Achieving the Dream™

ADAPTIVE COURSEWARE: New Models to Support Student Learning

LESSONS LEARNED FROM ATD NETWORK COLLEGES IN THE EVERY LEARNER EVERYWHERE INITIATIVE

everylearner everywhere

FULL REPORT

APRIL 2022

ABOUT THIS REPORT

Achieving the Dream (ATD) is one of 12 higher education and digital learning organizations that make up the Every Learner Everywhere (Every Learner) Network, whose mission is to help higher education institutions improve and ensure more equitable student outcomes through advances in digital learning, particularly among poverty-impacted, racially minoritized, and first-generation students. Every Learner partners are addressing high failure rates in foundational courses through the provision of scalable, high-quality support to colleges and universities seeking to implement adaptive courseware on their campuses. As part of its ongoing effort to help community colleges develop effective teaching and learning practices, ATD worked with seven community colleges in Florida, Ohio, and Texas on this initiative, providing coaching and direct support to the colleges, fostering collaboration within and among the participating institutions, and serving as a liaison to the Every Learner Network.

The following report summarizes the critical lessons learned from case studies conducted by ATD examining how adaptive courseware is implemented at those institutions as well as how courseware is used in particular disciplines to better serve students. The lessons learned represent the work of hundreds of faculty, staff, and administrators in over 25 different courses from nine disciplines across the campuses of the seven participating institutions, who together served more than 7,500 students throughout the pilot.

Acknowledgements

This case study and the underpinning work was made possible through the generous support and guidance of the Every Learner Everywhere Network. Achieving the Dream would like to thank the students, faculty, staff and administrators at the seven lighthouse institutions that participated in the pilot initiative for their dedicated work on the Every Learner Everywhere initiative on adaptive courseware and for their time and participation in the focus groups that served as a basis for this case study.

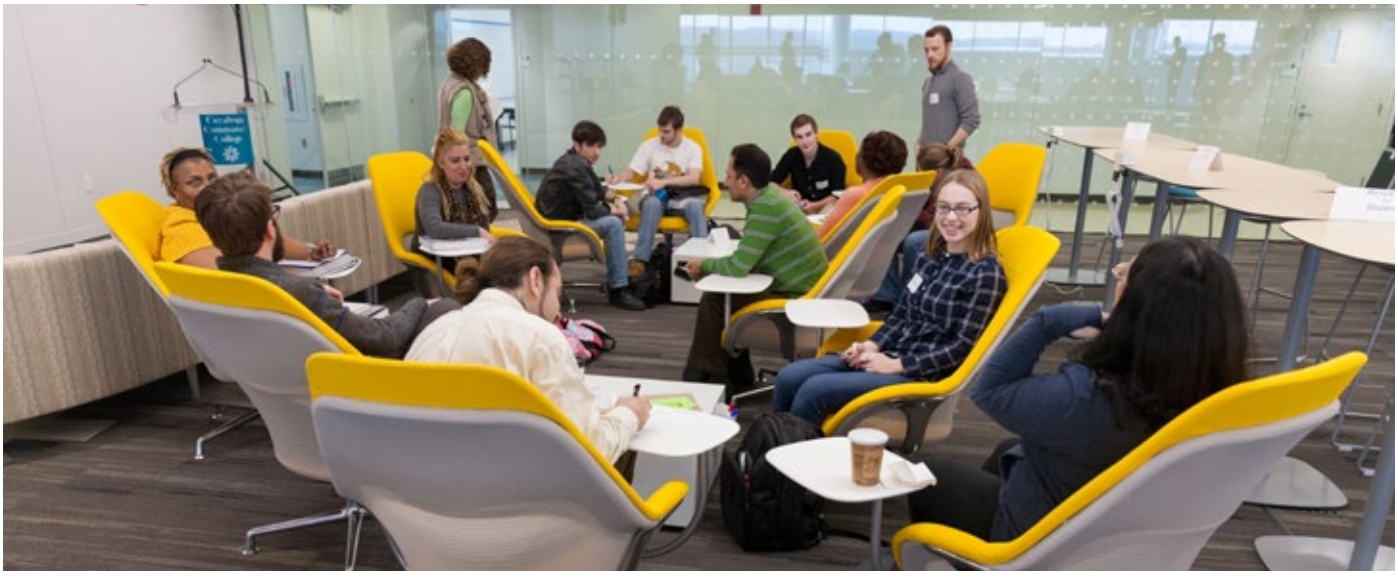
We would also like to thank ATD Director of Program Development Dr. Ruanda Garth-McCullough for leading ATD's Every Learner Everywhere work with the support of ATD staff Susan Adams, Francesca Carpenter, Eric Fiero, Cheryl Fong, Jonathan Iuzzini, Sarah Kinnison, Dr. Richard Sebastian, Dr. Tanya Scott, Paula Talley, and Dr. Monica Parrish Trent as well as former ATD staff members Joanne Anderson, Shauna Davis, and Shanah Taylor.

Finally, we would like to thank the staff at Communication**Works**, LLC for their writing and design assistance in producing these case studies.

EXECUTIVE SUMMARY

As part of ongoing efforts to improve teaching and learning and increase student success, seven ATD Network institutions — Amarillo College and Houston Community College (HCC) in Texas, Lorain County Community College (LCCC) and Cuyahoga Community College (Tri-C) in Ohio, and Broward College, Miami Dade College (MDC), and Indian River State College (IRSC) in Florida — participated in an Every Learner Everywhere (Every Learner) Network pilot project using advances in digital learning to address high failure rates in foundational courses, particularly among economically marginalized and racially minoritized student populations. Participating faculty and staff at these institutions implemented adaptive courseware — digital learning tools which provide personalized guided practice tailored to each student's progress — in 25 different courses across nine disciplines, serving more than 7,500 students throughout the initiative.

Faculty, staff, and college leaders involved in the pilot cited significant evidence of the learning technology's potential, including greater numbers of students completing targeted gateway courses and higher grades within specific courses. "We have already seen evidence of improved student success rates in some courses that use adaptive platforms, and it appears that these improvements are shared across demographic categories, including low-income students and students of color," says Tri-C President Dr. Alex Johnson. Students gave credit to the courseware for giving them the opportunity to engage with course material at their own pace while also giving them feedback on their progress in the adaptive assignments. Even though some students found the repetitive nature of adaptive work frustrating, many others acknowledged it helped them master key concepts.



The experiences of faculty, staff, and students at participating institutions indicate that adaptive courseware:

- **Encouraged student self-efficacy** by promoting progressive skill building through guided practice
- **Helped faculty members identify students who needed support and intervene appropriately** by using courseware data analytics to identify specific students and/or topics that large numbers of students found difficult
- **Supported flipped classroom models** in which students were introduced to key concepts before coming to class for further discussion or support, ensuring they were more engaged and prepared for classroom work
- **Addressed discipline-specific needs,** including reinforcing prerequisite skills in mathematics, walking students through multiple-step procedures in science courses, presenting complex and nuanced concepts in smaller, actionable chunks in social sciences and business, and building discrete skills in areas such as grammar and structure in English courses
- **Reduced course costs for students,** supporting ongoing institutional efforts to keep textbook and material costs low

Lessons Learned from Participating Institutions

The Every Learner initiative also surfaced key strategies across participating institutions that can guide the implementation of adaptive courseware and other digital learning strategies to support student learning and success in several fundamental areas of implementation and ongoing use, including:

Institutional Approaches to Digital Learning Implementation

- **Recognizing the importance of faculty-led efforts.** Administrators intentionally sought out willing faculty members, engaged them in leading pilots, and built structures that allowed for intentional collaboration and peer support.
- **Considering how implementation fits in with other institutional initiatives.** Institutions sought to integrate the adaptive courseware pilot initiative with ongoing course redesign efforts, particularly in high-impact gateway courses. They also intentionally found connections between the Every Learner initiative and ongoing work with other digital learning initiatives focused on reducing costs and supporting student success, including Open Educational Resources (OER) or Z-degree programs. At the same time, participating institutions relied on faculty judgment to determine whether adaptive pilots would support or hamper ongoing redesign efforts and initiatives.
- **Responding to institutional capacity limitations.** In the face of opportunities to significantly accelerate digital teaching and learning capacity and adoption, institutions recognized internal limitations, conflicting redesign efforts, and initiative fatigue.

