Achieving the Dream™

Integrating Adaptive Courseware into Broader Efforts to Improve Teaching and Learning

A CASE STUDY OF INDIAN RIVER STATE COLLEGE

everylearner everywhere

SEPTEMBER 2021

ABOUT THIS CASE STUDY

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 is working 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 case study is part of a series of 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. Case studies are based on a series of interviews with college leaders, faculty, instructional designers, developers, technology specialists and students who were enrolled in classes using the courseware.

Acknowledgements

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Achieving the Dream would like to thank the students, faculty, staff and administrators at Indian River State College 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, Melanie Fonder Kaye, Cheryl Fong, Jonathan Iuzzini, Sarah Kinnison, Dr. Richard Sebastian, Paula Talley and Dr. Monica Parrish Trent as well as former ATD staff members, Joanne Anderson, Shauna Davis and Shanah Taylor.

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OVERVIEW

Indian River State College considered adaptive courseware a potentially powerful tool in its ongoing efforts to improve online instruction and overall engagement and outcomes for students in math, physical sciences, and English. Faculty led adaptive courseware implementation in these three disciplines, reporting potentially significant improvements in engagement and student performance.

- The initiative tapped into existing faculty-led efforts to improve student outcomes by examining curriculum, pathways, and instruction, including participation in external improvement networks and institutional quality enhancement programs.
- Adaptive courseware supported broader efforts to address state reforms in developmental education and a shift to a flipped classroom model, providing students with corequisite practice and preparation in advance of in-class instruction and support.
- Peer tutoring and other supports were coordinated with the use of adaptive courseware, including providing courseware shells and training for tutors.
- Faculty identified and implemented modifications to adaptive courseware use, including shifting in-class models and selecting different courses for adoption.

SUPPORTING INSTITUTIONAL REFORM

The Every Learner initiative supports broader efforts to foster student learning with evidence-based practices, including efforts to support the development of students' mastery of concepts and critical thinking skills. "The Every Learner endeavor has been transformative for students and faculty alike," said Dr. Timothy Moore, IRSC President. "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." The initiative also reflects the contexts in which broader institutional reform is taking place at community colleges throughout the ATD Network, including building a culture of excellence in teaching and learning and leveraging data and technology to support student success and equitable student outcomes. To learn more, see p.9.

INDIAN RIVER STATE COLLEGE
DATA SNAPHOT[1]

