Every Learner Everywhere & Lighthouse Institutions

First-Year Experiences

Digital Promise
Accelerating Innovation in Education

everylearner everywhere

Context: The Foundation's Postsecondary Strategy and Every Learner Everywhere

The Every Learner Everywhere network aims to help institutions of higher education address achievement gaps for first-generation students, low-income students, and students of color by improving teaching and learning with the support of adaptive tools. The network was created in 2017 to bring together the capabilities of its 12 member organizations to implement a Bill & Melinda Gates Foundation strategy of working with two- and four-year colleges to promote effective implementations of adaptive courseware in high-enrollment "gateway" courses.[1] This work is one component of the foundation's larger Postsecondary Success strategy "to ensure that all students who seek the opportunity are able to complete a high-quality, affordable postsecondary education that leads to a sustaining career." Making progress toward the foundation's goal will require U.S. colleges and universities to transform themselves in ways that enable them to raise college completion rates for an increasingly diverse population of college goers. This means better serving first-generation, low-income students and students of color. Every Learner Everywhere network activities address a key aspect of postsecondary transformation—the improvement of teaching and learning.

Why gateway courses? Difficulties that many first-generation students, low-income students, and students of color encounter in the introductory courses they take in their first two years of postsecondary education can lead to discouragement and abandonment of college plans (Bloemer, Day, & Swan, 2017). This insight led the foundation's postsecondary team to focus on gateway courses. If students have higher success rates in these courses, they will accumulate more credits toward graduation in their freshman year and be more likely to persist in their academic program (Adelman, 2006; Doyle, 2011).

Why adaptive learning? Learning systems and instructors provide students with adaptive learning experiences when they tailor instruction to the individual needs of different students. Research has demonstrated that learning is enhanced when instruction adapts to (1) students' prior knowledge levels, (2) their learning strategies and errors, (3) student affect and motivation, and (4) differences in students' ability to regulate their own learning (Aleven, McLaughlin, Glenn, & Koedinger, 2017). Digital learning systems can not only provide differentiated experiences to different learners but also give learning data to instructors. Instructors can use that data to identify students who need additional support and to pinpoints topics with which many students are struggling so that they can return to those topics in class.

[1] A gateway course is the first credit-bearing college-level course in a discipline or program of study.

The foundation's Postsecondary Success Strategy calls out adaptive courseware as a key lever for improving students' course outcomes and, through those impacts, student retention and attainment. As a result, the key performance indicator for the Every Learner Everywhere network's work with an initial set of college and university partners was stipulated as "demonstrating that when there is implementation support for use of adaptive courseware in gateway courses, the percentage of students (including the percentage of low-income and minority students) completing the gateway courses for a program of study rises by 15 percent (including for low-income minority students) by 2022."

Why lighthouse institutions?

The first set of colleges and universities served by the Every Learner Everywhere network is intended to produce learning about what it takes to implement adaptive courseware well, and to spread best practices around both courseware use and the use of objective evidence to improve instruction broadly within a higher education institution. The learning that will be gained from intensive work with the initial set of postsecondary institutions will offer both examples of improvement in diverse settings and a concrete set of practices and tools that other higher education institutions can use with less involvement and support from the Every Learner Everywhere network organizations.

What does it mean to scale an education innovation?

One of the key elements of the Gates Foundation's Postsecondary Success strategy is the high-quality implementation of adaptive technology in gateway courses at scale. But defining and measuring scale in this context is complex: Unlike discrete products that are bought and sold, educational innovations have multiple components, and each component may be present to a greater or lesser degree (rather than simply present or absent) and may be strong in some parts of the institution but not in others. Head counts and product purchases are inadequate to capture the complexity of spread for an educational innovation. Moreover, there is neither a single actor (like a buyer) nor a discrete event (such as point of sale) that fully captures the experience of the intervention. Northwestern University Professor Cynthia Coburn (2003) articulates the case for a multidimensional view of scale. Her conceptualization includes dimensions of the innovation's depth (change in underlying pedagogical beliefs and practices), sustainability, and a shift in ownership (such that the education institution takes responsibility for and makes decisions about the innovation which is no longer viewed as belonging to an external organization) as well as spread (which includes looking at penetration within each educational unit, not just the number of participating units).

Why a network?

The Every Learner Everywhere network is one of several solution networks the foundation has funded as part of its larger strategy to create an ecosystem of supports for higher education transformation and improvement.[2] The foundation chose to fund networks of service providers, rather than any single provider organization, because networks promote breadth of capacity, flexibility, collaboration, and redundancy. Coalescing multiple organizations with a variety of strengths and capacities around a common goal enables a network to address challenges that no single individual or organization could handle by itself. It also builds collaborations among groups that do not normally interact and promotes the flexibility needed to respond rapidly to changes in the field. As the various solution networks expand and become interrelated, the foundation expects an ecosystem supporting the transformation of higher education institutions will emerge.

The Lighthouse Institutions

During the first phase of the Every Learner Everywhere work, network members Achieving the Dream (ATD) and the Association of Public and Land-grant Universities (APLU) worked with two-year colleges and four-year universities, respectively, to develop proof points for the value of the supports the network could provide for effective implementation of adaptive courseware in gateway courses. The plan for this work entailed inviting, convening, and advising faculty and staff teams led by a senior administrator from a dozen lighthouse colleges interested in using adaptive courseware. These lighthouse colleges were recruited from three states (Florida, Ohio, and Texas). APLU and ATD solicited applications to become an Every Learner Everywhere lighthouse institution from institutions they had worked with in the past. To be a lighthouse institution, a college needed to commit to:

- Convening a cross-functional project team, including a department chair or dean, a senior representative from academic affairs, faculty in selected departments, and staff responsible for instructional technology and faculty professional development, to redesign one or more gateway courses to incorporate adaptive courseware;
- Sending 3 or 4 participants to a series of Every Learner Everywhere events including a teaching and learning summit;
- Participating in an online community of practice around teaching and adaptive courseware; and
- Engaging in project research conducted by Digital Promise, including faculty surveys, interviews with faculty project team members, and assembling anonymized student outcome data for students taking the courses undergoing redesign.