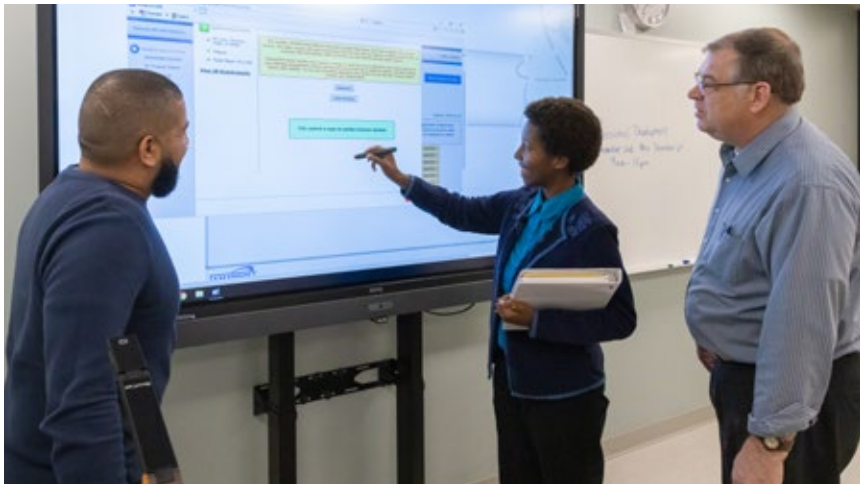
Targeting Appropriate Courses for Implementation

- **Identifying high-impact courses.** Participating institutions intentionally focused adaptive efforts on gateway courses and courses with the largest enrollment numbers of students, particularly where efforts had been made to restructure or eliminate developmental education.

- **Focusing on courses undergoing redesign efforts.** Adaptive courseware integration was most effective when implementation was part of broader redesign efforts, including gateway courses, efforts to flip classroom instruction, and new corequisite models.
- **Encouraging intentional integration into course activities.** Across participating institutions, faculty recognized clear differences in how students used and perceived courseware when adaptive courseware was fully and intentionally integrated into their classes instead of being used as a supplemental resource.

Selecting Adaptive Products

- **Supporting broader learning objectives for each course.** Faculty selected adaptive materials aligned with existing learning objectives and textbooks or that included the functionality to modify objectives or sequencing to meet course needs.
- **Assessing the ability to evaluate and adapt adaptive work to ensure it meets learning objectives and student needs.** Participating faculty reviewed questions to ensure they were appropriate for each course and reflected students' ability, as well as mapped assignments to specific course activities or sections.



- **Ensuring integration with college platforms.** Faculty found that integration between adaptive platforms and existing learning management systems (LMS) was easier for students and facilitated data exchange for purposes such as grading.
- **Collecting student feedback on usability.** Participating institutions and faculty sought to understand whether students found the material more engaging than traditional textbooks and whether faculty needed to adapt the difficulty and length of adaptive assignments to prevent students from unnecessarily repeating work without progressing.
- **Prioritizing cost and access.** Participating institutions used adaptive courseware as replacements for more costly textbooks or as part of OER, Z-course, and first-day textbook initiatives in which course materials are automatically made available to all students.

Supporting Faculty-Led Implementation

- **Empowering faculty champions.** Institutional leaders identified specific faculty members willing to be early adopters and to lead implementation efforts in their disciplines, as well as issued open calls for faculty interested in piloting the digital courseware.
- **Creating and supporting faculty learning communities or cohorts.** Doing so provided an intentional structure for faculty to collaborate on the selection and implementation of evidence-based teaching and learning practices that aligned with the adaptive courseware.
- **Providing support through cross-functional teams.** Leveraging Centers for Teaching and Learning and other existing professional learning structures provided faculty with learning technology and pedagogical expertise to support course redesign and implementation.
- **Recognizing and supporting the impact on faculty workload.** Some institutions offered release time and other supports to reflect the extra time involved in both initial implementation efforts as well as ongoing use of adaptive courseware to monitor student progress and give feedback.
- **Supporting adjunct faculty members.** Adaptive courseware provided valuable support for adjunct faculty members through the creation of common master course shells. However, it is vital to ensure they receive the same training and support as their full-time peers.
- **Allowing faculty to lead scaling efforts.** While some institutions intentionally sought out adaptive courseware to support greater consistency across sections and campuses, faculty members ultimately made decisions about the best opportunities to expand the technology's use.

Identifying What Worked Well and Ongoing Challenges

- **Onboarding students.** Students and faculty members alike reinforced the importance of designing intentional efforts to introduce students to digital courseware — how to access and use it as well as its purpose — so students understand the differences from other, more familiar assignments.
- **Ensuring pacing and workload meet student needs.** Faculty stressed the importance of monitoring the time students of differing skill levels spend in adaptive courseware to make sure it remains constructive practice and not an excessive time burden or impeding progress.
- **Supporting students outside of the courseware.** Faculty at some participating institutions used the product during class time and offered additional supports such as aligned tutoring or lab courses.
- **Addressing language issues, particularly for multilingual learners.** Faculty stressed the importance of doing so in courses where academic language requires an additional layer of support.
- **Monitoring student usage and feedback to address unintended consequences.** Some faculty observed that students chose less challenging work, while others stressed the need to pace assignments and address how courseware is used across paired corequisite courses.
- **Determining whether adaptive courseware is appropriate for all students.** Some faculty questioned whether adaptive courseware was the best support for every student in gateway and high-enrollment courses, particularly those with large numbers of learners who are uncomfortable with technology.

Guiding Principles for the Use of Digital Learning Tools

The seven participating institutions' experiences with adaptive courseware implementation reinforce key lessons learned by ATD Network colleges about broader institutional changes in teaching and learning. These experiences highlight guiding principles which college leaders and faculty must follow to ensure that any new learning technologies support a student-focused culture that promotes student success, including:

- **Ensuring equity** not only through connectivity and access to digital learning tools, but also by taking steps to keep lower-performing students from spending disproportionate amounts of time in adaptive assignments without targeted scaffolded supports.
- **Supporting faculty action research into evidence-based instructional practices** by connecting technology efforts with broader institutional efforts to revamp course design and pedagogy.
- **Creating collaborative, cross-functional teams to support students,** including supports from instructional designers and technologists, tutors, and other student services that provide a coordinated network of support for teaching and learning-based student success initiatives.

- **Encouraging building a culture of teaching and learning evidence** by framing digital learning implementation within existing structures such as Centers for Teaching and Learning and learning communities that provide opportunities for faculty and staff to examine their practice, test new evidence-based approaches, and support each other as learners as they explore new strategies to advance student success.

For more information about the Every Learner pilot and to read case studies of each participating institution and the key disciplines in which adaptive courseware was tested, visit ATD's Every Learner Everywhere resource page.

DATA SNAPSHOT

The following table shows the disciplines that each participating community college focused on as well as the number of students enrolled in those courses and the number of faculty who taught sections with the adaptive courseware. This data covers the Fall 2019 and Spring 2020 terms with the exception of English at Indian River State College, which was piloted in Summer 2020. For more detailed course-level information as well as information on courseware that was piloted, see Appendix A.

INSTITUTION	DISCIPLINES	STUDENTS	FACULTY
Amarillo College Amarillo, TX Enrollment: 9,739	Chemistry English Math	2,369	50
Broward College Fort Lauderdale, FL Enrollment: 38,976	English Math	199	5
Cuyahoga Community College Cleveland, OH Enrollment: 23,655	Business Biology Chemistry Economics Math Physics Psychology	2,288	44
Houston Community College Houston, TX Enrollment: 56,151	Math Economics	519	8
Indian River State College Fort Pierce, FL Enrollment: 16,686	English Math Biology Chemistry	535	15
Lorain County Community College Elyria, OH Enrollment: 10,206	Business Math	555	7
Miami Dade College Miami, FL Enrollment: 51,679	Math	1,085	23
Totals:		**7,550**	**152**

INTRODUCTION

For too many community college students, introductory courses, particularly in English and math, serve as gatekeepers rather than gateways to higher education. The reasons are as diverse as the students themselves. Broward College student Geolmary Suazo, who immigrated from Nicaragua the year before enrolling at the Florida college, was anxious because college-level algebra "was my first math class in another language." When Katie Cisneros returned to Amarillo College for the first time in more than a decade to seek a new career in computer information systems, she found herself most worried about passing English courses on her way to an associate degree. "I could read, but I didn't really comprehend," the Texas community college student says.