LOCATION Fort Pierce, Florida

TYPE SUBURBAN

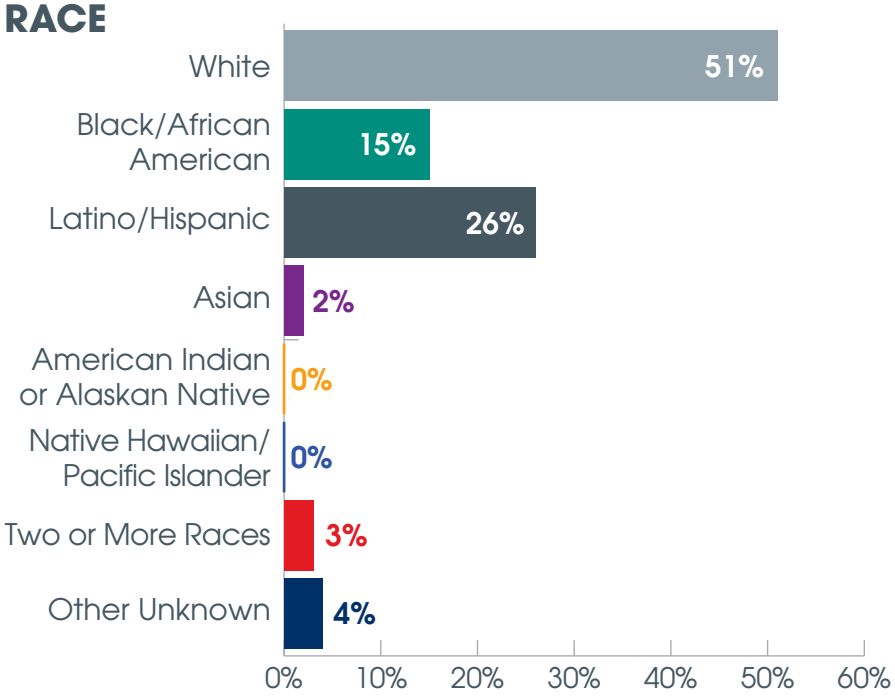
LOCATIONS (Campus/Centers) 11

ENROLLMENT
16,686

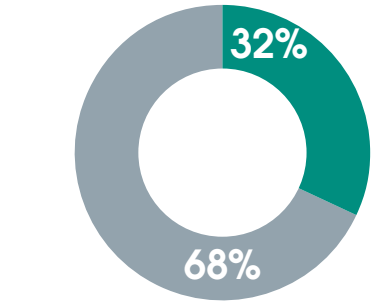
GENDER
FEMALE **61%**

MALE **39%**

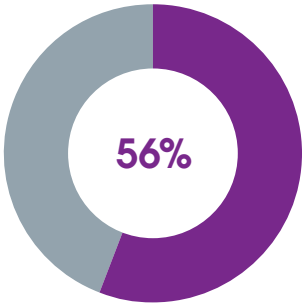
RACE



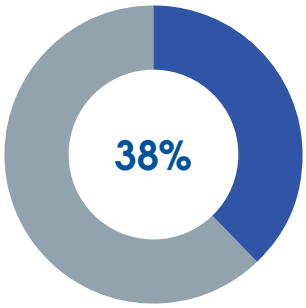
Full-time vs. Part-time



Pell-grant recipients



First-generation



(from IRSC website)

ATD MEMBER STATUS

JOINED ATD
2013

ATD ACHIEVEMENTS
ATD Leader College (2016)

1 The information contained in the Data Snapshot is based on data from the National Center for Education Statistics' College Navigator, data collected directly from the institution, and information maintained by ATD.

INDIAN RIVER STATE COLLEGE

ELE INFORMATION						
Discipline	**Courses**	**Sections**	**Students**	**Full-time Faculty**	**Adjunct Faculty**	**Courseware**
Math	Intermediate Algebra (1033)	7	149	5	0	MyLab Math (Pearson)
	Quantitative Reasoning (1100)	10	207	5	0	ALEKS (McGraw-Hill)
	College Algebra (2020)	1	46	1	0	ALEKS (McGraw Hill)
Biology	Introduction to Biological Chemistry (BIO 1100)	6	110	3	0	Inspark-Critical Chemistry
Chemistry	Everyday Chemistry (CHEM1000	1	23	1	0	Waymaker (Lumen Learning)

Note: Adaptive courseware was adopted in English after the initial pilot phase.

INTRODUCTION

Student Jennine Wilson admits to being apprehensive when courses at Indian River State College (IRSC) went online during the coronavirus pandemic in March 2020. "I'm 49, and I tend to learn better in person," says Wilson, who is in her final year of IRSC's health information technology program.

One of the classes she needed to take that semester was intermediate algebra, a subject about which she's not shy sharing her feelings. "I hate math, and not being able to get that face-to-face breakdown made me apprehensive," she says.

However, adaptive courseware that had been put into place in intermediate algebra and courses in two other disciplines at IRSC, helped ease the abrupt transition to online instruction. The software, Wilson says, "gave me the same tools as what the teacher would have been doing. The activities and the questions that you click on (to) break down the problem in a way that you didn't look at before explained things better."

Adaptive courseware is helping address the wide-ranging needs of students in math, chemistry, and English, a goal which has become more challenging in the wake of Florida legislation passed in 2013 that effectively ended developmental education statewide. IRSC faculty identified and implemented a series of student success approaches, including peer tutoring, corequisite courses, and in-class activities that amplified the interactive practice afforded by the courseware. For Wilson, their efforts made all the difference during the unplanned pivot to online instruction, with the courseware providing needed support in the absence of classroom activities.