In return, the college would receive a modest subgrant ($25,000 or $50,000) and technical support services from APLU or ATD, as well as from Digital Promise. Seven community colleges signed on to work with ATD, and five four-year universities committed to APLU

[2] Other solution networks deal with student advising and developmental education. See https://www.naspa.org/press/naspa-announces-the-advising-success-network and https://strongstart.org/.

for Every Learner Everywhere activities during 2019. Key characteristics of these lighthouse institutions, including their prior experience with adaptive courseware, are shown in Table 1. Readers should be aware that the institutional data in Table 1 are taken from the Integrated Postsecondary Education Data System (IPEDS) records for undergraduate enrollments. IPEDS does not include data on the number of first-generation college goers, who comprise a large proportion of the students at the lighthouse institutions. In addition, the lighthouse institutions serve large numbers of part-time students from low-income backgrounds, who are not eligible for Pell grants because of their part-time status, and hence the percentage of Pell recipients as shown in the table underrepresents the low-income enrollment at these institutions.

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	2-year	9,854	47%	58%	Some staff 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.
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.

Institution	Type	Enrollment[a]	% Students of Color[b]	% Pell Grant[c]	Prior Experience with Adaptive Courseware
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.
University of Central Florida*	4-year	58,821	38%	32%	Familiar with customized adaptive rather than off-the-shelf adaptive 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.
Note: An additional four-year institution, Florida International University, will begin working with APLU in 2020.

Needs Assessment

Following early conversations with each lighthouse institution and an initial site visit, staff from their technical assistance provider (ATD or APLU) and Digital Promise met to discuss where the institution was in terms of key capacities for supporting effective use of adaptive learning at the start of their engagement with Every Learner Everywhere. These needs assessments were structured as ratings on seven dimensions that the Every Learner Everywhere team judged important for implementations of adaptive learning:

- **Alignment:** To what extent is the use of adaptive courseware to improve gateway course success rates for low-income and underrepresented minority students viewed as essential to meeting the institution's strategic goals?
- **Leader Support:** How strong is campus leader support for improving teaching and learning, implementing adaptive learning, and closing gaps in success rates?
- **Project Team Capacity:** To what extent is there a project team on board with the needed capacity (i.e., expertise and available time) for redesigning the selected gateway course(s) for cycle 1, supporting effective implementation of a blended course, and designing and implementing an impact study?
- **Capacity for Course Redesign Using Adaptive Learning at Scale:** Across the institution, how much experience and instructional design expertise is available to work on course redesign incorporating adaptive learning? Specifically:
  - To what extent does the institution implement practices for regularly reviewing and refining its gateway courses?
  - To what extent are there staff members familiar with adaptive learning products in multiple subjects?
  - Is there a systematic process for selecting courseware and other digital learning tools?
- **Capacity for Using Data to Support Continuous Improvement of Teaching & Learning:**
  - Across the institution, how common is it to analyze student learning and course success rates?
  - Do department chairs know the student success rates for their gateway courses?
  - Do departments have access to data from the institutional research office?
  - Is evaluation expertise readily available?
  - Is there support for using data from digital learning systems formatively to improve instruction?

- **Capacity to Support Faculty Development:**
  - Across the institution, to what extent are there professional learning opportunities (such as workshops, mentorships, communities of practice, and training sessions) available for both adjuncts and regular faculty and instructors?
  - Are incentives (e.g., mini-grants, release time) available to support faculty and staff involvement in redesigning courses to incorporate adaptive courseware and promote equitable learning outcomes?
  - Do these supports attend to issues around quality implementation of adaptive learning, including leveraging data available from learning systems?
- **Capacity for Inclusive Teaching Practices**
  - Across the institution, to what extent are departments and faculty encouraged and supported in efforts to improve teaching and learning for low-income and under-represented minority students?
  - Do department chairs and faculty know the success rates in their gateway courses for key student subgroups?
  - Are faculty and staff being guided by research on pedagogical approaches that reduce equity gaps?

For each dimension, the institution received a rating from 1-4 from their technical assistance provider and Digital Promise liaisons, with 4 being the most mature instantiation of the rubric. Table 2 provides the range and average values for the seven dimensions among the 12 lighthouse institutions.

Table 2. Every Learner Everywhere assessment of lighthouse institutions' baseline capacity for redesigning courses with adaptive courseware at scale

Capacity Dimension	Rating			Description of Average Institution at Project Start
	Average	Minimum	Maximum	
Alignment	2.67	2	4	"Adaptive learning/courseware" and "improving introductory courses" rarely appear in institutions' strategic plans.
Leader Support	2.75	2	4	Good, but project lead at some institutions had limited influence institution-wide.
Project Team Expertise	2.67	2	4	Project teams initially included most but not all of the needed types of expertise.
Designing Courses with Adaptive Courseware	1.92	1	3	Course design activities were siloed and optional at most campuses. Typically, there was no systematic process for examining the quality of gateway courses.
Using Data for Improvement	2.50	2	4	Systematic processes for using data to improve teaching and learning were largely absent. Learning system data were rarely used for improvement purposes.
Faculty Development	2.36	2	4	Professional learning opportunities for faculty were of uneven quality and not incentivized; there were none for adjuncts.
Inclusive Teaching Practices	2.36	2	3	Faculty were unaware of course success rates for different kinds of students; they had not received training in inclusive pedagogy

With one notable exception invited into the cohort as a model of advanced practice (University of Central Florida), the lighthouse institutions were missing some of the capacities needed to use adaptive courseware strategically to improve outcomes for low-income students and students of color when the project started. Institutional strategic plans, for example, did not include implementation of adaptive courseware. Even though the strategic plans talked about improving teaching and learning or closing achievement gaps, they did not highlight gateway courses as a focus for improvement efforts or adaptive learning as a catalyst for instructional improvement. The project strategy was to deliver technical assistance in a way that supported the institutions' capacity building.

For the Every Learner Everywhere work, each lighthouse institution had a project lead who assembled a project team with all or most of the kinds of expertise identified in their agreement with their technical assistance provider. However, only a few teams talked about 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.

Most of the lighthouse institutions had staff with instructional design expertise who were available to help faculty design or redesign courses for the Every Learner Everywhere effort. However, before engaging with Every Learner Everywhere, these teaching and learning staff had worked with individual faculty members who happened to seek their help, and they were not consistently leveraged by academic departments in efforts to improve instruction.