As part of ongoing efforts to improve teaching and learning and increase student success, seven ATD Network institutions — Amarillo College and Houston Community College (HCC) in Texas, Lorain County Community College (LCCC) and Cuyahoga Community College (Tri-C) in Ohio, and Broward College, Miami Dade College (MDC), and Indian River State College (IRSC) in Florida — became part of an Every Learner Everywhere (Every Learner) Network pilot project to address high failure rates in foundational courses, particularly among economically marginalized and racially minoritized student populations. These seven colleges, serving more than 200,000 students in Florida, Ohio, and Texas, have committed to institutional improvements to better

support students like Suazo and Cisneros as they enter and progress through critical gateway courses that serve as key determinants of progression and persistence.

Across the seven institutions, faculty from multiple disciplines implemented adaptive courseware — digital learning tools that provide a personalized guided learning experience responsive to each student's progress — in 25 different courses across nine disciplines, which served more than 7,500 students throughout the pilot. Working with instructional designers and other academic affairs staff, participating faculty focused on scalable practices and high-impact opportunities to support the greatest number of students in gateway and high-enrollment courses which have traditionally had large equity gaps. "They were really trying to teach us the basics to get everybody on the same playing field," explains Amarillo student Ashley Landrum.

Every Learner efforts to implement adaptive courseware supported broader institutional efforts to foster student learning with evidence-based practices. "Every Learner allowed us to transition away from the `traditional' model of learning," says Amarillo College President Dr. Russell Lowery-Hart. The technology "supports our student-ready approach to teaching and learning," adds LCCC President Dr. Marcia Ballinger.

The initiative also reflects the contexts in which broader institutional reform in teaching and learning and the use of data and technology is taking place at community colleges throughout the ATD Network to support student success and equitable student outcomes (see box, next page). "Faculty-led efforts to incorporate adaptive courseware into a redesign of college algebra reflect MDC's commitment to creating accessible, high-quality teaching and learning experiences for our diverse global community," says MDC President Madeline Pumariega.

This report highlights the potential of adaptive courseware in addressing student needs and supporting broader course redesign goals, as well as the lessons learned about effective implementation, support, and potential challenges among the participating institutions, resulting in outlining a path forward for institutions. "Learning engagement, outcomes, and overall student success have all realized gains as a result of these adaptive approaches, and IRSC is excited to take this endeavor even further in the classroom," says Dr. Timothy Moore, the college's president.

BUILDING ON ATD'S CORNERSTONES OF EXCELLENCE

Each of the ATD Network community colleges participating in the Every Learner Everywhere grant has committed to engaging in bold, holistic, and sustainable institutional change across multiple institutional areas and priorities. Their efforts to implement adaptive courseware reflect the importance of several key cornerstones of institutional change, including building a culture of excellence in teaching and learning and leveraging data and technology to support student success and equitable student outcomes. "The learning technology helps our faculty meet students where they are, creates rich opportunities to help students reach their full potential, and prepares students with knowledge and skills to thrive in a changing world," says Dr. Marcia Ballinger, president of Lorain County Community College (LCCC).

ATD's Institutional Capacity Framework and Institutional Capacity Assessment Tool (ICAT) outlines seven essential institutional capacities required to create a student-focused culture that promotes student success. One focuses specifically on teaching and learning and the commitment to engaging full-time and adjunct faculty in examinations of pedagogy, meaningful professional development, and a central role for faculty as change agents within the institution. Building capacity in this area is crucial because, as ATD President Dr. Karen A. Stout recently asserted, "focusing on teaching and learning is still not central to the field's overall theory of change. We still have much more to do to build a deep focus on pedagogy and to support our colleges in building a culture of teaching and learning excellence."

To foster this culture of teaching and learning excellence, ATD's *Teaching & Learning Toolkit: A Research-Based Guide to Building a Culture of Teaching & Learning Excellence* is centered on four cornerstones of excellence that provide a forward-looking vision that campuses can use to inform their work. Initiatives such as the Every Learner Network provide important supports to community colleges and the time, space, and resources to explore innovative pedagogical approaches to improve student learning and outcomes. They also offer sustained opportunities to build on these cornerstones of excellence. "The Every Learner Everywhere grant supports MDC's culture of evidence, which is characterized by the achievement of measurable learning outcomes, innovative assessment modalities, and data-driven adaptability in serving students," says Miami Dade College (MDC) President Madeline Pumariega.

Participating institutions' engagement with the initiative exemplifies the importance of institutional efforts to empower faculty to consider, adapt, test, and refine new approaches to fit their campus context and the needs of their students, including efforts to ground adaptive courseware within broader course redesign efforts. "The adoption and integration of adaptive courseware in our course design process enable us to meet students exactly where they are and then to automatically develop an individualized learning plan for that student within that course," says Broward College Provost and Senior Vice President for Academic Affairs Dr. Jeffrey Nasse.

This commitment builds on broader efforts to integrate and scale technology in ways that support evidence-based instructional practices that foster student learning. "Adaptive courseware allowed us to effectively integrate and elevate technology to flip our classrooms, extend learning well beyond class times, and support students more robustly," says Amarillo College President Dr. Russell Lowery-Hart.

The Every Learner Everywhere grant also provided faculty with opportunities for professional learning that supported ongoing improvements in pedagogy. "The Every Learner Everywhere endeavor has been transformative for students and faculty alike," said Dr. Timothy Moore, president of Indian River State College (IRSC), pointing to higher success rates and ongoing efforts to expand adaptive courseware in several disciplines. "It has provided us with another set of tools and approaches that we can integrate into our efforts to improve teaching and learning at the college."

ADAPTIVE COURSEWARE AS A TOOL TO SUPPORT STUDENT SUCCESS

Participating institutions focused their efforts on Every Learner Everywhere's goal of leveraging technology to advance equitable student outcomes, particularly in gateway courses with significant equity gaps among poverty-impacted, racially minoritized, and first-generation students. Faculty and administrators cited significant evidence of the technology's potential, including greater numbers of students completing targeted gateway courses and higher grades within specific courses, despite complications in quantifying the impact of adaptive courseware experienced by shifting courses online in response to the COVID-19 pandemic.

"We have already seen evidence of improved student success rates in some courses that use adaptive platforms, and it appears that these improvements are shared across demographic categories, including low-income students and students of color," says Cuyahoga Community College President Dr. Alex Johnson.

Five Key Areas of Impact

Participating institutions reported that adaptive courseware helped support students in five important ways:

Encouraging student self-efficacy. In most courses at participating institutions, adaptive courseware was used as homework during which students learned and practiced key concepts to reinforce in-class learning. Students generally found the inclusion of adaptive assignments that promoted progressive skill building through guided practice helpful.

"The courseware was extremely forgiving," HCC student Ian Ondoa says. "You can make mistakes, and it won't penalize you until you get it right, and you can go over and over it until you do."

At several participating institutions, students — particularly women, racially minoritized students, and adult learners — stressed the benefit of practice with feedback in adaptive courseware. A few spoke frankly about their fears of feeling stupid or embarrassed if they asked questions in person or approached instructors repeatedly for help, and others said the technology made them feel more confident about working through concepts they found difficult. "I didn't have to feel uncomfortable about not getting something right away," says IRSC student Jennine Wilson. "It afforded me the luxury of being able to not have to keep asking my professor (for help) by giving me the tools to solve the problem."

Faculty recognized this as a benefit. "Many students are shy — they don't want their peers to know they don't know that information," says HCC economics professor Lawrence Paye.

Helping faculty members identify struggling students and intervene appropriately. Participating faculty said they used data analytics to both identify specific students who were struggling in adaptive work and focus instruction on topics large numbers of students found difficult. Some also said that the way courseware helped students track their own progress as learners was particularly beneficial.

"I can see where they're weak and they're strong, and they can monitor themselves," says Rhonda Bobb, an English assistant professor at Broward College. "I tell students they'll be able to see where they stand in the class. It's a great measuring tool for your own (course objectives) as well."

As faculty develop greater competencies in data analytics, an end goal for some institutions was to encourage them to shift their pedagogy in ways that "build your face-to-face instruction with students around what is happening in adaptive courseware… and drive their instruction rather than having it already planned," says Dr. Lori Petty, director of Amarillo College's Center for Teaching and Learning. "That's where course redesign comes in."

