfaction with a service or product. Net Promoter Score (NPS) is calculated from responses to a single question that asks: How likely is it that you would recommend [brand] to a friend or colleague? Using a 0-10 scale, responses are categorized as Promoters (score 9-10), Passives (score 7-8), or Detractors (score 0-6). Subtracting the percentage of Detractors from the percentage of Promoters results in the NPS.

The Baseline: Capacities of Lighthouse Institutions in Spring 2019

Every Learner Everywhere technical assistance providers conducted a needs assessment with respect to the capacities of the lighthouse institutions at the start of the engagement. The needs assessments considered seven dimensions that the Every Learner Everywhere team judged important for implementing adaptive learning:

- **alignment,**
- **leader support,**
- **project team capacity,**
- **capacity for course redesign using adaptive learning at scale,**
- **capacity for using data to support continuous improvement of teaching and learning,**
- **capacity to support faculty development,** and
- **capacity for inclusive teaching practices.**

Assessments were based on the collective judgment of the technical assistance team after conducting interviews with lighthouse team members and reviewing institutional strategy documents and online resources. Strengths and weaknesses with respect to the seven dimensions varied across institutions, but there were several general themes. Each lighthouse institution had a project lead who assembled a project team with all or most of the kinds of necessary expertise identified in their agreement with their technical assistance provider. Most lighthouse institutions had staff with instructional design expertise who were available to help faculty design or redesign courses for the project; however, prior to the collaboration with Every Learner Everywhere, these teaching and learning staff had worked with individual faculty members who sought out their help rather than teams of faculty teaching a common course.

Only a few teams described their institution as having a campus-wide strategy linking the implementation of adaptive learning to a commitment to closing gaps in course success rates for different kinds of students. Moreover, like most higher education institutions, most of these 12 did not have regular, systematic departmental processes for examining the quality and effectiveness of their gateway courses. Administrators were generally aware of course success rates, but most did not have institution-wide practices around looking at these data on a regular schedule and developing action plans in response to them. Faculty were aware of the proportion of students succeeding in their course overall but did not know the success rates for specific racial/ethnic subgroups. Without this kind of information, many faculty did not fully appreciate their role in larger efforts around equity and student success and institutions lacked processes to promote this

understanding. In addition, some faculty attributed low success rates in their course to student deficiencies, such as inadequate course preparation or poor work habits, and did not feel they had the power to improve student learning and success through modifications to their teaching practices.

Most lighthouse campuses had been offering professional learning opportunities to help faculty acquire new teaching strategies and learn to use courseware, but participation was voluntary and typically not incentivized. Moreover, institutions usually did not make these opportunities available to adjunct faculty who teach the majority of gateway course sections. Finally, in 2018-19 most of these institutions were not providing faculty with professional development around culturally responsive instruction and pedagogies that have been shown to be effective with low-income students and students of color.

Every Learner Everywhere Supports for Lighthouse Institutions' Activities and Supports

Every Learner Everywhere Technical Assistance

Every Learner Everywhere support activities were designed in recognition of the considerable expertise and leadership already available in the lighthouse institutions. For example, initial meetings between an institution's team and Every Learner Everywhere technical assistance providers had college team members share the experiences they already had with digital learning and course improvement and their ideas for how to go farther with it. The Every Learner Everywhere technical assistance providers shared information about the availability and characteristics of adaptive courseware in different subject areas but left the selection of courseware products up to the instructors teaching each course. The technical assistance activities also drew upon the experience of eight public universities that had worked with APLU on implementing adaptive courseware under a prior adaptive learning implementation grant.

The main components of the technical assistance were:

- Needs assessment that enabled the technical assistance provider to identify where the institution and its participating departments were strong already and where additional supports could move their work forward, enabling customization of planning workshops and timelines
- Lighthouse team project scoping, planning and team building activities using common planning templates and facilitation provided by the Every Learner Everywhere Network
- Face-to-face collaboration between the network technical assistance provider and the lighthouse team at the institution, including one- or two-day workshops, and bringing in consulting faculty from institutions experienced in implementing adaptive courseware. Lighthouse institutions had one to three Every Learner Everywhere site visits (conducted on campus during 2019 and virtually thereafter)
- Extraction, analysis and interpretation of student course outcome data by Digital Promise (described further below) to involve teams in data-informed continuous improvement processes at the course level
- Coaching at a distance through scheduled conference calls with their technical assistance provider and calls with other higher education institutions implementing adaptive learning in the same academic disciplines

- Convenings and, in some cases, campus visits that brought the lighthouse institutions together with others, either experienced in implementing adaptive learning or at a similar stage of launching their initial efforts (institutions participated in two to four of these events annually, depending on their preferences)
- Required reporting to the technical assistance provider (APLU or ATD) regarding their progress, achievements, challenges faced, and adjustments to goals and timelines.

While ATD provided technical assistance for two-year colleges and APLU did so for four-year institutions, Digital Promise served as the research and data partner for all the lighthouse institutions. Most colleges and universities do not routinely give departments and faculty access to student administrative data. Without access to data on how different kinds of students perform in their course, faculty may miss important equity issues and lack important feedback regarding the impacts of any changes they make in their teaching and assessment practices on those students most in need of assistance. Digital Promise's role in supporting Every Learner Everywhere lighthouse institutions was to collect data on student characteristics and course outcomes for the courses trying out adaptive courseware and provide teams with external support and capacity building around using course outcome data, disaggregated for key student groups, as an indicator of the effectiveness of their approach to implementing adaptive courseware.