Also absent at many of the institutions were regular, systematic departmental processes for examining the quality of gateway courses. Administrators were generally aware of course success rates (the proportion of students enrolled in a course who received an A, B, or C), 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. For their part, faculty knew the proportion of students succeeding in their course overall, but did not know success rates for specific kinds of students, such as African American and Latinx students. Without this kind of information, many faculty did not fully appreciate their role in a larger effort around equity and student success. Moreover, some faculty attributed low success rates in their course to qualities of their students (e.g., inadequate preparation or poor work habits) and did not feel they had the power to increase student learning and success rates through modifications to their teaching practices.

Professional learning opportunities to help faculty acquire new teaching strategies and learn to use digital tools were offered on most campuses, but participation was voluntary and typically not incentivized. On most campuses, professional development opportunities were not available at all for adjunct instructors, who tend to change from term to term but are increasingly teaching the majority of gateway course sections.

Finally, most faculty had not received any professional development around culturally responsive instruction and pedagogies that are particularly effective with low-income students and students of color.

This composite portrait represents the baseline of lighthouse institutions with respect to capacities needed to leverage adaptive courseware for student success. The Every Learner Everywhere supports for lighthouse institutions were designed to help them build these capacities and practices. The technical assistance team will examine where the lighthouse institutions stand with respect to the same dimensions at the conclusion of the spring 2020 academic term.

Description of Every Learner Everywhere Technical Assistance

To make headway in improving gateway course success rates for underrepresented students, Every Learner Everywhere needs to reach large numbers of institutions to help them improve their capacities to enhance the quality of gateway courses. The rationale for starting with a relatively small number of lighthouse institutions is to:

- Gain new insights into best practices in implementing gateway courses using active and adaptive learning;
- Catalyze the emergence of a cohort of higher education leaders and faculty with experience supporting the implementation of course redesign and continuous improvement processes;
- Better understand what external supports are both valuable and scalable;
- Codify practices and develop tools for supporting course redesign and improvement efforts at scale; and
- Generate compelling examples of course redesign efforts that improved student outcomes.

The support activities supplied by Every Learner Everywhere were designed to help the initial cohort of 12 institutions become "lighthouses" that could guide the way for additional institutions to make the journey more rapidly and efficiently. These support activities recognized the expertise and leadership already available in the lighthouse institutions, and drew upon the experience of a set of eight universities that had worked with APLU on implementing adaptive courseware under a prior grant.

The main components of the technical assistance were:

- Face-to-face work at the institution, including one- or two-day workshops, bringing in consulting faculty from institutions experienced in implementing adaptive courseware. Lighthouse institutions had one to three Every Learner Everywhere on-campus visits during 2019.
- Coaching at a distance through scheduled conference calls (five to eight, depending on schedules) with their technical assistance provider and calls with other higher education institutions implementing adaptive learning in the same academic disciplines.
- Convenings and 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 (two to four of these events depending on institutional preferences).

Interaction with Digital Promise was woven into these activities. A Digital Promise researcher accompanied the technical assistance provider on one of the early on-campus visits to each lighthouse institution to promote the use of a data-informed continuous improvement process in conjunction with the institution's efforts to improve teaching and learning. The researcher also explained the Every Learner Everywhere process for collecting student-level course success data before and after course redesign and helped project teams plan the designs for their course redesign impact studies. The latter effort involved balancing the methodological elements of a rigorous research design with the realities of campus culture and the limited time and capacity for conducting research in parallel with redesign and implementation efforts. Digital Promise researchers described design alternatives and the benefits of more rigorous designs, but left the design decision to the lighthouse institution team. In most cases, the course lead chose to compare student grades and success rates (proportion finishing the course with a grade of A, B, or C) for fall 2019 sections experiencing the adaptive version of the course to the same measures for sections that had the nonadaptive version with the same instructors in the prior year.

Digital Promise also worked with institutional research offices to do any necessary tailoring of Digital Promise's data request to the institution's student information system and to explain the process for de-identifying student data and doing secure data transfer. Finally, Digital Promise researchers observed and documented interactions within and across lighthouse institution teams attending Every Learner Everywhere convenings.

Courses Redesigned for Fall 2019

Because of a later-than-anticipated project start (several months into 2019 for most lighthouse institutions), two of the 12 lighthouse institutions felt they could not complete their course redesign work in time to pilot the new adaptive version of their courses in fall 2019. The 10 institutions that did pilot adaptive courses in 2019 launched 41 redesigned courses in aggregate. These courses involved seven subject areas (Biology, Chemistry, Economics, Language Arts, Mathematics, Physics, and Psychology) and a range of products, including ALEKS, Inquizitive, Lumen Waymaker, Pearson Mastering Biology/ Physics, Pearson MyMathLab, Smart Sparrow eSpark, and Wiley Plus. Table 3 shows the key characteristics of the lighthouse institution courses involved in fall 2019 pilots.

Table 3. Fall 2019 Adaptive Course Pilots

Institution	Type	Course	Subject Area	Number of Instructors[a]	Estimated Number of Students
Amarillo Community College	2-year	Composition I and II	English	3	UK
Amarillo Community College	2-year	College Algebra/ College Algebra for STEM	Math	3	UK
Amarillo Community College	2-year	Introductory Chemistry I	Chemistry	2	UK
Amarillo Community College	2-year	Gen Organic & Biological Chemistry	Chemistry	2	UK
Amarillo Community College	2-year	Principles of Chemistry I	Chemistry	2	UK
Amarillo Community College	2-year	Principles of Chemistry II	Chemistry	1	UK
Amarillo Community College	2-year	Adult Education & Literacy	English	1	UK
Cleveland State University	4-year	Applied Algebra	Math	1	34
Cleveland State University	4-year	Precalculus I	Math	4	131
Cleveland State University	4-year	Precalculus II	Math	2	92
Cleveland State University	4-year	The Living World	Biology	2	345
Cleveland State University	4-year	Introductory Bio I	Biology	1	260
Cleveland State University	4-year	Introductory Bio II	Biology	1	132
Cleveland State University	4-year	General Chemistry I	Chemistry	5	595
Cleveland State University	4-year	General Chemistry II	Chemistry	2	150
Cleveland State University	4-year	Organic Chemistry I	Chemistry	2	225
Cleveland State University	4-year	Organic Chemistry II	Chemistry	1	69
Cuyahoga Community College	2-year	Introduction to Biological Chemistry	Biology	1	87
Cuyahoga Community College	2-year	Anatomy & Physiology	Biology	1	34
Cuyahoga Community College	2-year	Introduction to Inorganic Chemistry	Chemistry	1	92