"Had we been face to face the whole class, I may not have done so well," she says.

ADDRESSING INSTRUCTIONAL NEEDS

IRSC had already made significant investments in digital learning platforms and engaging faculty in professional development to use them effectively. IRSC is a Quality Matters institution, part of a network which focuses efforts on improving the structure, quality, and engagement of online courses. Adaptive courseware was envisioned as part of broader efforts to improve student engagement and success across the three disciplines that have participated in implementation.

Chemistry faculty had been exploring flipped classroom models and were planning textbook changes to boost student engagement, as was the English department. Mathematics faculty had also been involved in research on curricular changes and pathway models, including limited exploration of adaptive courseware as part of their quality enhancement efforts.

"Adaptive technology seemed like a really good step for many of our courses, particularly in STEM areas," says Dr. Heather Belmont, vice president of academic affairs.

Faculty had an additional incentive to seek new models after legislation passed by the Florida legislature placed all public high school graduates into college-level gateway courses regardless of ability. Before students were no longer required to go through mandatory assessment and placement processes, 70 percent had tested 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."

While adaptive courseware has been adopted widely in STEM subjects at other institutions, IRSC was one of a comparatively smaller number of institutions which also explored implementing the technology for English courses. However, due to a lack of vendors, it took faculty longer to find suitable adaptive courseware to complement ongoing efforts to rework the critical gateway composition course. Existing courseware simply was inadequate for student needs since "the supports weren't cohesive," says Dr. Scott Stein, dean of liberal arts, who envisioned adaptive courseware focusing on prerequisite skills that would prepare them for college-level writing.

"The hope is to help our students who are weaker to develop the skills necessary to be successful in that course," he says.

FLIPPING THE MODEL — TWICE

Like many flipped classroom models which replace in-class lectures with hands-on work, the focus at IRSC was on fostering direct support from instructors during class time. Flipped classrooms were implemented in different ways across different departments and course modalities, but adaptive courseware played a key role in making work done out of class more engaging for students.

In chemistry, the physical science department chair recognized the importance of engagement after students came to her lectures unprepared for the material she was covering; she and other instructors ultimately shifted guided lectures and discussions to online platforms and had students work collaboratively in small groups in class. In the three different math courses in which adaptive courseware was used, the emphasis was on homework, with faculty devoting part of class time to help students work through assignments. They also took advantage of the courseware's learning analytics so students could see what topics they had and had not mastered to "let them know where they stood," O'Dell says. And while English faculty struggled to identify courseware that met the needs of their introductory classes, the goal was to use technology to focus on grammar and structure so students could spend more time on writing in class, says Stein.

The flipped model helped with a second transition — the rapid pivot to online instruction this spring. Faculty were "already reliant on that flip for delivery of content and a large online component," says Dr. Anthony Dribben, dean of math and natural sciences. "The content delivery in homework was really unchanged. What they could do is take content for (classroom discussions) and take it to the discussion boards."

"There was no handwringing," says Belmont. "Our faculty have come together in the most monumental way to make sure our students do not stop learning."

BUILDING ON ATD'S CORNERSTONES OF EXCELLENCE

Like other community colleges participating in the Every Learner grant which are part of the ATD Network, IRSC has committed to engaging in bold, holistic, and sustainable institutional change across multiple institutional areas and priorities. The institution's 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. "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.

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 particularly 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 Every Learner provide important resources and supports to community colleges and the time, space, support, and resources to explore innovative pedagogical approaches to improving student learning and outcomes. They also offer sustained opportunities to build on these cornerstones of excellence. IRSC's work 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. Faculty considered Every Learner "another opportunity to continue active research," says Dr. Anthony Dribben, dean of math and natural sciences.

In particular, faculty implementation of adaptive courseware supported broader efforts to examine curriculum, pathways, and instruction, as well as state reforms in developmental education and a shift to a flipped classroom model which places more emphasis on student work in courseware. These efforts will "ensure our online classrooms are different places, and adaptive technology will be part of that," says Lynne O'Dell, mathematics and science student success coordinator.