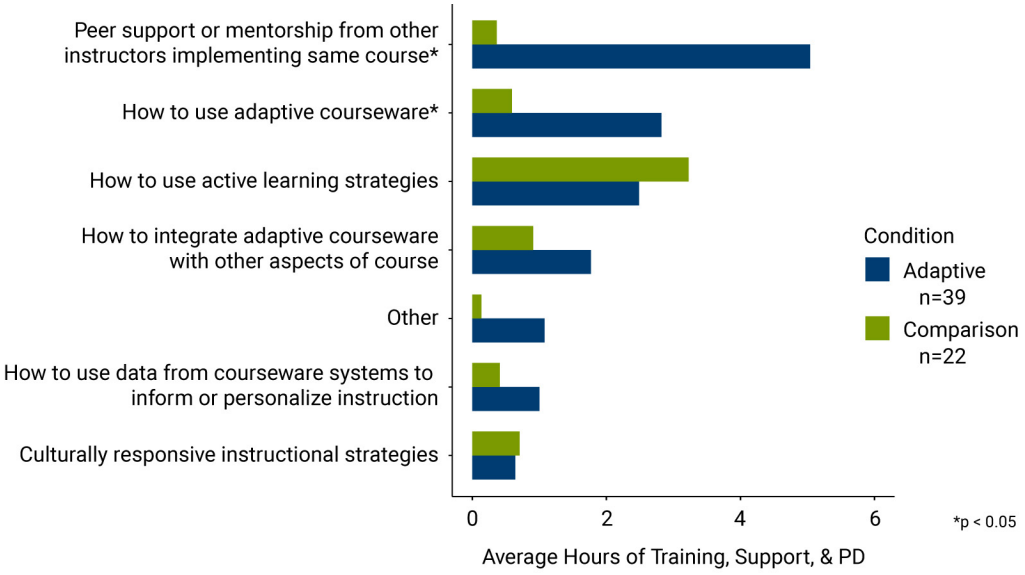
Digital Promise developed a template for reporting deidentified student-level data including enrollment, demographic, and prior achievement information for each student along with the student's course section and course outcome (grade). Each lighthouse institution's office of institutional research provided this information to Digital Promise at the conclusion of each regular academic term starting in fall 2019 and extending through fall 2020 with a few submissions for spring 2021.

Every Learner Everywhere Professional Learning Supports

Data from an instructor survey that Digital Promise administered in fall 2019, the first semester of implementing adaptive courseware for many instructors in the project, provided the first quantitative estimate of the contribution of Every Learner Everywhere activities to the professional learning experiences of participating faculty. Comparing the responses of instructors who were part of the Every Learner Everywhere lighthouse activities to those of instructors in the same departments who were not participating revealed differences in the number of hours of training, support and professional development instructors received in a number of areas. (See Figure 1.) Instructors working on Every Learner Everywhere lighthouse teams reported receiving an average of 5 hours of peer support or mentorship from others teaching the same course they

did over the last 6 months compared to less than a half an hour of this kind of learning experience for instructors who were not part of an Every Learner Everywhere team. The data in Figure 1 indicate, as one would expect, that the focus of this training, support, and professional development in the first year of lighthouse work was how to use adaptive courseware and integrate it with other aspects of their course. There were not significant differences in the amount of support the two groups of instructors reported for using active learning strategies or using culturally responsive teaching approaches.

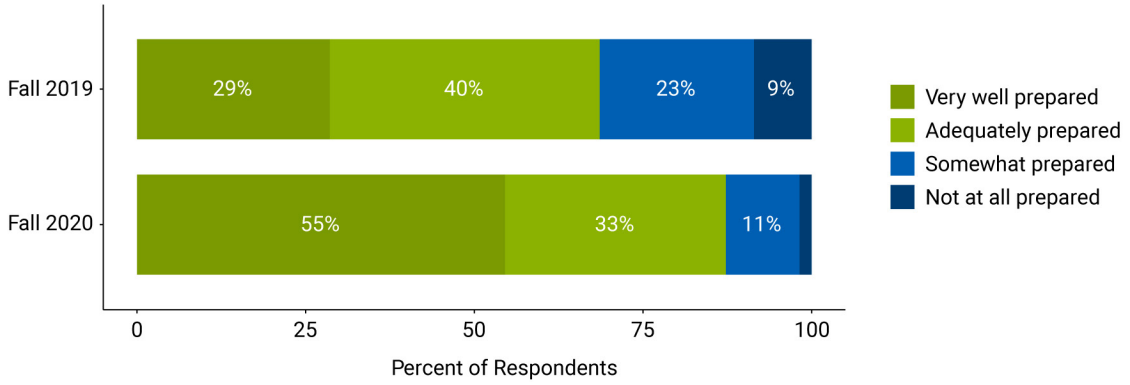
Figure 1. Average Hours of Training, Support, and Professional Development Received by Instructors in the last 6 months (Approx. June 2019 to December 2019)



Source: Fall 2019 Instructor Survey data. N = 61; 39 Implementing and 22 Comparison.

The fall 2019 survey data also showed that two-thirds of lighthouse faculty engaged in Every Learner Everywhere activities felt adequately (40 percent) or very well (29 percent) prepared to implement adaptive courseware in their fall 2019 classes — a remarkable achievement given the very short time frame between signing agreements with their technical assistance provider and the start of the fall term. On the second Digital Promise instructor survey administered in fall 2020, a majority (56 percent) of participating lighthouse instructors felt very well prepared to implement adaptive courseware with another 33 percent feeling adequately prepared, as shown in Figure 2.

Figure 2. Lighthouse instructors' assessment of their preparation level for teaching with adaptive courseware



Every Learner Everywhere Support for Using Data

After the dataset for each course using adaptive courseware at a lighthouse institution was received and analyzed, Digital Promise provided the institution with a customized report, and the Every Learner Everywhere team hosted a discussion of the findings with the college's team. These conversations appeared to catalyze faculty interest in using data to shed light on where they were making progress and where they still had work to do. When asked about the findings from their first semester implementing adaptive learning, a lighthouse institution faculty shared the following,

> *"One of the things that really struck me was after you step back when the semester's over and you start looking at the data…Digital Promise showed us how the equity gaps in some of these entry-level math courses were significantly smaller. And [it was] something we had not really realized when just looking at our raw data. But once we saw the sections that were implementing the adaptive feature versus the sections that were not, we could see a substantial difference there, and that was really striking."*

In the words of another lighthouse faculty member,

> *"[The Every Learner Everywhere data analyst] helped me go through my numbers because it's a lot to go through and figure out this stuff… I ended up writing a case study for my microeconomics class and the numbers were pretty eye-opening for me…. And, as it turns out, the pass rate went from 80% to 90% and the average GPA went from 2.50 to 2.96. [The data analyst] broke out what the numbers were for Pell-eligible people…*

> *The whole point of this is to use the data to improve your course outcomes for students, but when it got one level with Pell versus these people with these demographics, it became a lot…. I think that another important component of this project is that people [technical assistance providers] can get the data out and explain it to you so that we as faculty know how to redesign or tweak or reinvent parts of our classes."*