Supporting flipped classroom models. While the specific approaches varied across institutions and disciplines, many participating faculty members used adaptive courseware to adopt flipped classroom models in which students were introduced to key concepts before coming to class for further discussion or support. By assigning guided lectures, interactive learning materials, and adaptive practice questions before discussing concepts in class, faculty members helped ensure that students were more engaged and prepared for classroom work, including graded tests and quizzes. In some classes, faculty members also devoted a portion of class time to help students work through assignments in the courseware or work collaboratively in small groups.

"It forces them to do what all students should do — read the chapters," says LCCC business faculty member Jerry McFadden, who rolled out adaptive courseware across all of his business courses after observing that students were not reading assigned materials before class. "It essentially makes it a prerequisite. They're learning the concepts before I discuss them. We all have different learning styles, and this is another tool in the toolkit they didn't have before."

Addressing discipline-specific needs. Faculty in a wide range of disciplines reported that courseware helped meet the content-specific demands of their courses, including reinforcing prerequisite skills in mathematics, helping students apply what they learned through multiple-step procedures in science courses, presenting complex and nuanced concepts in smaller, actionable chunks in social sciences and business, and building discrete skills in areas such as grammar and structure in English courses.

In business administration courses, for example, courseware "builds cognitive stamina" by allowing students to "read a little, do a little, then read a little more," says Dr. Michele Hampton, a professor of business administration at Tri-C. "Compared to the traditional model of 'read a whole bunch and regurgitate,' it's a lot more effective, and it puts a bigger safety net around our students." (To learn more about discipline-specific uses of adaptive courseware, access case studies on the ATD Every Learner Everywhere resource page.)

Reducing cost and increasing access. Many participating institutions focused on efforts to keep textbook and material costs low and reported that adaptive courseware was often significantly less expensive than textbooks. "It's really obvious to students that it's $40 vs. several hundred dollars," Broward instructional designer Miguel Suarez says.

Institutions also leveraged publisher partnerships and worked with campus bookstores to provide free subscriptions to students with financial needs. As part of broader institutional access efforts, some adopted adaptive courseware as part of Z-course and first-day textbook initiatives in which course materials are either free or included in registration costs and immediately available to all students to ensure greater access to materials. Some also explored OER variations of adaptive courseware.

STRATEGIC IMPLEMENTATION TO SUPPORT STUDENT SUCCESS: LESSONS LEARNED FROM PARTICIPATING INSTITUTIONS

The Every Learner Everywhere initiative surfaced key lessons across participating institutions that can guide the implementation of adaptive courseware and other technology-based strategies to support student learning and success in several key areas, including:

- Integrating instructional and institutional initiatives
- Targeting appropriate courses for implementation
- Selecting adaptive products to meet specific instructional needs
- Supporting faculty-led implementation
- Monitoring and addressing challenges that surfaced during the pilot

Each is described in more detail in the sections that follow.

Integrating Instructional and Institutional Initiatives

Each participating Every Learner Everywhere college followed two principles during the pilot — identifying opportunities to connect adaptive courseware to other institutional initiatives and ensuring that faculty-led implementation efforts, including key decisions about course selection, usage, and whether to discontinue the use of specific products.

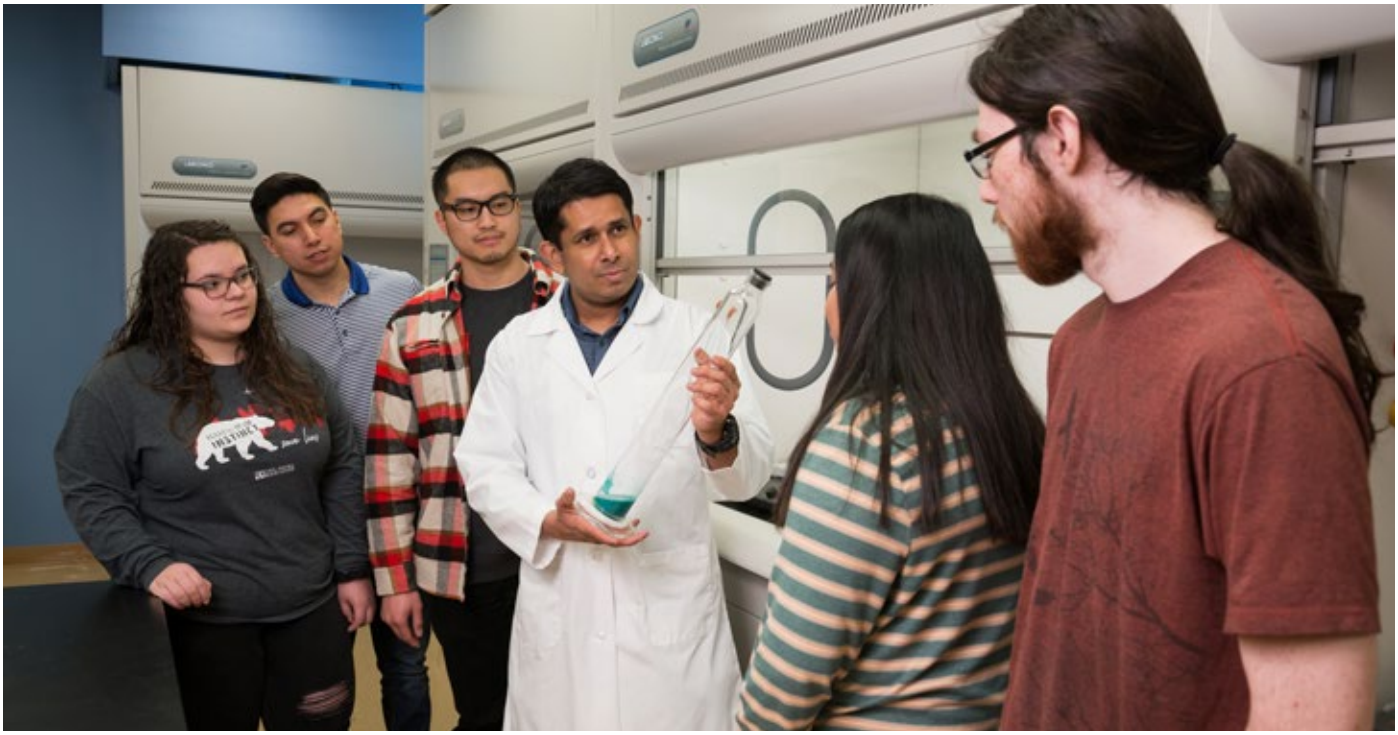
"Our faculty are deeply committed to improving student success and providing greater support to our minoritized students to address equity gaps," says HCC Chancellor Dr. Cesar Maldonado. "Their involvement in evaluating and implementing adaptive courseware reflects efforts at all levels of the institution to use technology to improve teaching and learning."

Among the key implementation strategies suggested by the experiences of participating institutions:

Consider how implementation fits in with other institutional initiatives. Participating institutions were actively exploring broader instructional changes to gateway courses, particularly in math and English. Institutions also sought to find connections between integrating adaptive courseware and ongoing work with other technology-driven initiatives that focused on reducing costs and supporting student success, such as Open Educational Resources (OER) and Z-degree programs. IRSC, for example, linked its integration of adaptive courseware to ongoing faculty engagement in institutional Quality Enhancement Plans, as well as with Quality Matters, a network supported rubric which focuses efforts on improving the structure, quality, and engagement of online courses. LCCC also connected participation with broader efforts to build institutional capacity to "identify new types of edtech and adopt them into our courses," says Karla Aleman, former dean of LCCC's library and eLearning.

At the same time, participating institutions relied on faculty judgment to determine whether adaptive courseware pilot programs would support or hamper ongoing redesign efforts and initiatives. At some institutions, department leaders and faculty ultimately decided not to pilot adaptive courseware in critical gateway classes due to ongoing redesign initiatives that faculty felt may confound results or conflict with other efforts.

"To be successful, pilots need to be intentionally integrated into a department's priorities… if it isn't, it's hard to maintain focus and enthusiasm," says Dr. Nathan Smith, HCC philosophy faculty



member and coordinator of the institution's Every Learner and OER efforts.