Intentional faculty-led efforts also focused on integrating adaptive components with evidence-based instructional practices that foster student learning, including providing courseware master shells and training for tutors, as well as using learning analytics data from the courseware to target interventions to students who are struggling. "Having that information before walking in the door is very helpful," says Lanie Culligan, a master instructor in mathematics.

PEER TUTORING AND OTHER SUPPORTS

Adaptive courseware also complemented other academic supports. For example, mathematics faculty recognized that there weren't enough academic success tutors to meet student needs in the redesigned introductory courses, so they turned to peer tutors — and took steps to ensure that they could help students with adaptive work.

Peer tutors were required to have completed the same course they were hired to support with an A or B and be recommended by a faculty member. Importantly, since they had recently taken the same classes, they were familiar with the courseware and could support current students. "They had been in the software before and knew how it works," O'Dell says. Faculty also worked with publishers to create tutor shells that allowed them to see the same assignments as students.

Along with using peer tutors in breakout and review sessions, peer tutoring support was embedded in two synchronous online course sessions during summer 2020. During these classes, students could reach out in real time to peer tutors, who also helped faculty respond to general questions in the chat box.

"The feedback from students was tremendous," says O'Dell. "They're more likely to reach out to someone who looks like them and have had the same classes."

Some faculty took additional steps to bring adaptive courseware into their classes. Associate professor of mathematics Sarah Wyatt started her face-to-face courses in the computer lab to ensure students signed into the courseware and held several classes in the lab over the semester to get a sense of what students were struggling with. "As an instructor, that really helped me see where they were," agrees Heather Michaels, a master instructor in the physical science department.

THE STUDENT EXPERIENCE

Arona Duncan is an international student from Jamaica who plans to earn a bachelor's degree in elementary education. Jennine Wilson is a 49-year-old student who has been working toward her degree in health information technology since 2012. Both adult learners took to adaptive courseware quickly and said it helped them navigate intermediate algebra, a required course for their majors in a subject neither prefers. "I do not like math. We are enemies," Duncan says.

For Duncan, who says she learned math differently in Jamaica and was returning to the subject after being out of school for four years, the courseware helped by providing multiple strategies to approach complex questions. "In math, there are different ways of solving problems," she says. "If my professor gave you her way of solving it, (the courseware) had another way. You got to choose which way is easier for you, the one you understand better."

For Wilson, adaptive courseware made it "a lot easier to double back" and review previously learned content. Videos and step-by-step instructions helped her grasp unfamiliar concepts. "There are certain things you can't put together looking at a flat page," she says.

THE IMPACT

Individual faculty members offered strong anecdotal evidence that adaptive courseware benefitted students. One math instructor saw pass rates jump 20 percent in one course after making adaptive study a prerequisite for taking graded quizzes. While the limited number of pilot courses and the disruption caused by the pandemic made data collection difficult, other faculty members reported students coming to class "having done the work and ready to have nice engaging conversations," Dribben says, while still others point to evidence that the software is helping students scaffold key concepts over time.

"The software we're using is really helping students retain content from one unit to the next," says O'Dell. "That's something we haven't seen in the past."

In English composition, a pilot course in one 30-student section during summer 2020 saw significant drops in failing grades and withdrawals, according to Stein. Faculty have since rebuilt the introductory course "from the ground up" to implement the software for fall 2020.

What Worked Well:

Engagement. After employing adaptive courseware as part of flipped classroom models, faculty reported that students were more likely to come to class having done the work and prepared to participate in discussions and assignments. But the benefits of engagement extended to faculty as well, according to Dr. Heather Belmont, vice president of academic affairs: "Our faculty really want to do better with our students," she says. "They thrive on this — they want to figure out ways to engage our students in the classroom."

Addressing differing student needs. Adaptive courseware helped address the wide range of skills in introductory courses following the changes to developmental education. The technology "gave students who were struggling more time while the students who knew what they were doing wouldn't have to do as much work," says Lynne O'Dell, IRSC mathematics and science student success coordinator.

