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CASE IN POINT: Adaptive Courseware as a Tool to Master Complex Concepts



A CASE STUDY OF ADAPTIVE LEARNING TECHNOLOGY IN BUSINESS AND THE SOCIAL SCIENCES

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OCTOBER 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

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 Cuyahoga Community College, Lorain County Community College and Houston Community 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, 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.

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Achieving the Dream. (2021). *Case in Point: Adaptive Courseware as a Tool to Master Complex Concepts — A Case Study of Adaptive Learning Technology in Business and the Social Sciences*

OVERVIEW

Courses in the business and social sciences disciplines challenge students to question preconceived ideas and misperceptions as they are introduced to complex concepts. Faculty in these disciplines at community colleges participating in the ELE Network found that adaptive courseware helped students master these concepts by providing regular knowledge checks that assessed and reinforced what they were learning. Among their findings:

- Adaptive courseware proved a powerful learning tool when it was implemented as part of intentional efforts to redesign courses around learning outcomes.
- Students valued integrated class experiences which provided seamless connections between adaptive work, textbooks, and other class materials.
- Courseware provided new opportunities for faculty to provide individualized feedback to students doing well or struggling in courses, as well as integrated supports such as tutoring.
- Following the pivot to online learning in Spring 2020, participating faculty identified

opportunities to deepen the use of adaptive courseware in new hybrid modalities beyond the pandemic.

SUPPORTING INSTITUTIONAL REFORM

The Every Learner initiative supports broader efforts to foster student learning with evidence-based practices, including supporting students as they explore unfamiliar and complex concepts. The adaptive courseware “puts a bigger safety net around our students,” says Dr. Michele Hampton, a professor of business administration at Cuyahoga Community College (Tri-C). It 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. 7.



COURSE AND COURSEWARE DATA SNAPSHOT

INSTITUTION	COURSES	COURSEWARE
Cuyahoga Community College Cleveland, OH 23,655 students	Introduction to Business Administration Business Law Principles of Microeconomics Principles of Macroeconomics General Psychology Child Growth and Development Life Span Development	LearnSmart/Connect (McGraw-Hill) Waymaker (Lumen)
Lorain County Community College Elyria, OH 10,206	Introduction to Business Administration	LearnSmart Connect (McGraw-Hill)
Houston Community College Houston, TX 56,151 students	Principles of Microeconomics Principles of Macroeconomics	Knewton Alta (Wiley) Waymaker (Lumen)

For more detail on the pilot efforts at each college, see case studies for each institution.

INTRODUCTION

After stopping out of college to work and raise her children nearly a decade earlier, Alichielle Shears returned in fall 2019. As the 28-year-old juggles homeschooling, her children during the pandemic and her own studies, Shears is working towards an associate degree in business from Lorain County Community College (LCCC), where she takes all her classes online from her home in the Cleveland area.

“So far so good,” she says.

One reason for her strong start as she resumed her studies, Shears says, is the adaptive courseware in her introductory business course that helped her identify what she needed to learn and allowed her to practice key concepts as the class progressed.

“It helps a lot,” she says. “I’m taking multiple classes and taking care of my kids. I’m not going to read 50 pages in a textbook and memorize it all... We read material and answer the questions, and you retain the material — it works. In other classes, you just use the textbook.”

That’s particularly important in disciplines like business and the social sciences — where faculty at institutions participating in the ELE initiative have integrated adaptive courseware into subjects including economics, accounting, tax law, and psychology, all of which require students to master complex concepts through lengthy readings.

Before adopting adaptive courseware, too many students failed to “do all their homework or master the concepts,” says Lawrence Paye, an economics instructor and faculty tutor at Houston Community College (HCC). “Adaptive has them go back and strengthen their understanding of the concepts and then helps them apply those concepts.”



'LEARNING HOW TO LEARN'

Students taking business and social sciences courses for the first time often bring with them misperceptions about the disciplines and key concepts.