Institution	Type	Course	Subject Area	Number Instructors[a]	Estimated Number Students
Cuyahoga Community College	2-year	General Chemistry I	Chemistry	2	57
Cuyahoga Community College	2-year	Principles of Microeconomics	Economics	1	40
Cuyahoga Community College	2-year	Beginning Algebra	Math	4	124
Cuyahoga Community College	2-year	General Physics II	Physics	1	8
Cuyahoga Community College	2-year	General Psychology	Psychology	2	264
Houston Community College	2-year	Macroeconomics	Economics	2	214
Houston Community College	2-year	College Algebra	Math	4	203
Houston Community College	2-year	Math for Business	Math	3	178
Indian River State College	2-year	Intermediate Algebra	Math	4	1,427
Indian River State College	2-year	Quantitative Reasoning	Math	5	511
Indian River State College	2-year	Intro to Chemistry	Chemistry	2	226
Lorain County Community College	2-year	Introduction to Statistics	Math	5	810
Miami Dade College	2-year	College Algebra	Math	10	4,856
University of Toledo	4-year	Chemistry for Health Sciences	Chemistry	1	132
University of Toledo	4-year	Elementary Chemistry	Chemistry	3	473
University of Toledo	4-year	General Chemistry	Chemistry	4	1,040
University of Toledo	4-year	Trigonometry	Math	5	233
University of Central Florida	4-year	College Physics I	Physics	1	198
University of Central Florida	4-year	Spanish 1	Languages	2	164
University of Texas - Rio Grande Valley	4-year	College Algebra + Co-Requisite	Math	9	190
University of Texas - Rio Grande Valley	4-year	Elementary Stats + Co-Requisite	Math	5	86
Total				99	13,680

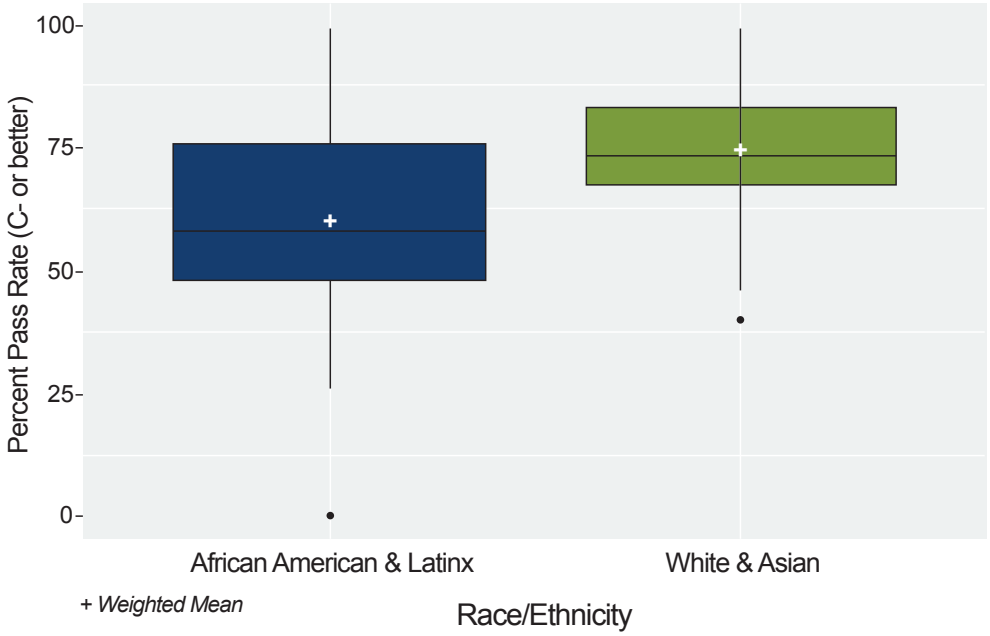
Note: UK = Unknown: institution did not provide enrollments from fall 2018

[a] Total is number of instructor course implementations; some instructors taught more than one course piloting adaptive courseware.

We computed prior-year course success rates for the courses undergoing redesign with Every Learner Everywhere using data submitted by the institutional research offices of participating lighthouse institutions. 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. The inclusion of courses at the high end of this range of success rates indicates that not all lighthouse institutions were limiting this work to their gateway courses with the highest DFWI rates.

Breaking out the data for students of color (African American, Latinx, Native American, and Pacific Islander students), we found an average course success rate of 61 percent for these 41 courses, as shown in Figure 1. ***When success rates for these students were compared to those of white and Asian students in the same courses, the average difference was 14 percent.*** As data from the fall 2019 pilots come in, we will estimate the gap in course success rates for these student groups when their courses use adaptive courseware.

Figure 1. Course success rates for African American, Latinx, Native American/Pacific Islander students compared to White and Asian students.



After computing success rates for the versions of these courses using adaptive courseware in fall 2019, Digital Promise also will compare them to the prior success rate for each course to quantify the impact of lighthouse institutions' early efforts at adaptive instruction. Digital Promise will hold collaborative impact data review sessions with the lighthouse institution project teams to model the process of using both course data and instructor experience to inform refinements of the way adaptive courseware is implemented.

The same process of data collection and impact analysis will be applied to courses redesigned with Every Learner Everywhere support and implemented in spring 2020.