Recognize the importance of collaborative faculty-led efforts. Administrators intentionally sought out willing faculty members and engaged them in leading implementation. "If this had been proposed in a direction other than the faculty closest to the curriculum and actively engaged in teaching it, it would have died a very quick death," says Dwayne Keeney, Tri-C interim associate dean for liberal arts. The overarching goal, Keeney adds, was to "figure out the resources the administration can provide to support faculty and get out of the way."

Across institutions, participating faculty members stressed the importance of collaboration and peer support. "If I didn't have the collaboration of other instructors, I might have said this is too much and changed (back) prematurely," says Sarah Wyatt, an associate professor of mathematics at IRSC.

Respond to institutional capacity limitations. In the face of opportunities to significantly accelerate adaptive capacity and adoption, some institutions recognized internal limitations. For example, LCCC English faculty had the opportunity to collaborate with product vendors to essentially build an adaptive product from scratch, but faculty members recognized that they lacked the bandwidth to do so effectively given competing priorities. "In a perfect world, we would give faculty time to build something online, adaptable, and free — like OER," says Aaron Weiss, LCCC's dean of science and mathematics. "Time is the hardest part to account for."

Initiative fatigue also proved a challenge — one institution's leaders said they were involved in hundreds of different projects at all levels of the institution, an experience echoed by other participants. At HCC, the Every Learner Everywhere grant was part of a "constellation" of grants and initiatives, and the pilot's intentionally limited scope reflected in part the "dizzying" sense of "everything going on." Targeted courses also were the focus of other institutional projects, which guided decisions about where and how adaptive courseware was used, says Dr. Andrea Burridge, associate vice chancellor of research, analytics, and decision support.

Targeting Appropriate Courses for Implementation

Selecting high-leverage courses for adaptive courseware implementation was part of the design of the Every Learner Everywhere initiative, and faculty involved in the pilot emphasized the importance of carefully identifying which courses would see the greatest benefits from implementation. Several key factors in course selection suggested by the experiences of participating institutions:

Identify high-impact courses. The grant's intentional focus on gateway courses and those which enroll the largest numbers of students was intensified in places where efforts had been made to restructure or eliminate developmental education. Depending on the institution, these efforts were a combination of internal redesign efforts and external factors, such as Florida legislation which placed all public high school graduates into college-level gateway courses regardless of readiness and Texas legislation encouraging a corequisite model in which students were enrolled in paired developmental and college-level courses.

For some institutional teams, adaptive courseware was seen as a way to address skill development and lack of readiness. At IRSC, for example, 70 percent of incoming students had previously placed into developmental math, English, or both. "A lot of students were very unprepared for the courses," says Lynne O'Dell, IRSC mathematics and science student success coordinator. "We have such a broad difference of skills for students coming in. Students with strong skills were bored, those with weak skills were failing, those in the middle were in the middle. The traditional modalities of teaching were simply not working."

Other institutions focused on introductory courses with the largest enrollments. At HCC, participating faculty looked at the college's 10 largest enrollment courses, ultimately focusing on college algebra and introductory macroeconomics. LCCC focused on its introductory statistics course, a prerequisite for several high-demand majors and as such the college's highest enrollment math course. The emphasis on statistics posed a particular challenge since the developmental courses that students often take before the course focus on unrelated math skills.

Course redesign. An important lesson across this first Every Learner Everywhere institutional cohort was that adaptive courseware was most effective when implementation was part of broader, intentional redesign efforts. "Is it actually embedded into the course, or is it an add-on?" asks Amarillo's Petty. "If you're thinking about adding it into a course, it has to go through redesign. There's no other option."

For example, math faculty at MDC redesigned college algebra from the ground up, developing a new syllabus, learning objectives, detailed daily lecture notes for faculty, and implementation of adaptive courseware to support

students who needed help mastering the prerequisite concepts required for college algebra. "It was intended to take care of students on the back end so they could catch up and (be) all the same in the classroom," says Nicholas Schur, math department chair at MDC's Kendall campus. "We built the structure first and integrated the courseware into the structure." And at Tri-C, participating faculty worked with instructional designers and technologists at the college's Centers for Learning Excellence to apply the backward design planning framework to design courses that support successful learning outcomes. "No matter the content, you have to structure it well," says Hampton.

Intentional integration into course activities. Successful implementation depended on faculty members' willingness to integrate adaptive work into classroom activities. Across participating institutions, faculty recognized clear differences in how students used and perceived courseware when adaptive courseware was fully integrated into their classes instead of being used as a supplemental resource. "If you're going to use it, use it fully — in and outside the course," Broward's Bobb says.

Integration plays a particularly important role in corequisite models in which students take paired credit-bearing and support courses in subjects including math, English, and chemistry. Both faculty and students stressed the importance of ensuring that adaptive work in the corequisite courses support work in the college-level courses. MDC, for example, ensured that adaptive coursework was balanced between developing prerequisite skills and completing college-level course objectives.

Selecting Adaptive Products to Meet Specific Instructional Needs

Participating faculty who evaluated multiple adaptive products found significant differences among them. "They were all good in some ways and had challenges in some ways," says Jasmine

Vazquez, assistant professor of mathematics at Broward College. "It all depends on how you implement the courseware and how you want your students to implement it as well."

Several key factors in courseware selection suggested by the experience of participating institutions:

Supporting broader learning objectives for each course. Faculty at some institutions selected courseware that was developed by the same textbook publisher they were using for the course. Others evaluated products based on whether they allowed faculty to select objectives and adjust sequencing to meet course needs. At HCC, faculty ultimately rejected one product because it was "too rigid and locked them into a sequence of instruction they weren't comfortable with," Smith says. At Amarillo College, some faculty members found that adaptive content didn't align with existing syllabi and objectives, particularly in courses with OER materials or textbooks developed by different publishers. These experiences reinforce the importance of identifying key learning objectives and existing practices that work before exploring specific products.

"Avoid looking at platforms first," MDC's Schur advises. "Come up with the idea of what you want it to be able to do and… try to get the platform to meet those (needs)."

Adaptability and flexibility within courses. Participating faculty stressed the importance of reviewing adaptive work to ensure it was appropriate for their courses and their students' needs. At Amarillo College, for example, math faculty adjusted questions to make sure they aligned more closely with transfer course objectives. "Students didn't see it as beneficial until I tweaked it so it matched what we were doing in college algebra," says math instructor Gale Brewer. Dr. Jennifer Rabson, an assistant professor in Amarillo's physical sciences department, agrees, noting that she maps out adaptive assignments and readings in her course syllabus: "It works well if you spell things out exactly and make sure all the content matches," she says.

Conversely, some faculty members reported that some products made it difficult to understand what questions were being assigned to students. "I don't know if they're getting the right level of questions," says Dr. Prabhat Sharma, an assistant professor of biology at Tri-C. "I should be able to see what they are getting." Others noted that some products didn't easily allow faculty to adjust assignments, contributing to challenges with workload (described in more detail in the Monitoring and Addressing Challenges section below).

In some cases, faculty worked with courseware publishers and their representatives to modify or develop adaptive materials for their courses, most notably at Amarillo College, where a publisher helped develop completely new GED courseware from faculty course materials and objectives.

Integration with college platforms. Broward faculty credit the integration between adaptive courseware products and the college's learning management system (LMS) with ensuring that students could access their adaptive assignments without having to search for or switch to another website. Integration also ensured that grades from work in the adaptive courseware were automatically updated in the LMS.

Technology integration also supports adaptive use in a variety of in-person, fully online, and hybrid modalities. "You can place it wherever you want in the continuum of learning, so the modality doesn't matter," Tri-C's Hampton says. It also has proven critical to efforts to expand adaptive pilots to serve more students across different sections and courses. For example, MDC faculty intentionally designed the structure of adaptive assignments and other curricular changes to be "courseware agnostic" so they could be used on any online platform — critical at the multi-campus institution, which employs different LMS and adaptive platforms in different locations.

Usability. Participating faculty paid close attention to student feedback in evaluating the efficacy of the adaptive products they piloted. Students were more likely to describe adaptive courseware as helpful when it included learning material that they found easier to use or more engaging than the traditional textbooks. "When you think back to using textbooks, there's so much information in your face," says MDC student Emily Gonzalez. In courseware, she adds, "you have just one question presented to you, and then you go on to the next one. You're not bombarded with all these problems. We're used to technology and that simple format."