Terms such as “positive reinforcement” in psychology or “inflation” in economics have more precise meanings in these disciplines than they do in everyday conversation, for example, and business students may believe they already understand the nuances of accounting because of their experiences managing their own finances. “Everyone thinks they get it because it’s in the world. (But) if you read the textbook on inflation, you’re probably not going to understand it,” says Dr. Michele Hampton, a professor of business administration at Cuyahoga Community College, which is known locally as Tri-C.

Adaptive courseware helps students “learn how to learn,” says Stacey Souther, a psychology professor at Tri-C’s eastern campus. It “builds their cognitive stamina,” Hampton adds, by presenting material in smaller chunks and giving students an opportunity to test their comprehension before moving on — an approach she summarizes as “read a little, do a little, then read a little more.”

“Especially in an introductory course, it makes a world of difference,” she says. “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. Some are going to get it no matter how you structure it, and some aren’t. This is about getting most of them to really know the things they thought they knew.”

At LCCC, business faculty member Jerry McFadden first began experimenting with adaptive courseware independently of the institution’s ELE initiative. He ultimately rolled out adaptive software across all of his business courses after students in an introductory section told him that they “found it important to know where they

stood so they could meet the course objectives and outcomes,” he says. “They were glad I assigned it to them because it forced them to read. It essentially makes (reading) a prerequisite.”

“That was the light bulb for me — it’s helping them in a way they couldn’t get from me lecturing,” McFadden says. “This is another tool in the toolkit they didn’t have before.”

“It showed me how to take notes and what to focus on. I could see what I had to focus on for the exams.”

—Katelyn Robac, Tri-C student

Adaptive courseware’s ability to prompt students to go back and revisit key concepts until they correctly answer homework questions was also critical, participating faculty members say. As befits a business professor, McFadden likens progressing through the courseware to the Monopoly board game. “They can’t pass go and collect \$200 unless they go through all the stages,” he says. “That’s what I think is beneficial in an introduction to business course.”

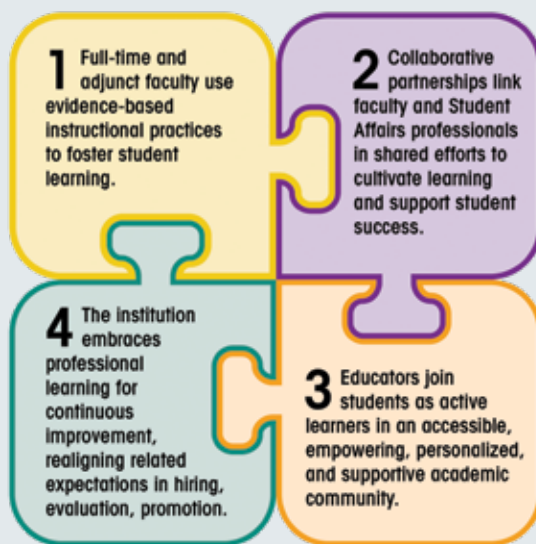
That approach works for students like Tri-C business management major Aimee Krivacic, who says she struggles with staying focused on her reading. “With my learning style, I need to have some activity to perform while reading,” she says. “Typically, I have to type everything out as I read it in order to comprehend it. Having those study guides to complete while reading the material... gave me an extra opportunity to apply the materials I was reading.”

BUILDING ON ATD'S CORNERSTONES OF EXCELLENCE

Like other community colleges participating in the Every Learner grant which are part of the ATD Network, the three institutions profiled in this case study have committed to engaging in bold, holistic, and sustainable institutional change across multiple institutional areas and priorities. Their efforts to implement adaptive courseware to support student understanding of complex concepts in business and social science courses reflect the importance of several key cornerstones of institutional change, including leveraging data and technology to support student success and equitable student outcomes and building a culture of excellence in teaching and learning.

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 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. At these three institutions, the grant

provided faculty in a wide range of courses and disciplines with the time and resources needed to evaluate, implement, and modify their use of adaptive courseware to best serve students.

Efforts to provide support for student mastery of complex concepts in business and social sciences courses exemplifies institutional efforts to empower faculty to consider, adapt, test, and refine new approaches to fit their campus context and the needs of their students. The iterative format of adaptive work helps students "build their cognitive stamina," says Dr. Michele Hampton, a professor of business administration at Tri-C, while interactive activities support students as they apply theory to practice, says LCCC business faculty member Jerry McFadden.