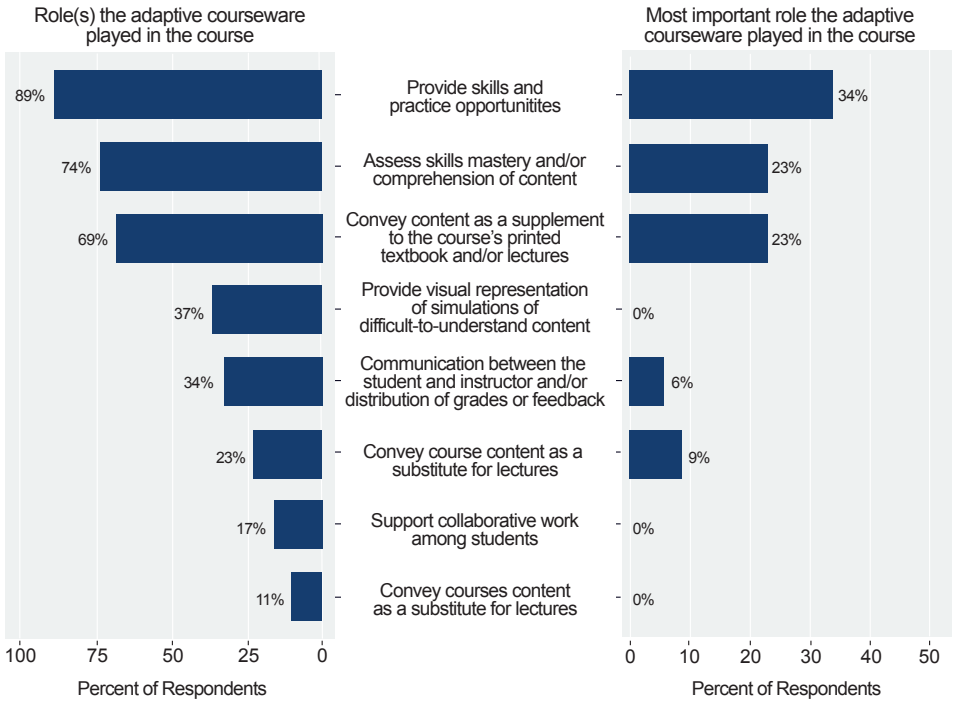
Instructor Perceptions of Redesigned Courses

Lighthouse institutions were asked to provide contact information for instructors teaching the courses redesigned with Every Learner Everywhere support and for other instructors at their institution who taught the same or similar courses, but were not involved with the adaptive learning effort. Digital Promise contacted these individuals and invited them to take an online survey; a $35 gift card in recognition of the value of their time was offered. Digital Promise received 61 survey responses from instructors at nine of the 10 institutions fielding adaptive courseware in fall 2019. Of these, 39 respondents were using adaptive courseware in conjunction with their institution's involvement with Every Learner Everywhere (for a response rate of 45 percent among courseware using instructors on the survey roster).

Most of the instructors responding to the survey used the courseware in a blended learning approach. Typically 36 to 65 percent of students' learning in the course was expected to occur through working with the courseware. The great majority (90 percent) of these instructors had volunteered to use adaptive courseware, and 83 percent chose the product they used. A majority (63 percent) of these instructors had used the product in the past, though perhaps not in the same way.

Figure 2 shows the role instructors reported having courseware play (they could indicate more than one role). ***Skills practice, assessment, and conveying content were the dominant roles for courseware in these classes.*** With respect to the latter role of conveying course content, most instructors viewed the courseware as a supplement to (rather than replacement for) lectures and textbooks.

Figure 2. Role of adaptive courseware in fall 2019 pilot courses



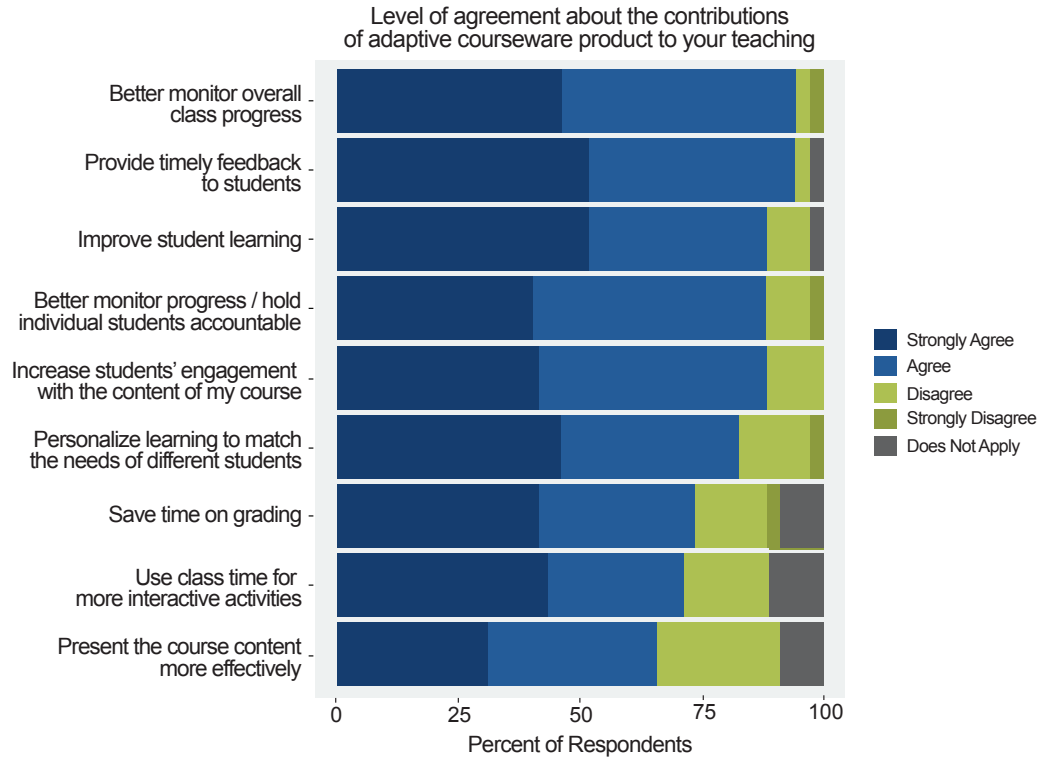
A majority of instructors reported that they first introduced material in class and then had students use portions of the courseware on the same topic (60 percent). Only 23 percent reported having students read about or practice content using the courseware first before working on the same material in class (i.e., "flipping the classroom").

On average, instructors using adaptive courseware reported that 29 percent of a student's grade in their classes was based on his/her work with the adaptive courseware. The courseware could count in a number of different ways: 69 percent of instructors counted the number of modules completed toward a student's grade; 66 percent counted students' performance on quizzes within the courseware toward grades; 20 percent counted the amount of time the student spent on the courseware; and 17 percent used course examinations integrated into the courseware.