Student reaction to features of the technology centered around two areas, the first of which was the opportunity to engage with material such as videos, interactive models, or guided lecture notes. HCC Student Fugi Thompson noted that the courseware "gave you more insight. It gave me the option to read at my own pace, study the information, and attempt to reapply it." The other involved structuring study and work. "If there's nothing to follow and it's just a textbook and exams to be taken down the line, I feel a little lost," says Tri-C student Sinem Balta Beylergil. "Courseware gives me some sort of schedule and more frequent deadlines. Rewards, reminders — that kind of feedback is really helpful."

Cost. As described above, participating institutions often sought out adaptive courseware products which could serve as a lower-cost replacement for textbooks and other course materials. Some also included adaptive courseware in Z-courses and first-day textbook initiatives to ensure that all students would have access to course materials.

Supporting Faculty-Led Implementation

As stated above, participating institutions focused on empowering faculty to lead the implementation of adaptive courseware. "Their enthusiasm is contagious," says Dr. Heather Belmont, IRSC's vice president of academic affairs. "It has to be a faculty-driven process at the end of the day."

Several key strategies for supporting faculty implementation suggested by the experiences of participating institutions:

Empower faculty champions. At Broward College, senior leadership, including the provost, vice provost, and deans in key subject areas identified specific faculty members to lead implementation efforts. In similar fashion, Amarillo College approached faculty in disciplines already working on redesign efforts and those who wanted better access to courseware. "It was knowing our faculty, knowing our departments, and knowing what their needs were," says Becky K. Burton, associate vice president of academic affairs.

While many implementations were strategically planned efforts within a department or discipline, several institutions also issued open calls for individual faculty members interested in piloting adaptive courseware. "It's good to do trials," says Dr. Susan Fife, HCC mathematics program chair. "If you have faculty who want to try something, they should be encouraged to do so."

Faculty champions provided critical support for peers implementing adaptive courseware. At LCCC, for example, each of the three participating disciplines began work with a faculty champion who supported their peers. "There needs to be someone with a little bit of prowess working with the technology or the willingness to investigate it," says Weiss. "It makes the implementation easier."

Build faculty learning communities. Institutions leveraged faculty learning communities or cohorts to support implementation. Tri-C, for example, created a faculty learning community (FLC) to support 15 participating faculty members across a half-dozen disciplines and four campuses

as they researched and implemented courseware in their classes. "This was a unique opportunity to collaborate," says Kara DePaul, program manager of academic professional development and co-lead of Tri-C's Every Learner Everywhere work. "The FLC gave faculty the opportunity to share teaching strategies, experiences, and course feedback with each other."

Meeting in person each month, the FLC provided feedback to participating faculty across disciplines and modalities. "The learning community was "incredibly supportive and informative," says Dr. Anne Distler, a professor of chemistry at Tri-C's Westshore campus. "Getting feedback from other disciplines and courseware gives you a better understanding of what the pros and cons are." Importantly, Tri-C administration continued to enable the FLC through release time and other supports throughout the pilot, recognizing that fine-tuning implementation would be an extended process.

Peer learning communities also extended beyond institutions, as faculty at several participating colleges reached out to peers from other institutions for help in identifying and adapting courseware and mastering the pedagogical strategies required to support them. Others participated in convenings which allowed them to connect with peers, including ATD's 2019 Teaching and Learning Summit and DREAM 2020 conference.

Provide support through cross-functional teams. Many institutions provided participating faculty with technological and curriculum expertise through existing structures focused on faculty pedagogy, such as Centers for Teaching and Learning. Amarillo College, for example, built supports through its Center's existing faculty cohorts involved in a range of redesign efforts and provided instructional designers to build capacity. "You have to have support for faculty — people who understand instructional design, technology, and what a good, student-centered classroom looks like," Burton says.

Instructional designers helped support implementation at many institutions. HCC, for example, hired a part-time instructional designer who worked with faculty to build out model course shells for each participating course. Tri-C instructional technologists created a courseware guide based on faculty feedback. This work proved critical, as the college's coordinators said that faculty who dropped out of the pilot cited their lack of familiarity with technology.

Supports also extended beyond technology implementation to course design and pedagogy. "Course outcomes talk about the higher level, but the learning objectives focus more narrowly on the defining and understanding levels in Bloom's taxonomy," says HCC instructional designer Harun Yilmaz, who focused on helping faculty address the disconnect by zeroing in on learning objectives in planning and using adaptive courseware.

Administrators say supports such as these are critical. "Is there funding to support faculty exploration and development? Are there professional development opportunities?" asks Dr. Julia Philyaw, associate vice president of Broward's Center for Teaching Excellence and Learning. "If not, you might have a harder time of it."

Recognize the impact on faculty workload. Institutional leaders recognized that faculty efforts to implement adaptive software represented "a heavy lift" on top of ongoing responsibilities, as Tri-C's Hampton puts it. In response, some institutions provided faculty members with release time during the pilot.

Beyond implementation, however, it's important to recognize that using adaptive courseware to guide and differentiate instruction requires additional time. "You're going in and monitoring based on this real-time feedback," LCCC's Weiss says. "That's a lot more time spent by faculty members." Without continuing support, Broward's Vazquez cautions, "some instructors are going to exit out and do what they've

been doing." Release time and the learning communities and cross-functional teams described in this section helped institutions keep faculty engaged throughout implementation.

Support adjunct faculty members. Adaptive courseware can represent an avenue for additional support for adjunct faculty, particularly when master course shells provide them with materials and other resources for their courses. MDC, for example, envisioned its course redesign of college algebra as ensuring greater consistency across instructors, but also providing additional support for adjunct faculty members. "If you're a new adjunct faculty member, you're going to be able to teach the class tomorrow," says Schur. "It makes their lives easier."

However, adjunct faculty members require support to use adaptive courseware effectively, particularly among those with less familiarity with this type of technology. To that end, LCCC ensured that full-time and adjunct faculty members engaged in the same professional development on courseware and were encouraged to collaborate with peers in their departments.

Recognize opportunities to scale. Most institutions selected target courses in part because of their potential to support scaling the use of adaptive courseware following the pilot — typically across sections of the targeted courses, but in some cases into subsequent classes within a program or discipline based on the experiences of students in introductory courses.

Scaling adaptive courseware can support greater consistency across sections and campuses, as was the explicit goal of MDC's use of adaptive courseware within its redesign of college algebra. "With something that's systematic, we can be assured that the students who go on to the next level have had the most focus on the learning outcomes that are part of the course that make sure they're successful in the next course," says MDC math faculty member Lourdes Espana.

Given different institutional conditions and the presence of academic freedom and collective bargaining agreements, the extent of scaling is largely dependent on the relationships between faculty members. "In the short-term, expansion will be collegial — peer to peer among faculty," says Tri-C's Keeney. However, two essential components surfaced across participating institutions.

The first involves faculty-provided supports for scaling, such as informal peer learning and course materials shared by participating faculty members. For example, at IRSC, faculty leveraged their experience with adaptive courseware to develop online and hybrid options for science lab courses for the first time. LCCC's Aleman agrees. "It is very helpful to have someone who says, `this is the course, this is the content, we've done this in one section and we're ready to scale'," she says.

Master course shells, created either by faculty members or instructional designers, also have been used to simplify the process of other faculty members adopting adaptive courseware. HCC, for example, created course templates for faculty members and a common onboarding module to make it easier for new faculty members to support students using the courseware.

While scaling to date has been organic, IRSC's O'Dell predicts that adaptive courseware will ultimately spread to other courses and disciplines, in large part due to faculty commitment to student success and outcomes by improving engagement across all modalities. "We're going to see a movement toward adaptive technology," she says. "Faculty are scrambling to ensure our online classrooms are different places, and adaptive technology will be part of that."

Monitoring and Addressing Challenges that Surfaced During the Pilot

Faculty members at every participating institution monitored student use of adaptive courseware to surface challenges that affected its use during the pilot and implementation phases. Among the lessons learned:

The importance of onboarding students to adaptive courseware — including explaining its role in the learning process. Students and faculty members both stressed the importance of introducing students to the mechanics of adaptive courseware, including how to access their assignments and then complete them. For example, IRSC's Wyatt started her face-to-face courses in the computer lab to ensure students signed into the courseware and then held several classes in the lab over the semester to get a sense of what students were struggling with. Tri-C psychology professor Stacey Souther and a colleague in the psychology department, Melissa Resnick, collaborated to create an interactive quiz to help ensure students understood their courseware's introductory module.