Interest in using data for improvement was expressed even in cases where students had not performed significantly better with the adaptive courseware. One team leader, reflecting on data from semesters impacted by the COVID-19 pandemic, shared:

> *"I'll admit I am disappointed no significant improvements were found. . . . We'll continue supporting the needs of those faculty and will connect them to our internal data processes to allow continued study for those participating. Hopefully we see life settle down a bit and can point to results beyond buffering the pandemic-induced disruptions that everyone is experiencing."*

Scaling of Courseware Use at Lighthouse Institutions

Across the two academic years during which Every Learner Everywhere worked with the lighthouse teams, 11 lighthouse institutions provided Digital Promise with de-identified student-level data for their focal courses. In aggregate, the data included 193 adaptive courseware implementations in 62 different courses drawn from 10 different academic disciplines. These course implementations were experienced by 26,400 students, of whom 11,223 were taking a course at a two-year college and 15,177 at a four-year college. Table 2 shows the distribution of students by course subject area, and Table 3 shows the number of students in the dataset using each of 21 different courseware products or product combinations.

Table 2.
Lighthouse student samples by course subject area

Subject Area	Number Student Records
Anatomy & Physiology	572
Biology	3,929
Business	948
Chemistry	6,513
Economics	1,069
English	2,235
Mathematics/Statistics	7,884
Physics	1,257
Psychology	1,084
Spanish	909

Table 3.
Lighthouse student samples by courseware product

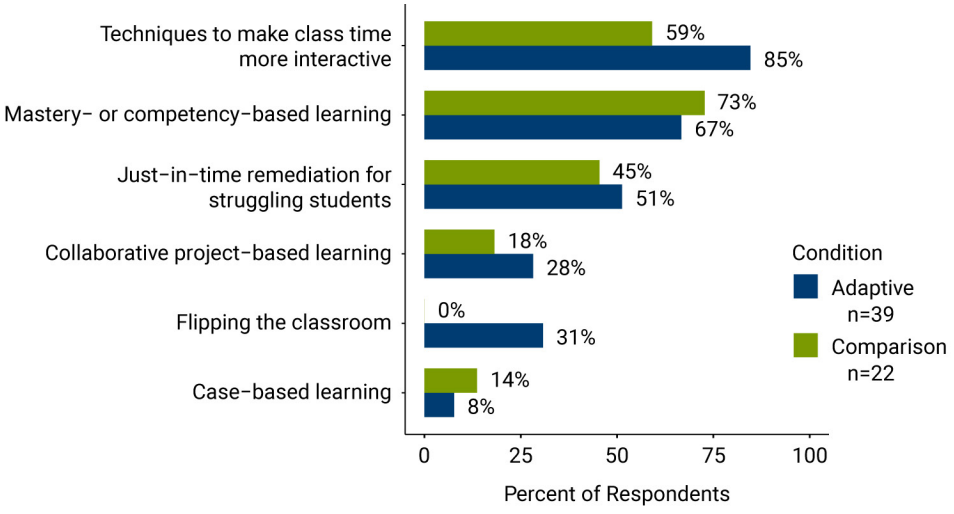
Courseware Used	Number Student Records
ALEKS	7,810
ALEKS 360 with Atoms First	75
CogBooks with OpenStax	537
Hawks	58
iMathAS	139
InSpark Critical Chemistry	330
Knewton Alta	862
Lumen Waymaker	3,173
MacMillan with LearnSmart	798
McGraw Hill Connect	1,006
McGraw Hill Connect with LearnSmart Achieve	1,985
Pearson Mastering Anatomy & Physiology	97
Pearson Mastering Biology	1,832
Pearson Mastering Chemistry	2,031
Pearson Mastering Physics	126
Pearson MyLab Math	416
Pearson MyLabs Plus	208
Pearson Integrated Review	1,651
Realizeit	2,040
Sapling Learning Curve	19
Wiley Plus Adaptive Practice	1,173

Lighthouse Institution Outcomes

Teaching Practices

The instructor survey administered to both lighthouse instructors implementing adaptive courseware and instructors teaching the same courses without courseware in fall 2019 revealed ways in which instruction differed in course sections taught by these two groups. As shown in Figure 3, instructors implementing adaptive courseware were more likely to report using techniques to make in-class activities more interactive (85 percent versus 59 percent). Almost a third of the courseware-using lighthouse instructors reported "flipping the classroom" (having students acquire knowledge and practice on their own before class and then engage in peer-based active learning strategies in class). They were also more likely to report having their students engage in collaborative project-based learning. In short, instructors adopting adaptive courseware in the lighthouse institutions appeared to be more inclined than their comparison group colleagues to implement student-centered pedagogies.

Figure 3.
Instructional practices used in a typical month, by Fall 2019 adaptive courseware condition



Source: Fall 2019 Instructor Survey data. N = 61; 39 Implementing and 22 Comparison.

On the whole, the self-report survey data from fall 2019 in Figure 3 present an encouraging portrait of instructional practices in the course sections of lighthouse instructors using courseware. Most of the instructors were trying to make instruction more student-centered by making in-class instruction more interactive. A significant proportion of them were taking advantage of courseware affordances for providing students with information and practice prior to class sessions ("flipping the classroom"). In response to other survey items, these instructors reported that they were examining the data in courseware dashboards and using it to shape their plans for class sessions.[3]

As noted above, Digital Promise administered a second instructor survey in the fall of 2020. At that time most college courses were offered primarily or completely online due to COVID-19, and the survey structure and questions about instructional practices were modified to take this shift in the dominant course modality into account as well as to probe for a set of evidence-based teaching practices identified by the foundation as conducive to student learning and course success.[4] This set of teaching practices was identified with explicit attention to equity and what is known about enhancing engagement and learning among students from cultural groups that have been marginalized in academic settings in the past. During this time period, Every Learner Everywhere activities were shifted to a more explicit focus on equity issues and instructional practices beyond the use of courseware that can complement courseware affordances to better support students of color and those from low-income backgrounds.

Table 4 shows responses of 56 lighthouse instructors using adaptive courseware who responded to the fall 2020 survey.