Many researchers believe much of the value of adaptive courseware stems from the instructor's use of the learning data available from the system as a guide to identifying students who need additional support and to focusing future classroom-based activities on topics many students struggle with (Kinshuk & Kumar, 2018). The technical assistance provided through Every Learner Everywhere stressed the value of using the learner data available on instructor dashboards because past studies have found that many instructors fail to use it (and sometimes don't even realize it's available). ***Two-thirds (66 percent) of courseware-using instructors responding to the Digital Promise Instructor Survey said they looked at the courseware whole-class dashboard once a week or more.*** Half (50 percent) said they looked at dashboards for individual students once a week or more.

A large majority of the instructors who used adaptive courseware in fall 2019 Every Learner Everywhere pilots (89 percent) believed using the product had improved student learning. Percentages of instructors who agreed or strongly agreed that the courseware contributed in various ways are shown in Figure 3.

Figure 3. Instructor perceptions of the contributions adaptive courseware made



Nearly all of the surveyed instructors (90 percent) said that if given the choice, they would use the product again. The Net Promoter Score for adaptive courseware was +.24 with twice as many promoters as detractors.

> *The courseware is working very well. Those who are using it are doing well. I would like help on figuring out how to engage those who are not using it...*
>
> *- Instructor write-in response*

Digital Promise also collected qualitative data on instructor perceptions of their experience integrating adaptive learning into their courses. These data were collected through end-of-semester phone interviews and, in one case, a written response offered by an instructor who terminated use of the adaptive courseware mid-way through the semester.

In end-of-year interviews, instructors reported both positive and challenging experiences implementing adaptive courseware. Some of the interviewed instructors had previous experience with courseware and used the grant to integrate courseware into more sections of a course or into new courses, including newly created co-requisite modules. As part of this implementation process, they selected topics in the courseware, determined the frequency and quantity of problems to assign on each topic, set up quizzes, and

decided how courseware assignments and quizzes should factor into grades. In addition to integrating the adaptive courseware, some instructors redesigned other components of their course. For example, they considered written assignments, the optimal number of class hours, attendance policies, use of supplementary instruction (SI) and tutoring, whether these supports should be required or optional, and what criteria should be used for recruiting undergraduate tutors.

Instructors found it valuable to have the opportunity to learn how to use features of the systems. A few instructors had concerns about the quality of the courseware they selected; one instructor decided to withdraw from the project team at her college because she found the accuracy of content and user experience of the product she had selected unacceptable.

> *"On-demand personalized practice opportunities from a product that also provides quick, actionable feedback to both students and instructors sounds fantastic! Knowing what technology can make possible, I was excited to give [PRODUCT] a try. Unfortunately, the more time I spent working with this product last semester, the more surprised at the lack of quality I became, and the less comfortable I felt with the thought of continuing to make [PRODUCT] a required element of my classroom. ...*
>
> *"It seems that students with weaker general skills (e.g., reading, problem solving, technology savvy) are penalized more by the flaws of the [adaptive courseware] product than students with stronger general skills. ... Adaptive technology in general has the potential to help close equity gaps, but my impression is that the [adaptive courseware] product in its current form may even do the opposite by further discouraging students who are already at risk."*
>
> *- Instructor who dropped the courseware product*

Others felt they were getting more familiar with features in the software, and identified ways they could implement it better the next semester. Instructors recognized that adding adaptive courseware was only one of the elements of instruction they had changed.

"I feel like I haven't yet had a chance to take as much advantage of the feedback that we get from [PRODUCT] and the feedback that we could get from all the data from the homework assignments and the adaptive follow-ups that are available. So that's kind of my goal for the second semester now that everything's set up and I don't have the learning curve in front of me, can I take more advantage more quickly of the data that's available from using the various software and Clicker Quizzes."

- Instructor interview comments

Student Perceptions of Redesigned Courses

Digital Promise offered to run online focus groups for interested lighthouse institutions piloting courses in fall 2019, and six opted for this data collection. The focus group protocol was reviewed by the relevant institutional review boards (IRBs), and instructors sent invitations to their students to contact Digital Promise to volunteer for a focus group. The process was designed in such a way that instructors would not know which of their students had volunteered, and participating students received a $25 gift certificate from Digital Promise.

The student focus groups were conducted online by a Digital Promise researcher or an advanced social sciences graduate student. Recordings of the focus groups were transcribed, leaving out any mention of a student's name, and transcripts were coded by two Digital Promise researchers using nVivo software. A total of 34 focus group participants were drawn from five lighthouse institutions (two four-year and three two-year). Focus group facilitators estimated that three-quarters of the focus group participants were students of color (primarily Latinx and African American). In aggregate, the focus group students had experienced seven different Every Learner Everywhere redesigned courses involving seven different adaptive products in five subject areas.[3] Subject areas for the courses discussed in focus groups were biology, economics, mathematics, psychology, and statistics.

Students in focus groups reported using the courseware for an average of approximately four hours per week, with individual students reporting usage times ranging from one to 10 hours.

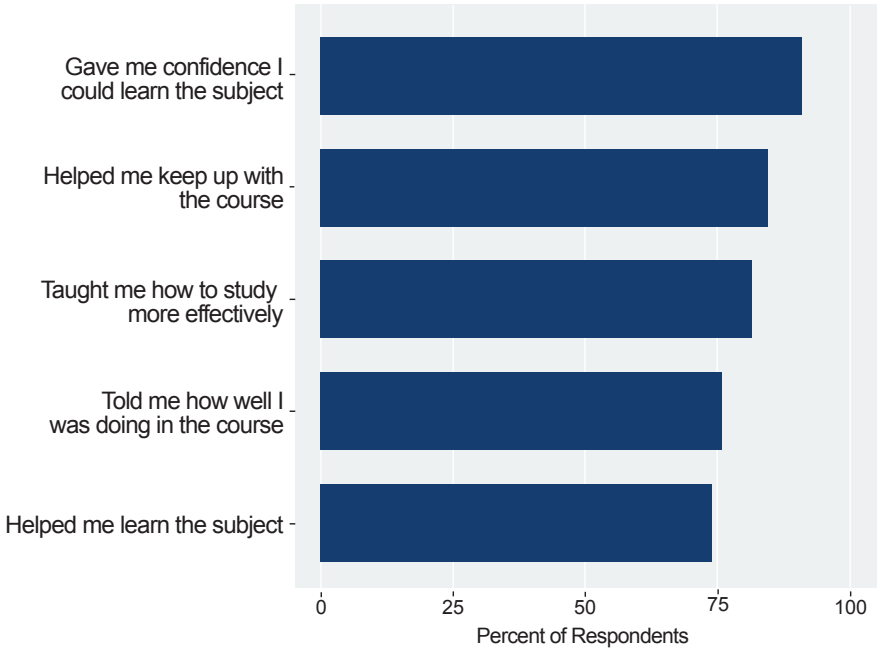
[3] We were not able to get IRB approval at one four-year institution in time to conduct focus groups, and one two-year college conducted its own student focus groups. Data from the latter are not included in the tabulations below.