These efforts became particularly important following the pivot to online instruction in Spring 2020, when faculty recognized that many nontraditional students weren't familiar with the differences between online and face-to-face modalities and needed support in understanding different delivery formats. "A lot of our students don't know how to do an online course," says Broward's Vazquez. "They don't have those skills."

It's also important to ensure that students understand the reasons why adaptive assignments are different from traditional homework, whether done on paper or online. "Students sometimes have a hatred of the courseware, and often it's just because they don't understand how it works," says Kati Dobeck, a math faculty member at LCCC. "They didn't realize they could keep working to improve their grade." To that end, HCC's Smith and Dorsetta Williams, manager of the college's Center for Teaching and Learning Excellence, developed an onboarding module that was integrated into courseware shells. The content of the module was "geared towards getting students and faculty to think about how adaptive courses are different, how expectations are different, and how faculty will be teaching differently," Smith says.

Importantly, students said that onboarding helped them understand why they had to keep working through concepts in the courseware until they mastered them. HCC student Selene Hernandez credits the adaptive assignments with "making sure you have to learn the information and apply it to the rest of your assignments."

Ensuring that pacing and workload meet varying student needs. A key element of adaptive work involves the reinforcement of key concepts through a series of questions and exercises until a student demonstrates mastery. While students generally recognized the value of this work, "at times it can be repetitive, but to me it's extra practice, and more ways to help me believe I can do the work," says Amarillo's Cisneros.

"You just have to plan for what you can realistically accomplish with everything else students have going on in their lives," says Amarillo's Rabson. "Most of our students are trying to work full-time hours while taking a full course load and caring for someone at home. We're trying not to add to that burden."

That burden is exacerbated by the wide range of skill levels, particularly in introductory classes, which result in different students spending varying amounts of time completing adaptive practice assignments. "That's not necessarily a bad thing — the time it takes each student to learn something is the time it takes," LCCC's Weiss says. "What I need to know in the long run is if it's an appropriate amount of time."

Some students raised similar concerns, reporting that they could spend as much as five hours on adaptive assignments if they were struggling

with the content. "It's a good tool if you're proficient and you're trucking along, but if not, it's very different," says LCCC nursing student Sabrina Thompson.

Faculty learned to adjust components of adaptive assignments, including the number of questions or the grades required to progress. For example, IRSC faculty adjusted thresholds within courseware after finding default pass rates for pretests were too high, forcing students to retake the pretest multiple times before moving on to the actual test. "Some students would get frustrated by the workload by having to keep repeating when they couldn't get past the threshold," says Dr. Anthony Dribben, IRSC dean of math and natural sciences. "They'd tune out after that." In similar fashion, MDC minimized the number of skill checks in adaptive work "to show students there is light at the end of the tunnel and it's not going to go on forever," Schur says. The goal, he adds, is to strike a balance between remediation while "at the same time pushing forward."

Some faculty reported that students were confused about why their assignments were significantly longer or shorter than those given to their peers, reinforcing the importance of the onboarding practices described above.

Supporting students outside of the courseware. Students say they benefited when faculty members used courseware within classes, and faculty members stress the importance of providing additional support. "You can't just press play and walk away," says LCCC's Dobeck. "You have to say `you can't settle for this grade — you can visit a tutor or use these resources.' That's absolutely an important part of this."

Aligned tutoring became a key support at several Every Learner Everywhere institutions. At IRSC, for example, peer tutoring included student tutors who were experienced with both the course and the courseware and were provided training and tutor shells. "They had been in the software before and knew how it works," O'Dell says.

Broward also intentionally housed assistance for students using adaptive courseware within existing support structures. Tutors — known at Broward as "Academic Success Mentors" housed in dedicated centers on each campus — offered online orientations and supports for the adaptive courseware, as well as one-on-one support for individual students. And HCC included managers from each of the institution's 14 tutoring centers in the planning process for the courseware rollout. Faculty tutors were trained to ask students if they were using courseware in the classes for which they were seeking help, and then examine the students' efforts directly inside the courseware in order to "bring a different level of intentionality," says Burridge.

Some institutions also provided additional supports. At MDC, a math lab and a subsequent zero-credit lab course intended to support college algebra students both use the same adaptive courseware as the course itself. "The lab uses the same material, and tutors are trained on it," says Schur. "All of this is happening in the background, which is what we wanted."

Addressing language issues, particularly for multilingual learners. Participating faculty reviewed language in courseware to ensure it was appropriate for students. Academic support leaders stressed that extra attention needs to be paid at institutions where large numbers of students are multilingual. "Mathematics is written in a strict grammatical style, which can seem a little out there for even native English speakers," MDC math lab manager Raquel Ortiz says. "If you add that extra layer of not being your native language, that further confuses things."

Listening to student feedback. At IRSC, faculty convened student focus groups after the end of the pilot stage, learning too late about challenges involving workload. "Unfortunately, not a lot of students said anything to the faculty to clue them in," says IRSC's O'Dell. "Had we known, we would have made adjustments through the term." Student feedback was

instrumental in surfacing a number of unintended consequences of adaptive work at participating institutions, including:

- **Grading.** While LCCC statistics faculty assigned grades to adaptive work to ensure that students consistently completed it, several students reported that since the courseware identifies strengths and weaknesses as students progress through adaptive assignments, they often choose easier sections to keep their grades up. "I'll use the breakdown to see where I'm weakest," says LCCC student Samuel Bitter. "I can choose an easier section and keep up my grade. I use it as a study tool, but only after I secure my grade." Other students pointed out that courseware often reduces student scores if they need multiple attempts to solve a problem. "I don't think it's intentional, but it almost comes across that way," LCCC student Thompson says. "Those little things could use tweaking to not discourage students."

- **Assignments.** Students and faculty reported that some adaptive products did not assign due dates for each assignment, prompting students to wait until the end of the semester to complete their work — defeating the purpose of ongoing skill building and support. "The courseware tells them you should be doing this this week to reinforce what's in class," Broward's Bobb says.

- **Adaptive use in paired corequisite courses.** At Amarillo College, adaptive courseware was used only in corequisite courses, which meant that "students didn't see the value, because the transfer course is what gets them to the next level," Burton says.

One strategy to recognize these and other unintended consequences is to encourage faculty to use the courseware themselves — which has the added benefit of supporting their own growth as learners, says LCCC's McFadden. "It helps keep you up to date," he says. "If faculty members are willing to go through it themselves, it will help them, too."

Determining whether adaptive courseware is appropriate for all students. Some institutions grappled with this challenging question, particularly in courses where students struggled to complete adaptive assignments and those with large numbers of learners who lack comfort with technology. "Some benefit greatly from the approach, whereas for others it destroys their motivation. I've been thinking about whether there's a way to identify those students beforehand," says Branson Brade, HCC mathematics professor and program coordinator. "It may just come down to letting students know early on that it's an adaptive course and give them some choice."

At Amarillo College, faculty working with adult learners in GED courses targeted adaptive courseware at students comfortable with the technology and who continued to use it over the course of the class. "It's not suited for everybody," says Dr. Teresa Gaus-Bowling, curriculum specialist. "It depends on whether students are suited to technology or wary of it. Making it a one-size-fits-all might not have the best intended consequences."

CONCLUSION

Each participating institution is continuing plans to expand the use of adaptive courseware across additional sections — and in some cases, additional courses and disciplines. Faculty, staff, and college leaders point to promising signs of the technology's potential, including greater numbers of students completing targeted gateway courses and higher grades within specific courses. For their part, students generally credit courseware with giving them the opportunity to engage with course material at their own pace, as well as receiving just-in-time productive feedback on their progress in adaptive assignments. While some found the repetitive nature of adaptive work frustrating, many acknowledged it helped them master key concepts.

These institutions' experiences with adaptive courseware implementation also reinforce key lessons learned by ATD Network colleges about broader institutional changes in teaching and learning. These experiences highlight guiding principles which college leaders and faculty must follow to ensure that any new learning technologies support a student-focused culture that promotes student success, including:

Access and equity. As technology-enabled learning becomes a permanent part of community college offerings, each tool must be evaluated to ensure that it provides support to the students who need it the most. During the pandemic, many institutions made great efforts to provide connectivity and devices to support remote learning, which meant they had to verify that products were equally accessible on mobile devices such as phones and tablets.