Table 4. Instructional practices used by courseware-using lighthouse instructors in fall 2020

Dimension of Evidence-based Teaching	Related Digital Promise Instructor Survey Items	% of Lighthouse Instructors Using
Active Learning: Instructors use pedagogical practices that are rooted in constructivist theories, involve students engaging deeply with course content, and encourage "learning by doing."	Having students work on new material as homework prior to discussing it or working on problems in class	76
	Project-based learning	14
	Instructor-led discussions	74
	Peer learning or think-pair-share activities	54
	No lectures over 30 minutes	32
Transparency: Students are provided with a clear understanding of the course's content, learning outcomes, and assessment criteria.	Detailed descriptions of learning outcomes	96
	Detailed descriptions of quality criteria	87

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Dimension of Evidence-based Teaching	Related Digital Promise Instructor Survey Items	% of Lighthouse Instructors Using
Formative Practice: Students are given the opportunity to practice skills in ways that provide timely and targeted feedback to nudge them towards mastery.	Adaptive or digital learning	98
	Mastery learning	34
	Immediate feedback	100
	Feedback with information on how to improve	96
	Low-stakes formative assessments	94
	Opportunities to re-do assignments to improve	82
Data Analytics: Instructors use real-time data to inform teaching and engage in ongoing course improvements to optimize student success.	Use of whole-class performance dashboard	83
	Use of dashboard for individual students	86
	Modification of what is covered in class based on student performance data	75
	Referrals to tutoring/Supplemental Instruction	84
	Personal messages to students about how they're doing on the course	96
	Solicitation of anonymous student feedback while the course is underway	52
Metacognition: Instructors use practices that help students learn to be a better learner and take control of the learning process.	Explicit teaching of study skills	70
	Routines that include some independent learning	89
	Having students reflect on what they have learned and what they still need to learn	87
	Activity organizers or hints	80
Inclusive Learning Environment: Instructors use practices that enable all students to feel that they and their unique background have a place in the life of the classroom.	Activities to build classroom community/ sense of belonging	66
	Content relevant to students' cultures/ identities	61
	Content relevant to each student's future career / job / goal attainment	89
	Activities to allay anxiety, stereotype threat, or imposter syndrome	34

Source: Fall 2020 Instructor Survey data. N = 56 instructors implementing adaptive courseware.

The fall 2020 survey reports suggest that lighthouse instructors using adaptive courseware implemented many research-based instructional practices including use of low-stakes formative assessments, feedback providing information on how to improve, examination of learning system dashboard data, sending personalized messages to students, inclusion of real-world relevant content, and opportunities for students to reflect on their own learning.

Figure 3 and Table 4, above, show the teaching practices reported by lighthouse institution instructors at two different points in time on two different surveys. The instructor samples overlap but are not identical. All of these factors warrant caution in drawing conclusions from apparent differences between instructor reports on the two surveys, but several differences are large enough to warrant some consideration. The proportion of lighthouse instructors saying they had students "work on new material as homework prior to discussing it or working on problems in class" was 76 percent in fall 2020 compared to the 31 percent who reported "flipping the classroom," the term of art used for this practice, in fall 2019. This rise may reflect the different wording of the question (providing a definition rather than the term "flipped classroom") but also is consistent with reports from other sources that flipped learning became more prevalent during the COVID-19 pandemic.[5] A similarly large difference in the other direction was found between the 67 percent of adaptive instructors reporting use of "mastery- or competency-based learning" in fall 2019 and the 34 percent who reported using "mastery-based learning" in fall 2020. It is not clear whether this difference reflects a real move away from requiring students to master specific content or skills before moving on to new material during the pandemic or conception of "competency-based learning" than is broader than that of "mastery learning" on the part of college instructors.

On a related note, it seems somewhat surprising that only about a third of fall 2020 instructors implementing adaptive courseware reported using mastery learning in their classrooms. While many courseware products are designed to enable mastery learning, instructors often choose not to use this feature in the interests of keeping the students in their classes more or less in sync and enabling all students to be exposed to all the course content within the confines of the academic term.

Resilience in the Face of COVID

When the COVID pandemic hit U.S. college campuses in spring 2020, face-to-face classes were cancelled and all instruction was done remotely. Students faced multiple challenges to continuing their academic studies and expressed lower satisfaction levels with their courses.[6] In interviews conducted by Digital Promise, instructors of courses that had used adaptive courseware prior to March 2020 described fewer challenges than their colleagues did in preparing their courses for the transition to remote instruction. As a math instructor explained,

> *"I would say I spent maybe a few days moving the course online because we're already so web-based as far as our content goes, so it was pretty easy to switch it over. I didn't have to do anything different with my grading for that particular semester. I already had Blackboard Collaborate setup. I just had to put together a few documents and send out a few emails. It was really relatively easy for me. It was just like, 'Let's roll' … I would say that I spent a few days, maybe eight hours."*

Students in courses that were implementing adaptive courseware before the shift to remote instruction similarly felt that the transition was less disruptive than in courses without courseware.

> *"I'm pretty well satisfied with the course. What helped me the most in the course was the [courseware] program, and the teacher being very quick to respond to my questions if I had any questions. I know that some teachers don't really do that, so I was pretty well satisfied with the course."*

> *"I think it's because in all of that transition, the MyLabsPlus interface was the one thing that stayed consistent. Even though we experienced a ton of those network failures and all that, that's the one thing that we knew, 'Okay. Everything else is changing, but this isn't. I know how to do this at least. I know how to use the interface and I know what's expected of me on this platform.'"*

Other students described benefiting from the diagnostic assessments that were included with adaptive courseware. An economics student, for example, explained how such assessments helped them reflect on content areas that they learned and those that needed additional work:

> *"She [the professor] had a little quiz at the end of each chapter to ascertain where you were in terms of the content and your understanding. Those were very helpful because I was able to say, 'I don't really get that topic, so I need to go over that again.' She also opened up a section on McGraw Hill that allows you to customize quizzes for yourself based on chapters. Those were extremely helpful because when I realized, 'Well, this topic I'm not getting,' I just go and do a random customization of this chapter on McGraw Hill, and it really helped me a lot."*

The transition appeared to go particularly well in courses that continued their pattern of courseware use and instituted online synchronous time together to allow students to ask questions and get feedback from instructors.[7]

Student Course Outcomes

The data presented above suggest that, in aggregate, the Every Learner Everywhere activities with lighthouse institutions engaged a significant number of gateway course instructors (over 182), nurtured their awareness and appreciation of courseware products in their subject areas, and influenced the nature of instruction experienced by over 26,000 students over four academic terms. While these are important accomplishments in terms of adaptive courseware access, it is important also to assess progress with respect to the network's mission of improving course outcomes for students, and in particular for students of color and those impacted by poverty.