Faculty-led efforts to identify evidence-based instructional practices that fostered student learning were centered in efforts to align courseware with intentional course design, learning outcomes, and out-of-class supports such as peer tutoring. Faculty also worked to use data from adaptive courseware to monitor student progress and target supports. And within the rapidly changing nature of the social sciences, adaptive courseware also provided faculty with opportunities continue their own learning and professional growth. "It helps keep you up to date," McFadden says.

CONNECTING COURSEWARE WITH THE CLASSROOM

“It’s user friendly and easier to learn for me, but I guess it depends on people’s learning styles. I would rather learn online than turn 60 pages in a book.”

— Alichielle Shears, LCCC student

With the goal of providing students with the opportunity to augment assigned readings with checks on their knowledge, participating faculty members were intentional about the ways in which they integrated adaptive courseware into broader class structures. For example, McFadden introduced adaptive courseware to his business courses as part of a flipped classroom model, with students reading materials and answering adaptive questions ahead of online or in-person lectures. The questions help ensure “they’re learning the concepts before I discuss them,” McFadden says.

At Tri-C, economics courses follow a similar model, except the textbook was replaced by publisher videos which students watch before responding to adaptive questions in ways that “cognitively chunk it out so it makes more sense,” Hampton says. Souther’s psychology classes integrated OER materials in similar fashion to “make the materials accessible and easy to make sure students actually use them,” she says.

In addition, in more advanced classes like McFadden’s tax courses,

adaptive courseware provides real-world scenarios that students must work through. “You could read the paragraph in the book, but let’s see it on a tax return and go through the calculations,” he says. “Unless you’ve done it and applied it, you could read the theory all day long. You have to do the practice.”

Paye credits adaptive courseware’s ability to generate different questions as students return to concepts they have not yet mastered. “You don’t want them just to memorize the information,” he says.

Souther says the focus on foundational concepts within adaptive homework allows class lectures to focus on applying the information students learned ahead of time. “Courseware helps them get the basic materials on their own, then we can make it deeper,” she says.

Students agree. “It gave you more insight,” says Fughi Thompson, who took economics classes at HCC. “It gave me the opportunity to read at my own pace, study the information, and attempt to reapply it. I can learn the way I like to grow and develop.”

THE IMPACT

“You had to think through it. You can’t just search the material. If you chose the wrong answer, you got a good explanation. I found that really beneficial.”

—Aimee Krivacic, Tri-C student

At Tri-C, psychology students who retook quizzes in the adaptive lessons saw their grades increase by 20-30 percent. “The ones who wait a day or two (to relearn concepts) really improve,” Souther says. In Houston, Paye says he saw the number of students earning As and Bs in his macroeconomic course double to around 50 percent. “When you look at the grades side by side, it’s a big jump,” he says.

McFadden, who also saw scores rise in his business courses at Lorain, believes that the feedback from adaptive assignments helped students identify the areas where they needed to go back and relearn key concepts. “Self-assessing is hard,” he says. “That part of the software makes them think about that a bit more.”



What Worked Well:

Courseware integration: Faculty members said adaptive courseware integrated well with existing learning tools and platforms. At Tri-C, for example, psychology courses integrated adaptive courseware and an OER textbook within the college's Blackboard platform. The adaptive work "was truly the central force of the course," says Stacey Souther, a psychology professor at Tri-C's eastern campus.

Continuity. As with overall course design, adaptive courseware which provided a uniform approach to units and modules helped students master unfamiliar material as they progressed through courses. "Once students go through a module or two, they know what's expected," Souther says. To that end, students also stressed the value of a common adaptive approach in sequential classes within disciplines (see Lessons Learned, below).

Up-to-date content. The content in social sciences and business courses are less static than in other disciplines — history marches on, tax laws change. Faculty members credited publishers with keeping materials within adaptive courseware relevant — both for their students and for themselves. "It helps keep you up to date, assuming the publishers are keeping the content up to date inside the adaptive learning engine — and they are," says LCCC business faculty member Jerry McFadden. "If faculty members are willing to go through it themselves, it will help them, too."