Beyond technology access, faculty also must consider the equity implications of adaptive courseware itself. In particular, efforts must be made to ensure that lower-performing students don't spend disproportionate amounts of time in adaptive assignments without progressing, a common concern across institutions during the pilot. "By adding the supplemental courseware, you were helping those who were already high achieving to enhance their skills, but exacerbating challenges for those trying to keep up with the pace of the course itself," Broward's Philyaw says. "We're seeing some increases in success, but when we look at who's successful, we're seeing some at-risk students continuing to be at risk."

For more information about the Every Learner pilot and to read case studies of each participating institution and the key disciplines in which adaptive courseware was tested, visit ATD's Every Learner Everywhere resource page.

Ongoing action research into evidence-based instructional practices. Implementing adaptive courseware and other digital tools must be considered within the context of broader, research-based instructional strategies that support learning and student success. At IRSC, for example, faculty saw the adaptive pilot as "another opportunity to continue active research," says Dribben. "We didn't have trouble getting faculty to step up."

Collaborative, cross-functional teams to support students. Moving forward, institutions must consider ways to leverage technology to connect teaching and learning to broader support structures focused on student success. "Thoughtful and intentional curriculum design, effective teaching practices, and a coordinated network of care are at the core of our student success initiatives," says Broward College Provost and Senior Vice President for Academic Affairs Dr. Jeffrey Nasse.

Structures that enable professional learning and the creation of a culture of teaching and learning excellence. Institutions must frame digital learning implementation and other new initiatives within existing structures, such as Centers for Teaching and Learning that provide ongoing opportunities to connect them to opportunities for faculty and staff to examine their practice, test new evidence-based approaches, and support each other as learners as they explore new technologies and practices to support student learning.

The importance of this kind of holistic approach to teaching and learning was reinforced repeatedly by students who took courses which were part of the Every Learner Everywhere initiative. Virtually all stressed the importance of the professor and the in-class experience as the primary reason for their success in challenging gateway courses. "It's on the teacher," Broward student Valeska De Langton says.

APPENDIX A: COURSE-LEVEL DATA SNAPSHOT

The following table provides information on all of the courses offered at the seven institutions during the pilot phase, the number of sections offered, student enrollment, the number of both full-time and adjunct faculty members who taught courses, as well as the courseware piloted in each course.

AMARILLO COLLEGE						
DISCIPLINE	**COURSES**	**SECTIONS**	**STUDENTS**	**FULL-TIME FACULTY**	**ADJUNCT FACULTY**	**COURSEWARE**
Chemistry	Introductory Chemistry I (CHEM 1305	4	185	4	0	Knewton Alta (Wiley)
	General Organic & Biological Chemistry (CHEM 1406)	2	85	2	0	Knewton Alta (Wiley)
	Principles of Chemistry I (CHEM 1311)	3	115	3	0	Knewton Alta (Wiley)
	Principles of Chemistry II (CHEM 1312)	3	105	3	0	Knewton Alta (Wiley)
English	Composition I (ENGL 1301)	7	~500	7	0	InQuizitive (W.W. Norton and Company)
	Composition II (ENGL 1302)	7	300	7	0	InQuizitive (W.W. Norton and Company)
Math	College HSE Math	10	250	0	10	MyLab Math (Pearson)
	College Algebra for STEM Majors (MATH 1414	3	111	3	0	MyLab Math (Pearson)
	College Algebra (MATH 1314)	7	~400	7	0	MyLab Math (Pearson)
	Business Math	1	58	1	0	MyLab Math (Pearson)
	Contemporary Math (MATH 1332)	3	260	3	0	MyLab Math (Pearson)

BROWARD COLLEGE						
DISCIPLINE	**COURSES**	**SECTIONS**	**STUDENTS**	**FULL-TIME FACULTY**	**ADJUNCT FACULTY**	**COURSEWARE**
Math	Developmental Mathematics (Mat0022)	6	153	1	3	ALEKS (McGraw Hill)
English	Advanced Composition I (EAP1540C – ESL)	2	46	1	0	MyLabsPlus (Pearson)

CUYAHOGA COMMUNITY COLLEGE						
DISCIPLINE	**COURSES**	**SECTIONS**	**STUDENTS**	**FULL-TIME FACULTY**	**ADJUNCT FACULTY**	**COURSEWARE**
Business	Intro to Business (BADM1020)	17	358	3	8	LearnSmart Connect (McGraw Hill)
	Business Law (BADM 2151)	2	52	1	1	LearnSmart Connect (McGraw Hill)
Biology	Introduction to Biological Chemistry (BIO 1100)	2	54	1	0	Mastering Biology (Pearson) MyLab (Pearson)
	Anatomy and Physiology (BIO2331)	3	61	1	0	Cogbooks Mastering A&P (Pearson)
Chemistry	Everyday Chemistry (CHEM1000)	2	43	1	0	LearnSmart Connect (McGraw Hill)
	Introduction to Inorganic Chemistry (CHEM1010)	10	218	2	0	ALEKS (McGraw Hill)
	General Chemistry I (CHEM 1300)	8	121	3	0	LearnSmart Connect (McGraw Hill) ALEKS (McGraw Hill)
	General Chemistry II (CHEM 1310)	6	100	2	0	LearnSmart Connect (McGraw Hill) ALEKS (McGraw Hill)
Economics	Principles of Microeconomics (ECON2000)	8	206	2	1	LearnSmart Connect (McGraw Hill)
	Principles of Macroeconomics (ECON2010)	6	134	1	1	LearnSmart Connect (McGraw Hill)
Math	Basic Arithmetic /Pre-Algebra (MATH0910)	2	30	1	0	MyLab Math (Pearson)
	Beginning Algebra I (MATH0955)	5	108	2	0	Newton Alta (Wiley) MyLab Math (Pearson)
Physics	College Physics I (PHYS1210)	2	30	1	0	Mastering Physics (Pearson)
	General Physics I (PHYS2310)	2	49	1	0	Mastering Physics (Pearson)
Psychology	General Psychology (PSY1010)	24	586	3	6	Waymaker (Lumen)
	Child Growth and Development (PSY2010)	1	15	1	0	Waymaker (Lumen)
	Life Span Development (PSY2020)	4	91	1	1	Waymaker (Lumen)

HOUSTON COMMUNITY COLLEGE

DISCIPLINE	COURSES	SECTIONS	STUDENTS	FULL-TIME FACULTY	ADJUNCT FACULTY	COURSEWARE
Math	College Algebra (MATH 1314)	6	163	4	0	Knewton Alta (Wiley)
	Math for Business and Social Sciences (MATH 1324)	2	58	1	0	Knewton Alta (Wiley)
Economics	Principles of Macroeconomics (ECON 2301)	8	298	3	0	Waymaker (Lumen)

INDIAN RIVER STATE COLLEGE

DISCIPLINE	COURSES	SECTIONS	STUDENTS	FULL-TIME FACULTY	ADJUNCT FACULTY	COURSEWARE
Math	Intermediate Algebra (1033)	17	358	3	8	MyLab Math (Pearson)
	Quantitative Reasoning (1100)	2	52	1	1	ALEKS (McGraw-Hill)
	College Algebra (2020)	2	2	2	2	ALEKS (McGraw Hill)
Chemistry	Intro to Chemistry (1020)	2	54	1	0	Inspark-Critical Chemistry
English	English Comp 1 (ENC 1101)	2	43	1	0	Waymaker (Lumen)

LORAIN COUNTY COMMUNITY COLLEGE

DISCIPLINE	COURSES	SECTIONS	STUDENTS	FULL-TIME FACULTY	ADJUNCT FACULTY	COURSEWARE
Math	Statistics (MTHM 168)	28	513	5	0	WileyPLUS Adaptive Practice
Business	Intro to Business Administration (BADM 155)	2	42	1	1	LearnSmart/ Connect (McGraw-Hill)

MIAMI DADE COLLEGE

DISCIPLINE	COURSES	SECTIONS	STUDENTS	FULL-TIME FACULTY	ADJUNCT FACULTY	COURSEWARE
Math	College Algebra (MAC1105)	36	1085	6	17	Pearson Integrated Review

Achieving the Dream™

LEARN MORE ABOUT ACHIEVING THE DREAM, INC.

Visit www.AchievingtheDream.org
or contact us at info@AchievingtheDream.org or call (240) 450-0075
Follow us on Twitter @AchieveTheDream