"Oh yeah, on a scale of one to 10, I want to say I'm an eight now. Before I used to be like a four, because I don't know if I had a horrible high school experience, but we didn't really have much sciences. So, trying to do Bio in my undergrad, it was just horrible. I didn't want to ruin my GPA, so I had to stop, but now with [PRODUCT] and having all these resources like SI and all that stuff, it really is even more confidence."

- Student at 4-year institution

On the whole, focus group students were very positive about the courseware, as shown in Figure 4.

Figure 4. Focus group student perceptions of the adaptive courseware



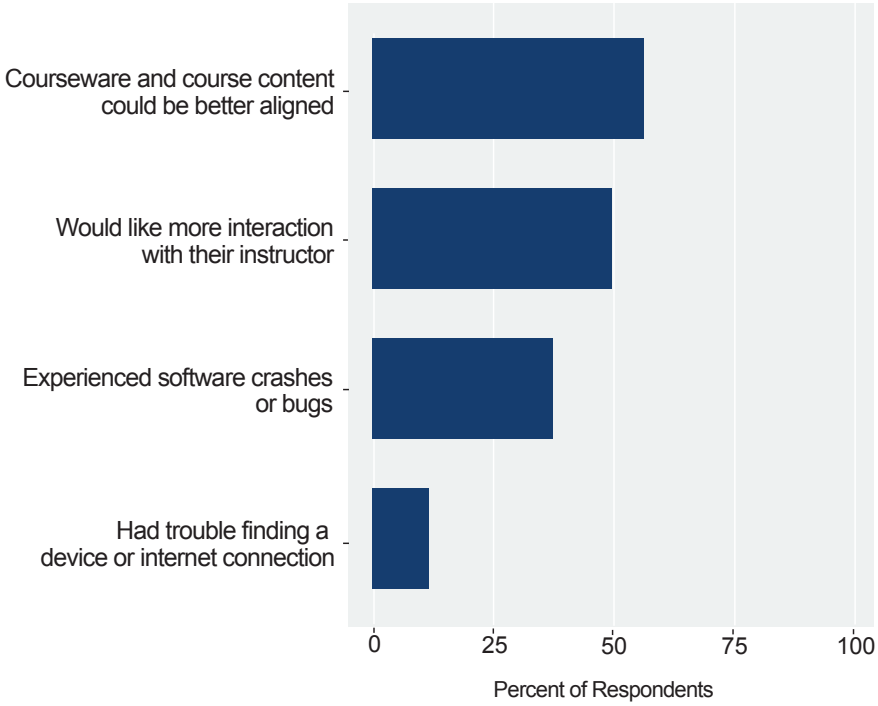
"I think [the courseware] helps me learn [the course subject matter] better than I normally would have because it answered a lot of the questions that someone would have if they had a passion for it. Some of my classmates, you could tell some of them really wanted to be there, and they were excited about it and I'd be able to sit down and have a conversation with them... so I think it really helped us, not just me individually, but as a class to be able to sit there and read up and explore on the different topics of psychology that [PRODUCT] provides."

- Student at 2-year institution

Reservations about the courseware were less frequent than positive comments but did highlight some issues that deserve attention. Almost half of the students had examples of situations where the courseware and the other content in the course were not aligned. These inconsistencies bother students, and are a particular impediment for students who lack confidence in the subject area or who come to the course with some weaknesses in their preparation.

Some students also expressed the desire for having more interaction with their course instructor, something that varied depending on how instructors implemented their courseware product and in-class sessions. About a third of focus group participants reported experiencing some problem with software glitches or crashes, something students need to be prepared for even if the course will be using commercial off-the-shelf products. Finally, about one in eight students reported having had some difficulty finding a device or internet connection for using the software. Despite progress closing the Digital Divide, any teaching and learning effort using digital learning tools should have strategies for making sure all students in the course can access the courseware on demand. These findings are summarized in Figure 5.

Figure 5. Focus group student concerns about the adaptive courseware implementation



"My professor didn't go over any problems or anything. So, I think it would've been cool if she did at the beginning. Because, I kind of went in expecting the problems to be very similar to what we had had for our homework and they were very, very different and a lot more challenging, and their wording and everything was a little bit different."

- Student at 2-year institution

"I think I could have done the same, I think even better if I didn't use [PRODUCT] because I think I would prefer to have had a class with maybe assignments and stuff, where I could actually write and I could go up to the professor if I needed help and stuff. Yeah, I prefer to have a professor there and assignments to be handed out instead of just the computer."

- Student at 4-year institution

Lighthouse Institution Reflections on the Process

Digital Promise researchers conducted semi-structured interviews with lighthouse institution project leaders in December 2019 to capture their perspectives on the work happening within their institutions. We asked these team leaders to describe their institutions' motivations for entering into the Every Learner Everywhere collaboration. The desire to close achievement gaps and interest in improving teaching and learning with digital tools generally were common motivations while interest in adaptive courseware was not. The decision to enter this particular project was also influenced positively by their prior experience with and trust in their primary technical assistance provider (ATD or APLU). Finally, team leads told us that the project's provision of some external funds was important, even though the amount of funding ($25,000 or $50,000) was modest. Institutions were able to use these funds to offer stipends or course releases to faculty participating in the course redesign and piloting efforts. Several institutions obtained internal funding to further support the effort, but team leads felt it would have been difficult to obtain enough internal support without the external contribution.