Students, in turn, 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."

Providing support to students. Students gave adaptive courseware high marks for providing videos, explainers, and step-by-step examples for homework that was aligned with quizzes and tests. "If you're not familiar with a problem, it shows examples and you can follow them step by step," says student Arona Duncan. "Everything's laid out, clearly and concisely… and you can try another question to help practice."

Cost savings. Adaptive courseware proved a cost-effective alternative to traditional textbooks, a student expense targeted by Florida lawmakers in higher education legislation. Even before the law, faculty had been "extraordinarily conscientious, since these are community college students who are making the decision between textbooks and food on the table," Belmont says.

In one English composition class, the switch cut costs by 60 percent, saving students $200,000 in total, according to Dr. Scott Stein, dean of liberal arts. Just as importantly, the lower costs ensure that they will have needed materials in the first place: "Before, students weren't purchasing the textbook, which was adding to the disengagement," says Dr. Anthony Dribben, dean of math and natural sciences. "Now they're required to purchase a relatively inexpensive code" — around $40 in many classes — "which gives them access to the courseware and the content."

Using courseware data to target interventions. Instructors said the progress reports generated by the courseware helped them focus their attention on specific students who were struggling. "Having that information before walking in the door is very helpful," says Lanie Culligan, a master instructor in mathematics.

Collaboration. Faculty worked to support each other in the implementation of the software — and reached out to peers at other institutions for help in identifying and adapting courseware. English faculty, for example, worked with other institutions which had participated in earlier initiatives involving adaptive courseware, including the University of Mississippi, to learn how to implement courseware. "They worked with us to adapt the lesson plans we wanted for what we wanted our students to learn," Stein says.

Ongoing Challenges:

Selecting software. Finding effective courseware was particularly challenging in English, where the adaptive options for courseware were limited and focused on existing publisher materials that "didn't provide a cohesive concept of what we were intending students to learn," Stein says.

Workload. Initial implementations often resulted in overloading students with work, in part because the default pass rates for pretests (between 70 and 80 percent) 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," Dribben says. "They'd tune out after that." Participating faculty members subsequently adjusted the thresholds within the courseware to address this issue.

The irony, says Culligan, is that the workload wasn't always that different, but often presented by the courseware in ways that made it look intimidating. "The list of assignments overwhelmed them mentally more than the work, which was the same amount of work," she says.

Overall, "the way we had it set up seemed to overload the students," adds O'Dell. "It caused a lot of stress and hindered their success."

Confusion about adaptive elements. Because adaptive courseware provides different assignments to each student based on their skill level, some faculty reported that students would be confused why their assignments were significantly longer or shorter than those given their peers. "You would have students talk to each other about their different workloads, and they'd get confused about what they had to do," says associate professor Sarah Wyatt, stressing the importance of explaining the adaptive elements as part of onboarding students to the courseware.

Navigation. Students gave adaptive courseware high marks for helping them work through complex problems, but said that it was more difficult to search for and find specific concepts and themes that weren't part of assigned work. "I want to be able to type in the search bar a problem if I saw it in a book and wanted to figure it out," says Wilson. She also suggested that courseware should be able to generate links to specific adaptive problems so students could email professors for help with a particular question or topic.

Differing levels of technology familiarity among students. With students ranging from recent high school graduates accustomed to using online courseware — and in some cases, adaptive products — to adult learners including working parents and, in one case, a 75-year-old, comfort with technology proved a challenge along with the wide variance in content-specific skills.

LESSONS LEARNED

Keys to IRSC's implementation of adaptive courseware:

- **An established emphasis on engaging faculty in instructional efficacy.** Faculty participation in Quality Matters, research on student learning, and institutional quality enhancement plans meant that many had already worked closely on changing curriculum and content delivery, particularly in the wake of state reforms that largely eliminated developmental education. Some also were familiar with the potential and challenges of using adaptive technology, and those who weren't "saw this as another opportunity to continue active research," says Dr. Anthony Dribben, dean of math and natural sciences. "We didn't have trouble getting faculty to step up."