Targeted messages. Automated messages generated by the courseware when students score below a pre-set threshold proved to be highly effective tools in encouraging them to seek help. "Even though I always say 'reach out to me on Blackboard, sending that (automated) message out gets them to respond,'" Souther says. Similar messages encouraging students

who do well on quizzes are equally motivating, she adds: "I've had so many students say they appreciate that," she says, while for faculty the automation of messages "gives us more time to do our jobs."

However, faculty members said the extent of automation varied across different adaptive products. Some sent their own messages based on data generated by the courseware to identify students who are struggling. Either way, students said the outreach helped.

"(My professor) emailed me saying 'I see you've only completed one assignment and you're a month in.' I didn't realize at first that the (adaptive) assignments would help me complete the other assignments," says HCC student Selene Hernandez.

Ongoing Challenges:

Onboarding: While many students found adaptive courseware easy to use, some students in social sciences and business courses said they received little support acclimating themselves to the products. "It was difficult at first because I wasn't very familiar with it and the professor didn't help with the technicalities of how to use it," says Hernandez. "The organization was a little strange to me, but I did get used to it and it became very easy to use."

Progression. The extent to which students are kept from moving forward until they demonstrate mastery of key concepts within adaptive courseware proved a challenge across multiple subjects and products. "Some courseware is much more intrusive than others," Souther says.

"One of the mistakes I learned early on is that it was hard for students to move on because there were too many questions per chapter," McFadden says. "If you went by the default values, your students are going to be spending a lot of time



in some of these chapters.” He subsequently adjusted adaptive assignments so they wouldn’t last longer than 30-35 minutes at a time.

Workload. Students also pointed to the time spent within adaptive courseware, although most found the activities manageable and beneficial.

“If you did the work and kept up, it helped because you learned more,” says HCC student Tito Ramirez. Tri-C student Marie Spivey agrees. “It does feel like a lot of work, but it’s not work that can’t get done,” she says. “You have to be self-motivated.”

For their part, students stressed the importance of working regularly in the courseware, suggesting that faculty assign regular due dates to keep students from procrastinating and postponing adaptive work until the end of the semester. “It would help you pace yourself with what you are learning in class,” Hernandez says. Ramirez agrees. “To try and learn at the end when you’ve been done with the chapter for three or four weeks is kind of futile,” he says. When that happened in his class, he adds, students “started panicking.”

Alignment. Students generally appreciated the ability to get a different perspective on key concepts in the courseware but urged faculty to be aware of how material is presented within adaptive elements. “The information was the same, but the words were a little different,” says Hernandez. “I didn’t have difficulty applying what I learned in the courseware because it was about the same, like two different books about economics are about the same thing but different.” Even so, she adds, for faculty “to see what we are getting from the courseware would be helpful.”

Content. Unlike math and science, questions in social sciences and business courses may not have indisputably “right” or “wrong” answers. Tri-C student Aimee Krivacic says that she and her professor identified answers they deemed incorrect or inconclusive in the courseware she worked with. “(Publishers) do have a section where you can send them feedback,” she says. “Do they look at it? Who knows.”

LESSONS LEARNED

Keys to the successful implementation of adaptive courseware in social sciences courses across ELE sites:

- **Focusing first on the structure**

of classes. Participating faculty members were intentional in using adaptive courseware as part of broader efforts to ensure that courses were structured in ways that supported the learning of complex concepts. At Tri-C, participating faculty worked with the college's Center for Learning Excellence to use backward design strategies to build courses, and then individual units and assignments, around learning outcomes. "No matter the content, you have to structure it well," says Dr. Michele Hampton, a professor of business administration at Tri-C. "I can't post a PowerPoint and say 'they're going to get it'. Sometimes you've got to translate the material and model good practices to teach them how to learn. That's where the structure of the class comes in. Adaptive courseware works very well in creating that structure."