The aspects of the Every Learner Everywhere technical support that team leads found most useful involved face-to-face interaction, either during on-campus visits or at the ATD Teaching and Learning Summit. One team lead at a four-year university described the latter experience as "transformative" for her faculty who attended the meeting in giving them a better appreciation of their students' lives and challenges.

> *"When faculty members [at the ATD Teaching and Learning Summit] heard community college people talk about the real lives of their students, they realized those were also the lives of their own students. It was persuasive to them that going to college now is vastly different [than when they went], and for other people it's different from their own experience."*
>
> *- Lead for a 4-year university team*

Team leads appreciated the amount of collaboration between Every Learner Everywhere network organizations and their campus team built into the experience and the willingness of the Every Learner Everywhere team to be flexible around processes in response to their institutions' local constraints, goals, and capacities. Still, there were two major concerns about the process:

- First, the schedule calling for implementing redesigned courses in fall 2019 after starting the project just the prior spring was said to be too rushed. Team leaders had to work with whatever faculty and courses could be ready in time, and the process of supporting these faculty could not be as deliberate and comprehensive as the team leads would like.
- Second, the project was scheduled to end in June 2020, and team leaders realized they still had much to do in terms of refining the adaptive courses they launched in fall 2019 and sharing the course redesign process beyond the initial courses and faculty participants.

That said, lighthouse team leaders felt there had been tremendous progress on their campuses and that the work will meet their goals for getting involved by project end. Areas of progress they highlighted were:

- Faculty learning about adaptive courseware and instruction
- Faculty attitude shift toward more responsibility for student learning
- Changes in instructional practice, not only in implementing adaptive learning but also in using more active learning strategies
- Collaborations across instructors working together on the same course(s)
- Deeper analysis of what they're teaching
- More consistency across sections taught by different instructors
- Collaboration across different units of the college that don't usually work together

"I think adaptive is a way to sneak some of these discussions about pedagogy because it is something that someone else has already done for you generally speaking. I don't think we're going to have a bunch of people who are just going to go design their own system. You can implement something that someone else has already done, so that makes it a little easier. But then it does start to get you thinking differently about how to deliver content, which is where we need to get."

- Lead for a 2-year college team

"It's beneficial to have an opportunity for faculty to really test out a product, for them to get used to it, [and determine if] this is a model that could be used in other situations where we piloted a technology like this and with a few faculty and adjust from there. … Historically when we've done course redesign, it's really like a person who's done that as part of a sabbatical project or whatever else, and that person is the one who does things. It's in isolation, so they pick the textbook and they design the class and they pilot the software. And if they like it, that's what is done. But guess what? That's okay, maybe, for a small course where very few people teach it or maybe just one individual section of something, not for something where we're offering 45 sections."

- Lead for a 4-year university team

Team leaders do not have the course redesign impact study data yet, but several expressed optimism that it would be positive even though their faculty were in their first attempts at implementing active and adaptive learning.

Leaders were mixed in their judgments of whether the work they were doing with Every Learner Everywhere had enough momentum to continue after their grant comes to an end. Three team leaders expressed confidence the work would continue and several thought that at least one of their departments would continue the work, but others would let the work fade once the grant drew to a close. A project lead from a two-year institution that involved a large number of courses and disciplines in the effort provided the most heartening response:

"Even if we stopped our involvement as a cohesive group next month, I think [the effort to redesign courses to leverage adaptive courseware] would continue in all disciplines. A few faculty members might drop off, but all the disciplines have progressed and are prepared to keep going. Even those not thrilled with the interactive product they've chosen are looking to change things [and try it again]. We'll convene the SLC [the faculty learning community they started for this project] as long as faculty want to participate. It will maintain now with or without grant funding."

- Lead for a 2-year college team

Taking Stock of the Early Lighthouse Experience

After nine months of working with a dozen lighthouse institutions, we have formed some tentative conclusions that can inform future Every Learner Everywhere work:

- Intensive, collaborative work, as conducted with the lighthouse institutions, did catalyze changes in practices within these institutions. The institutional changes with respect to improving teaching and learning involved only a minority of the institutions' faculty, but team leaders are thinking about how to spread the practices more widely.
- The structure of the Every Learner Everywhere engagement required a lot from both project leads and faculty. Laying out requirements clearly in contracts between the institution and their primary technical assistance provider gave the project leads a sense of urgency and catalyzed the involvement of multiple college staff who don't usually work together.
- "Technical assistance" is something of a misnomer for the engagements between Every Learner Everywhere network organizations and the lighthouse institutions. The engagement was a series of collaborative planning and coaching activities occurring within the general structure stipulated in the grants to institutions, rather than a one-way transmission of knowledge from Every Learner Everywhere organizations to lighthouse institutions. It was important to have real-time back-and-forth discussions as project leads and faculty were planning and starting to implement their redesigned courses.
- In seeking faculty participants, project leads turned to those already onboard with focusing on the quality of instruction. They believe that convincing less-interested and reluctant faculty through modeling of good practice by these volunteers and finding positive impacts on their students is more likely to succeed than top-down mandates.
- Both project leads and faculty really appreciated opportunities to meet with field-alike peers at other institutions engaged in using adaptive courseware.

In summary, the level and nature of engagement between Every Learner Everywhere and the lighthouse institutions were strong enough to catalyze implementation of adaptive learning and data-informed, equity-oriented improvement processes. Participating lighthouse faculty increased their understanding of adaptive learning and how adaptive courseware functions. Many of these faculty used the course redesign effort as an opportunity to think more deeply about their curriculum and instruction, with an emphasis on getting more active learning into face-to-face class sessions. Moreover, there are indications that some of the lighthouse teams have internalized the key elements of their interactions with Every Learner Everywhere (identifying equity gaps, leveraging adaptive courseware, supporting faculty learning, and measuring impacts for students) as something they need to do for all their gateway courses. Still, the lighthouse teams also realize they are still at the beginning stage of making the courses they're working on as effective for different student groups as they should be, and that there is a long road ahead to spread these practices more widely throughout their institutions.

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