Having negotiated a data sharing agreement with each lighthouse institution, Digital Promise was able to obtain de-identified student-level data for course sections using adaptive courseware as part of their Every Learner Everywhere activity and in many cases, from other sections of the same course taught earlier by the same instructors or in other cases, concurrently by different instructors who were not using adaptive courseware. We computed the average course success rate, after controlling for key student characteristics and controlling for course instructor wherever possible, for both adaptive and comparison (business-as-usual) course sections in fall and spring terms. The general analysis strategy was to compare course success rates for key student groups in course sections without adaptive courseware to those in sections using courseware.

Because the data came from course innovations implemented in widely different institutional contexts and in different timeframes, analysts worked with lighthouse institution teams to craft the most meaningful analyses for each course. In every case, however, Digital Promise analysts computed estimates of the course outcomes for the two groups only if differences in student characteristics in the adaptive and comparison sections were small enough to be controlled statistically (i.e., less than .25 standard deviation). A minimum sample size of 30 students with complete data in each group being compared was required also. Imposing these criteria, of the 41 courses that implemented or included adaptive courseware in fall 2019, 22 courses met analytic criteria. Of the 19 course datasets that did not meet analytic criteria, most failed to meet the sample size requirement. This problem was related to the fact that many of the fall 2019 implementations involved just a single faculty member for a given course, and community colleges typically have course sections with 30 students or less.

After the fall 2019 academic term, the COVID-19 pandemic hit college campuses and greatly reduced options for constructing meaningful comparisons between courseware-using and non-courseware-using sections. In spring 2020, many instructors accustomed to in-person or blended instruction had to switch to teaching entirely online. Throughout the pandemic but especially in spring 2020, both students and instructors were coping with issues of technology access and physical and mental health challenges related to COVID-19.[8] Because these factors would make changes in course success rates uninterpretable, Digital Promise did not request student-level data for spring 2020 adaptive courses.

Collection of student course outcome data resumed in fall 2020. That semester, a large proportion of courses were taught at least partially online, and we know from prior research that a change in course modality by itself can be expected to influence student engagement and course grades.[9] In addition, fall 2020 saw a big drop in college enrollments, especially in community colleges,[10] and we found that for many courses in our Every Learner Everywhere lighthouse sample, the characteristics of students enrolled in fall 2020 were markedly different from those enrolled previously, usually in the direction of having higher achievement levels prior to taking the gateway course. Grant agreements with lighthouse institutions did not require submitting data for spring 2021, but three institutions chose to do so. Table 5 illustrates the limitations of course outcome data from a single academic term and shows the rise in baseline equivalence issues starting in fall 2020.

Table 5. Course outcome datasets by academic term

Academic Term	Course Datasets Submitted	Failed Baseline Equivalence	Inadequate Sample Size	Met All Criteria for Analysis
Fall 2019	41	7	11	22[a]
Spring 2020	No data requested due to COVID disruptions			
Fall 2020	55	16	22	17[b]
Spring 2021	15	8	3	4

[a] One of these resulted in unreliable final models.

[b] Two of these resulted in unreliable final models.

As described above, the number of meaningful and reliable comparisons for individual courses taught using adaptive courseware and without adaptive courseware was drastically reduced because of COVID-related events. There were, however, a few datasets of a size and scope supporting meaningful interpretation, including that for a statistics course at Lorain County Community College. Analyses for that course are described on the pages that follow to illustrate what can be done with robust datasets meeting all analysis criteria.

Impact of Introducing Courseware in the Statistics Course at Lorain County Community College

At Lorain County Community College (LCCC) statistics is offered by the mathematics department, with around 15 different instructors teaching sections for close to 600 students each fall. In the past, students who entered LCCC without college-level math skills took a developmental math course first and entered statistics only after passing it. When the prerequisite policy changed and students entered statistics without taking a developmental math course first, the department was concerned that course success rates would drop and became interested in using adaptive courseware as a way for students to review concepts outside of class to prepare for class discussions and activities. (Under the new policy students without college-level mathematics skills took a math course concurrently with statistics rather than before it.) Four statistics instructors, including math professor Kati Dobeck who had experimented with adaptive products previously, joined the Every Learner Everywhere team at LCCC and began using Wiley Plus Adaptive Practice courseware in fall 2019. Dobeck also created a master course shell for statistics within the college's learning management system to make it easy for other instructors to incorporate adaptive practice into their teaching. By fall 2020, eight additional LCCC statistics instructors chose to incorporate the courseware in their sections.

The largest available dataset for LCCC's statistics course was from the fall 2020 term, for which data were available for 115 students who were in non-adaptive sections of statistics taught by one of three instructors and for 289 students in sections using adaptive courseware taught by one of 12 instructors. The average grade in the non-adaptive sections (on a 4-point scale) was 1.36 compared to an average grade of 1.76 in adaptive courseware sections. These unadjusted averages, however, do not account for differences in the students enrolled in the two types of sections. Digital Promise developed a statistical model to control for differences in prior academic achievement (by far the strongest predictor of course grade), Pell eligibility (a proxy for low income), race/ethnicity, gender, full- or part-time enrollment, and whether the student had attempted the course before. The model-adjusted average course grade in non-adaptive sections was 1.14 compared to 1.73 in adaptive course sections, a statistically significant difference illustrated below.

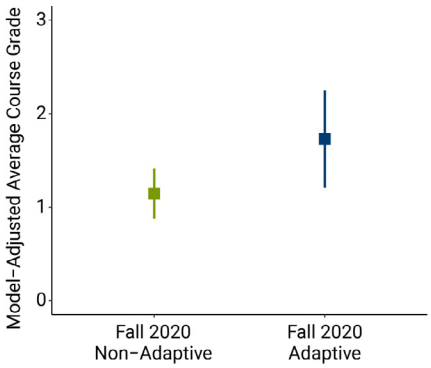
Average grades in LCCC statistics course sections

	Non-adaptive	Adaptive
Unadjusted Course Averages	1.36	1.76
Model-Adjusted Course Averages [b]	1.14	1.73

[a] A = 4.0, B = 3.0, C = 2.0, D = 1.0, etc., Fail or no grade = 0.0.