"Don't let the courseware drive your course. It can inform it, but it is just a tool — a powerful tool, but a tool," Hampton adds. "It's how I use it that matters. It starts with a design perspective."

- **The importance of integration.**

Faculty members stressed the importance of integrating digital materials, adaptive courseware, and learning management systems or platforms in ways students find easy to navigate. "It

doesn't drop you off and leave you to find your way," Hampton says. "Being seamless helps a lot."

Students also recognized and valued efforts to integrate relevant materials. Tri-C student Katelyn Robac pointed to news articles that weren't part of the textbook but aligned with its lessons. They also encouraged faculty members to draw from examples in the courseware during class activities.

"If the instructor pulled more content out of the courseware to discuss in class, it would give you a total understanding," says Fugi Thompson, a student at HCC. HCC student Selene Hernandez agrees. "Since my class has no textbook, I saw the courseware as the textbook and thought the professor was supposed to follow that and add his knowledge," she says.

- **Engaging and supporting**

students. Faculty should take advantage of automated messages or data reports within adaptive courseware. "It's super helpful in creating an environment where students feel like someone's really paying attention and their work is being acknowledged — good or bad, there's value in both," says Hampton, who developed a broader communication plan for students in her classes centered around these messages.

Beyond individual interventions, dashboards and other reports in adaptive courseware can help faculty identify areas in which larger numbers of students are struggling. “I will say in class that a number of students are struggling with this concept, so students won’t think they’re the only ones,” says Lawrence Paye, an economics instructor at HCC.

- **The value of student feedback.**

Participating faculty intentionally collected feedback from students and used it to modify how they used adaptive tools, in some cases through surveys embedded within the courseware or by offering extra credit for written responses. “We call it adaptive for a reason. Students will give you feedback if you ask,” says LCCC business faculty member Jerry McFadden. “Once we learn how it is and isn’t working for them, then you make adjustments.”

- **Supports and strategy for scaling.**

Faculty at Tri-C created course shells to support adoption by adjunct faculty and full-time staff on other campuses. One key to adoption was the focus on learning outcomes, which allowed the course shells to scale among faculty using different textbooks on different campuses. “If you build your assignments around the outcomes, even if you’re using different books, you don’t have to redesign,” says Stacey Souther, a psychology professor at Tri-C’s eastern campus.

Scaling courseware beyond introductory level courses also is beneficial to students, faculty

“Starting off, it was a challenge because it made you really read and reapply the content. Once you got used to how it worked, it got easier.”

— Fugie Thompson, HCC student

say. “They understand how the courseware works so when they get to harder and more in-depth material, they’re doing something they’ve been doing in previous classes,” Souther says.

Hernandez, who used adaptive courseware for both micro and macro courses in economics, agrees. “It was difficult at first, but it was definitely easier in the second semester,” she says.

- **Integrated supports.** Institutions have benefitted from integrating courseware into tutoring and other support structures. “The way you can make it more effective is to make the resources available to any tutor and give them some understanding of adaptive coursework,” says Paye, who also serves as a faculty tutor at HCC.

- **Flexibility across modalities.**

While course shells featuring adaptive courseware were invaluable during the shift to online classes in spring 2020, some faculty members are looking to using the tools to create new hybrid course models — or simply provide greater flexibility to students enrolled in in-person classes. “To do that, you have to start with a good course design,” says Tri-C psychology professor Melissa Resnick.

CONCLUSION

Efforts to scale adaptive courseware, as in other disciplines, often are centered around the creation of common course shells featuring adaptive content. At Tri-C, these shells proved particularly helpful during the pivot to online courses during the pandemic in Spring 2020, when some faculty members struggled to shift their courses to online modalities. “My course was set up preloaded with activities and interactive components, so it was so much easier to bring that in and offer it to students,” says psychology professor Melissa Resnick.

In particular, tools within adaptive courseware which helped faculty monitor and follow up on individual students’ practice were especially helpful following the transition, according to Hampton. “In this age of COVID, it gave students a chance to know that someone did care enough to check up on them to see if they’re okay,” she says. “We’re still building a community, even if it’s virtual.”





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