- **Supporting faculty to lead the process.** Faculty also led decisions on selecting adaptive products within their departments. To jumpstart the process, leaders identified faculty who were already experimenting with innovative teaching practices to get them involved. "Their enthusiasm is contagious," says Dr. Heather Belmont, vice president of academic affairs. "It has to be a faculty-driven process at the end of the day."

  "If it works, the faculty will decide if it's something they should implement in all sections," agrees Lynne O'Dell, mathematics and science student success coordinator. "It will be up to them."

  Importantly, faculty leadership looked different across disciplines. In mathematics, a core group of faculty members piloted the adaptive software in specific sections and communicated with each other as the initial term progressed. Conversely, the physical science department chair singlehandedly piloted the courseware in her chemistry classes to demonstrate its potential. "Once she did a pilot and showed them what's possible with the product and the data that's coming out of her class, that's when you got to see engagement," says Dribben.

- **Selecting the courses with the greatest potential impact — and adjusting as needed.** Faculty immediately recognized the potential benefits of adaptive software in providing corequisite support for students placed in college-level courses, but also made adjustments based on students' experiences. In math, after having challenges using the courseware in intermediate algebra, faculty decided to pilot it in a higher-level course, college algebra.

- **Explaining the goal of courseware to students.** After the initial semester of implementation, faculty members recognized the importance of introducing students to adaptive courseware — and explaining why the workload varied from student to student and assignment to assignment. One instructor, for example, created a handout explaining what students would experience and the expectations for completing work after the first semester.

  "Explaining the concept behind it helped to ease their anxieties," says Lanie Culligan, a master instructor in mathematics. "Once students understand what's going on, there are a lot of benefits."

- **Ensuring professional learning for all instructors.** Full-time and adjunct faculty engaged in the same professional development on courseware and were encouraged to collaborate with peers in their departments — which was critical to working through implementation, faculty said. "If I didn't have the collaboration of other instructors, I might have said this is too much and change it prematurely. Having that support was major to me," says Sarah Wyatt, an associate professor of mathematics.

- **Integrating adaptive courseware and other supports.** Robust peer tutoring included student tutors who were experienced with both the course and the courseware. Importantly, faculty created tutor shells so they could see and assist students in navigating the courseware and also provided training to help them tutor effectively. "Some of the skills they needed to help and encourage students we needed to point out," says O'Dell.

- **Recognizing the importance of soliciting feedback from students.** Student focus groups conducted by faculty following the pilot courses surfaced challenges with workload — and revealed another important fact. "Unfortunately, not a lot of students said anything to the faculty to clue them in," says O'Dell. "Had we known, we would have made adjustments through the term."

- **Making adjustments as needed.** Focus groups prompted significant changes after the first semester of implementation. For example, in math courses, instructors clarified objectives and switched from multiple quizzes which required completing adaptive assignments to focusing on a larger final test, says Culligan. "Students seemed to be less overwhelmed once we downsized the look of the assignments," she says.

CONCLUSION

Administrators say that the support provided through the Every Learner Everywhere grant, including resources from ATD and the opportunity to collaborate with other participating institutions, was helpful. Participating faculty also acknowledged the benefits that came from the implementation process.

"Looking back, I feel like it's worth it, especially for those lower-level students," Wyatt says. "Even though it was a lot of work, it's our job as instructors to improve (outcomes) to the best of our abilities."

Faculty in each discipline are scaling adaptive courseware in different ways. Chemistry, like English, is rolling out courseware in all sections of one introductory class. In mathematics, adoption is shifting from intermediate algebra to college algebra, and one math instructor added it to her online sections of business math because it is "a difficult class to take online." And faculty have leveraged their experience with adaptive courseware to develop online and hybrid options for science lab courses for the first time, with the grant helping these hands-on courses pivot following the COVID-19 pandemic.

"Faculty are deeply involved and vested in the project," Belmont says.

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 improving 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."

Achieving the Dream™

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