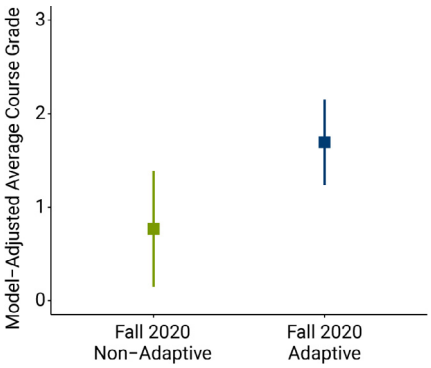
[b] Model adjusts for prior academic achievement, Pell eligibility, race, gender, age, enrollment status, and repeater status.

Model-adjusted average course grades for all students

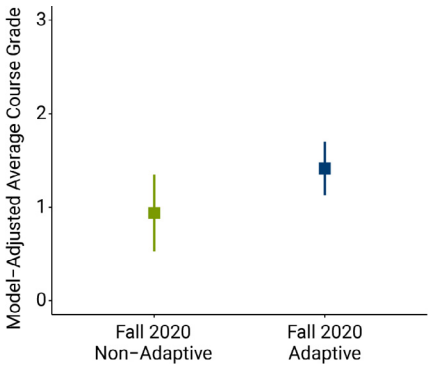


Next, the same comparison between grades in adaptive and non-adaptive sections was made for key student groups for which there were 30 or more students in both section types. To obtain sufficient sample size, Black, Hispanic, and Indigenous students were grouped together in a racially minoritized group.

Model-adjusted average course grades for racially minoritized students



Model-adjusted average course grades for Pell-eligible students



As shown in the two figures above, average course grades for racially minoritized students and for low-income students were higher in the adaptive sections than in nonadaptive sections.

These findings are very encouraging, but there are possible alternative interpretations. The instructors were different for the two types of course section, and the three instructors who declined to try adaptive courseware in fall 2020 may simply have been stricter graders or less effective instructors. Without assignment of instructors to use or not use courseware, it is difficult to rule out competing interpretations of student outcomes. However, we were able to perform a different set of analyses that add some further insight into the influence of adaptive courseware.

As noted earlier, four LCCC statistics instructors had begun using the Wiley practice courseware in their sections in fall 2019. For these early adopters, Digital Promise analyzed student course outcomes in fall 2019 compared to those for the same four instructors using the courseware in fall 2020, when they were in their third term of using the courseware. We wanted to see whether student course outcomes improved as these instructors gained experience in implementing the courseware and also whether these instructors appeared to have different course outcomes than those in the larger group of courseware using instructors in fall 2020. The table below shows model-adjusted course grades for all students in these course sections and for students who were Pell-eligible. There were not enough racially minoritized students in the two sets of course sections to support reliable estimates of their grades controlling for other differences among 2019 and 2020 students.

Average student grade in classes of four LCCC instructors who used courseware in fall 2019 and fall 2020[a]

Term	All Students		Pell-Eligible Students	
	Unadjusted Average Grade	Model-Adjusted Average[b]	Unadjusted Average Grade	Model-Adjusted Average[b]
Fall 2019	1.43	1.49	1.17	1.24
Fall 2020	1.63	1.70	1.31	1.34

[a] A = 4.0, B = 3.0, C = 2.0, D = 1.0, etc., fail or no grade = 0.0.

[b] Model for All Students adjusts for prior academic achievement, Pell eligibility, race, gender, age, enrollment status, and repeater status.

[c] Model for Pell-eligible students adjusts for prior academic achievement, race, gender, age, enrollment status, and repeater status.

Course grades for sections taught by these four instructors appear to be somewhat higher in 2020 than in 2019, but the difference is not statistically significant. It is also noteworthy that course grades for these 4 instructors are very similar to those in sections taught by the larger group of 12 courseware-using instructors shown above.

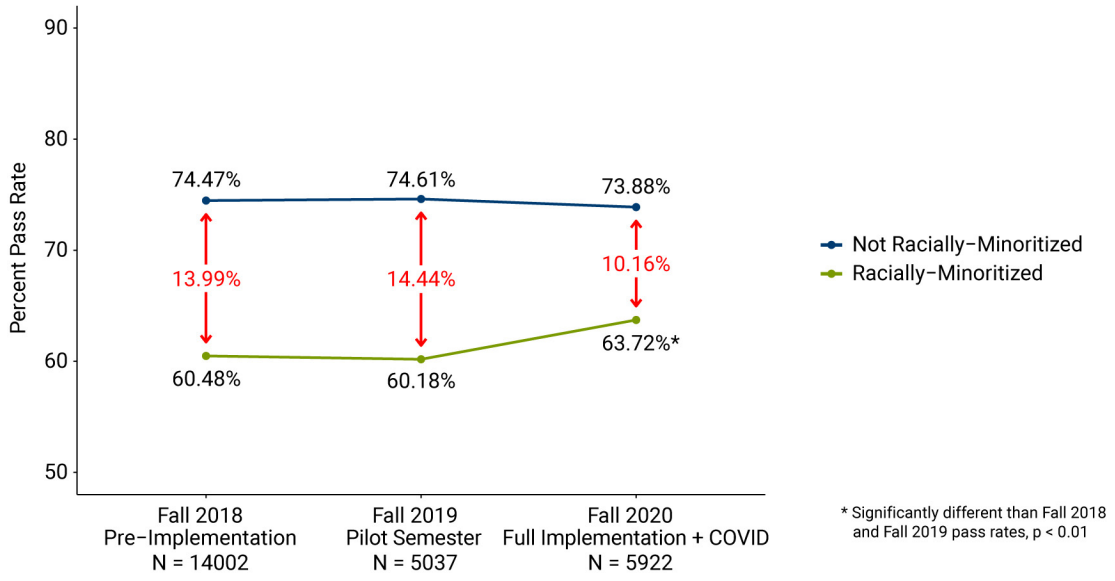
The Equity Gap in Lighthouse Courses Undergoing Redesign

During the first year of Every Learner Everywhere engagement with lighthouse institutions, Digital Promise computed prior-year (fall 2018) course success rates for the 41 courses undergoing redesign using data submitted by the institutional research offices of participating institutions.[11] Prior course success rates varied considerably across the courses identified for redesign, ranging from 39 percent to 90 percent with a weighted average of 66 percent.[12]

Breaking out the data for students who have been racially minoritized (African American, Latinx, Native American, and Pacific Islander students), we found an average course success rate of 60 percent for these students compared to more than 74 percent for white and Asian students, for a gap of 14 percent.

Repeating these calculations using enrollment and success data for the same courses implemented in the fall 2019 semester, we found a very similar course success rate gap (just over 14 percent) in this first semester of implementation. When this analysis was repeated using fall 2020 data, from a term when most instructors were on their third or fourth semester of courseware implementation, we found that the gap between course success rates for racially-minoritized students compared to non-racially minoritized students had narrowed to about 10 percent, as shown in Figure 4. Statistically, the ratio of course success rates in fall 2020 was significantly different from both the fall 2018 ratio ($X^2 = 10.439$, $p < .01$), and the fall 2019 ratio ($X^2 = 7.149$, $p < 0.01$) while the fall 2018 and fall 2019 ratios did not differ from each other ($X^2 = 0.054$, $p = 0.816$).

Figure 4. Race/ethnicity course success rate gap by academic term



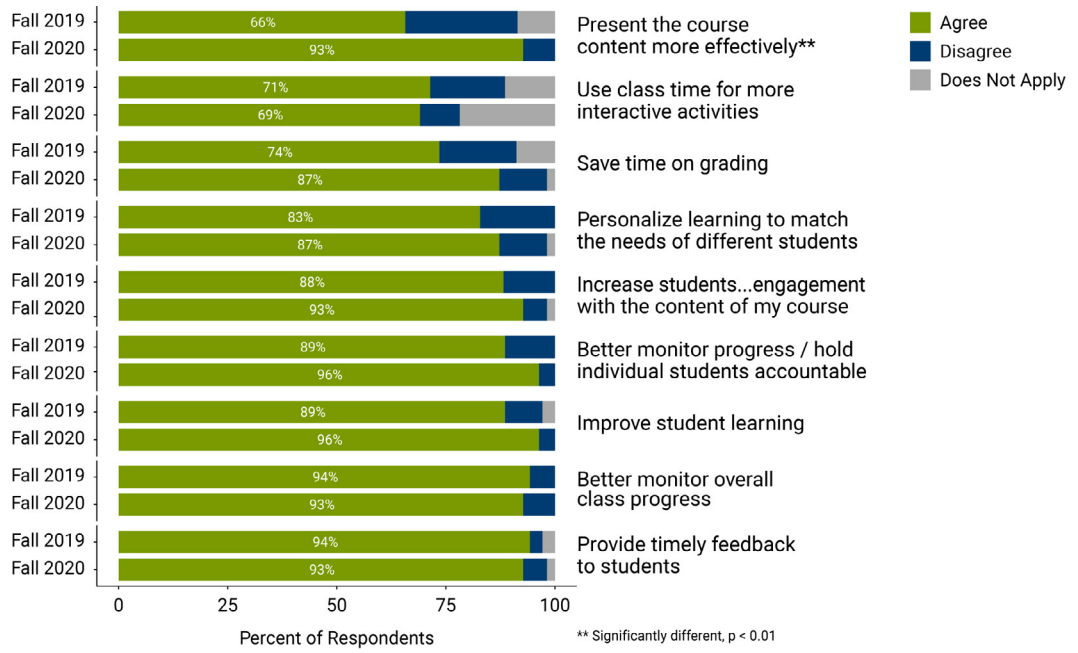
Faculty Perceptions of Courseware

Contributions of Courseware

As described in Digital Promise's Year 1 report, lighthouse faculty implementing adaptive courseware were quite positive about its contributions to the quality of their course in fall 2019.[13] And the level of faculty agreement with statements about certain positive contributions of courseware was even higher in the 2020 survey, as shown in Figure 5. By fall 2020 an overwhelming 96 percent of faculty agreed that adaptive courseware improves student learning and that it helps them monitor student progress and hold students accountable; 93 percent agreed that courseware helps them present course material more effectively, increases student engagement, provides students with timely feedback, and helps instructors monitor the progress of the class as a whole. The two biggest jumps from 2019 to 2020 in faculty agreement with the benefits of adaptive courseware were a 27 percent increase for courseware helping instructors present course material more effectively relative to the fall 2019 agreement level and a 13 percent increase for helping instructors save time on grading (with 87 percent agreeing that courseware helped them do this more efficiently in fall 2020).

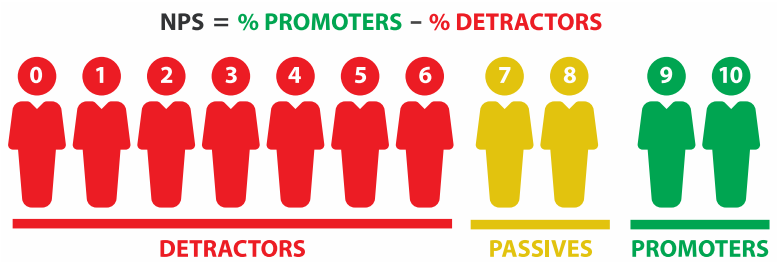
Fall 2020 lighthouse faculty perceptions of courseware also were more positive than those of instructors using courseware products that were part of the foundation's Next Generation Courseware Challenge,[14] a difference that could be attributable in part to the greater degree of support for courseware implementation provided by the Every Learner Everywhere network and in part to the greater product maturity of the courseware chosen by lighthouse instructors.

Figure 5. Faculty perceptions of the contributions of adaptive courseware in Fall 2019 and Fall 2020



Net Promoter Score

Another way to gauge perceptions of adaptive courseware among lighthouse instructors engaged with Every Learner Everywhere is through calculation of a standard industry metric called a Net Promoter Score (NPS). Responses to a survey item concerning likelihood of recommending the adaptive courseware product they were implementing to a friend or colleague were used to compute an NPS for lighthouse courseware implementers. Instructors were asked on a 0-10 scale to rank their likelihood of recommending the adaptive courseware they used to others. "Promoters" are those who answer 9 or 10 and are seen as likely to positively recommend the product to others. "Passives" are those who answer 7 or 8 and are seen as not likely to influence others' decisions. "Detractors" are those who answer 0-6, who are seen as potentially depressing others' likelihood of adopting the product by being less than enthusiastic about it. NPS is calculated as the percent of promoters minus the percent of detractors. A positive NPS is indicative of potential increases in product purchases or adoption, and investors consider an NPS above 50 as the gold standard for products with strong potential for growth.



Average net promoter score (NPS) among lighthouse faculty for the adaptive courseware products they were using rose from +23 in fall 2019 to +46 in fall 2020. It is possible that some of this increase is attributable to a few faculty who were disenchanted with courseware and declined to take the survey a second time. Nevertheless, an NPS of +46 is still remarkably positive, especially in light of earlier findings. For example, evaluators found an NPS of -14 in the last instructor survey conducted for the evaluation of the foundation's earlier Next Generation Courseware Challenge Grants,[15] and Tyton Partners calculated a national estimate of a negative NPS for courseware products among faculty overall and just +13 for those faculty using a courseware product for the third time on the basis of a large-scale 2021 faculty survey.[16]

Lessons for Future Engagement with Higher Education Institutions

Treat improvement of teaching and learning as a team sport.

Many institutions have individual leaders and faculty interested in leveraging digital learning to improve instruction and course outcomes. But major changes in instruction, like the shift to adaptive courseware, are difficult to accomplish as a solo practitioner. A key contribution of the Every Learner Everywhere engagement with lighthouse institutions was strengthening the perspective within participating departments that the quality of gateway courses is a mutual responsibility that should be addressed by collaborative teams of instructors, instructional designers, and academic leaders working together.

Consider use of incentives and enlisting external facilitators for change processes.

It was helpful also to have external change agents (the Every Learner Everywhere network organizations) provide a vision for change, set a cadence for lighthouse team activities, facilitate professional learning activities, and provide some concrete incentives, such as funding that could be used for faculty stipends and opportunities to attend and present at professional meetings. While developing and negotiating grant terms and data use agreements take time, such agreements are useful in securing colleges' sustained participation. Looking together at student outcome data was another productive feature of the lighthouse engagements; it appeared to pique faculty interest and to stimulate thinking about how courses could be refined further after the initial implementation of adaptive courseware. Another feature of the lighthouse engagement that project leads cited as important was peer-to-peer coaching and opportunities to exchange ideas with faculty in the same field at other institutions. These interactions took place at conferences, small convenings, and cohort calls with project leads.

Collect and analyze both early indicators and course outcome data.

Continuous improvement processes depend on robust measurement systems. As faculty teams make significant changes in their course, it is important to understand how those changes are affecting students early enough in the course that mid-course corrections can be made if necessary. At the end of the term, measures of students' cumulative learning in the course as well as their grades provide important information about whether course changes are having the desired impacts. Comparing student learning and course outcomes across course sections can also highlight faculty whose

students are exceeding expectations and motivate other instructors to learn about practices in those sections. More broadly, building faculty data literacy and sense of accountability for student success–that is, making sure they know what data they can collect and analyze, how to interpret data coming from student cohorts that vary from term to term, and actions they can take in response to persistent equity gaps–are key project components.

Stick with the improvement effort long enough for departments and programs to internalize the process.

Significant change in educational practice takes time.[17] The proportion of lighthouse faculty feeling very well prepared to implement adaptive courseware, for example, rose from 29 percent in the first term of implementation to 55 percent in the third term. The depth and two-year duration of the lighthouse activities catalyzed and supported by the Every Learner Everywhere network organizations appeared to be intensive and sustained enough to increase institutional capacity for using digital learning tools and data analysis to improve the quality of gateway courses in a number of instances. One community college found the course-level data provided by Every Learner Everywhere analysts so useful that they are working with their institutional research office to build a data dashboard so faculty involved in course redesign activities can view their course data. This was a shift from their prior practice of not sharing such data with instructors. Another community college has a faculty member on sabbatical working to better integrate the courseware with the course shell so adjuncts can use it. A four-year institution experienced such success implementing adaptive learning using Realizeit in their Spanish classes that faculty in German and French are now piloting the same product.

Attend to specific equity issues identified through student feedback and data analysis.

A weakness in the initial engagements with lighthouse institutions that the Every Learner Everywhere team moved to correct as events unfolded in 2020 was the lack of an explicit emphasis on culturally responsive teaching practices and attention to challenges experienced by specific kinds of students. When asked about needs and barriers of specific student groups, such as those minoritized by race/ethnicity or shouldering responsibilities as parents, many lighthouse faculty responded in 2019 that all of their students faced challenges. Their inclination was to focus on changes for “all our students” rather than focusing on the needs of particular groups defined by race/ethnicity, income, age, family or employment status. The pandemic and racial violence of 2020 turned a spotlight on the distinctive character of challenges faced by different kinds of students, and the need to attend to issues of student safety, time, technology, and belonging as experienced by particular kinds of students.[18] Online videoconferencing and the exchange of messages with students who were not active

in their courses gave instructors insights into students' circumstances they had not had previously. The Every Learner Everywhere network learned that the tools and processes being used to engage with faculty teams on course redesign need to give equity gaps much more prominence to motivate deeper investigation and understanding of barriers facing specific student groups and course designs and pedagogies to mitigate those barriers. Centering equity in this way will require bringing a broader perspective to course improvement strategies than one focused primarily on adaptive courseware.

Attend to scaling within departments and institutions.

The foundation's Postsecondary Success Strategy's long-term goal of dramatically increasing degree attainment rates for low-income students and students of color means that gateway course improvement tools, practices, and strategies need to scale up *within* higher education institutions as well as to more institutions. Improving a few gateway courses is a solid contribution, but impacting degree outcomes will require improving many courses, student supports, and the college climate for low-income and racially minoritized students within each institution.[19]

Looking Ahead

While the field is still awaiting definitive evidence of the impact of adaptive courseware on student learning and course success, the Every Learner Everywhere lighthouse work has provided proof points for the feasibility of spreading the use of adaptive courseware and examination of course data with an equity lens even in higher education institutions where faculty have the final say on what and how they teach. The dimensions highlighted in Every Learner Everywhere course improvement toolkits and playbooks, including the establishment of a multifunctional team to work together on course redesign and the expectation that course quality monitoring and improvement is an ongoing endeavor, were important for the lighthouse institutions.[20]

Questions remain about the extent to which additional higher education institutions are aware of the resources coming out of the Every Learner Everywhere lighthouse work and would be able to use them on their own, without extensive support from external entities providing customized strategic advice, faculty development, and data analysis.

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