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APLU ADAPTIVE COURSEWARE GRANT, A CASE STUDY: IMPLEMENTATION AT THE UNIVERSITY OF MISSISSIPPI

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INTRODUCTION

In 2015, the PLC released an RFP for a Gates Foundation grant to implement and scale adaptive courseware in higher education. Awarded in June 2016, the Accelerating Adoption of Adaptive Courseware at Public Research Universities grant funds programs at eight public universities to support the adoption of personalized learning in high-enrollment, general education courses (Duff, 2015). Adaptive courseware is a key personalized learning strategy designed to benefit traditionally underserved, minority, and first-generation students in higher education (Duff, 2016). In addition to supporting the adoption of adaptive learning systems, the grant provides support for research on the effect of adaptive courseware on student success and for faculty development training in personalized learning strategies. Administrators at the University of Mississippi (UM) applied for the APLU Adaptive Courseware Grant because they recognized its potential to enable UM to advance its mission to serve the people of Mississippi through education, research, and leadership.

UM's grant proposal team chose the following courses as a good fit for implementing personalized learning: College Algebra, Introduction to Chemistry, General Chemistry, First Year Writing I and II, Statistics, Introduction to Psychology, Human Biology, and Microeconomics. All nine courses are part of the general education curriculum in the College of Liberal Arts. Four were chosen for having DF rates above 20%: Statistics, Introduction to Chemistry, College Algebra, and Human Biology (University of Mississippi, 2015).

Although the DF rate for First Year Writing I was relatively low compared to the other courses chosen for the grant (8% in Fall 2015), the grant writing team included the course because the course directors had previous experience building modules in adaptive courseware, collaborating with peers at other institutions, and working within the parameters of an APLU grant.

The Pell-eligible target population of the APLU grant was an additional consideration in including the following courses in the grant: Statistics (30.7% Pell-eligible), Introduction to Chemistry (38% Pell-eligible), College Algebra (29% Pell-eligible), and Introduction to Psychology (27.3% Pell-eligible). Finally, outside of Introduction to Chemistry, courses chosen for the grant had annual enrollments exceeding 1,000 in the 2014-2015 academic year. Introduction to

Chemistry had a relatively low enrollment in that period (606 students), and yet a high DF rate (27%) and a high Pell-eligible population (38%). These factors convinced the grant proposal team to include Introduction to Chemistry in the grant.

Figure 1. Courses to be Developed for Academic Year One (2016 - 2017)

Department	Course	Fall, Spring, Summer Enrollment in 2014-2015	% Pell Recipients in 2014-2015	DF Rate in Fall 2015
Mathematics	Math 115 (Statistics)	1,247 Students	30.7%	21%
Chemistry	Chemistry 101	606 Students	38.0%	27%
Writing and Rhetoric	Writing 101	1,981 Students	25.5%	8%

Figure 2. Courses to be Developed for Academic Year Two (2017 - 2018)

Department	Course	Fall, Spring, Summer Enrollment in 2014-2015	% Pell Recipients in 2014-2015	DF Rate in Fall 2015
Mathematics	Math 121 (Algebra)	1,175 Students	29.0%	27%
Psychology	Psychology 201 (Intro)	2,108 Students	27.3%	17%
Writing and Rhetoric	Writing 102	2,085 Students	24.0%	19%

Figure 3. Courses to be Developed for Academic Year Three (2018 - 2019)

Department	Course	Fall, Spring, Summer Enrollment in 2014-2015	% Pell Recipients in 2014-2015	DF Rate in Fall 2015
Biology	Biology 102	1,860 Students	21.4%	22%
Chemistry	Chemistry 105	1,068 Students	25.5%	18%
Economics	Econ 202 (Micro)	1,669 Students	16.2%	12%

Of the nine courses identified in the original grant proposal, six have piloted adaptive courseware with two fully scaling in Spring 2018. Two courses have proven to be not a good fit for the grant, and one fully scaled for one semester before the course director decided to discontinue using adaptive courseware in favor of a learning system outside the scope of the grant.

Figure 4. Status of implementation in courses selected for the grant

Not participating in grant	Pilot stage	Fully scaled
First Year Writing II – Course director does not believe the course is a good fit for the grant.	**Human Biology** – Course director not ready to move from pilot of 4-6 sections to scale all 14 sections.	**Introduction to Chemistry** – Fully scaled out with two sections after one pilot semester.
Intro. to Psychology – sections are not taught with a common text or methodology and faculty were not interested in using an adaptive platform.	**Microeconomics** – only two of seven faculty who teach this course are interested in teaching with adaptive courseware.	**First Year Writing I** – Fully scaled out with 120 sections after two pilot semesters.
College Algebra – Course director prefers a learning platform not covered by the scope of the grant.	**General Chemistry** – only five of seven faculty who teach this course are interested in teaching with adaptive courseware.	**Statistics** – Fully scaled out with twenty-three sections after two pilot semesters.

COMPONENTS OF THE IMPLEMENTATION APPROACH

After deciding to house the grant project in the College of Liberal Arts, the grant PIs hired a full-time professional staff member to manage the grant and oversee the implementation program as well as research studies related to implementation. The grant program was named PLATO, Personalized Learning & Adaptive Teaching Opportunities. The grant program manager took a particular implementation approach that involved dozens of conversations with faculty members, department chairs, administrators, students, colleagues at peer institutions, and vendors. While many key decisions regarding implementation came out of these conversations, the conversations themselves seeded a relationship-focused approach to implementation.

FACULTY RELATIONSHIPS

UM had several early adopters to whom the grant program manager could turn for guidance. These were faculty who fell into one or more categories: 1) They had worked with vendors in building or customizing adaptive courseware for their classes. 2) They had been involved in previous PLC adaptive courseware grants. 3) They had experience as beta-testers for adaptive learning platforms associated with particular textbook publishers such as Pearson and McGraw-Hill.

The grant program manager met with each of the early adopters to learn about their use of adaptive courseware, solicit their advice regarding implementation, and to help compose a sales pitch to other faculty and department chairs.

The PLC grant allows UM to provide stipends for faculty developing and piloting adaptive courseware. The chart below represents the initial stipends for the 3-year grant period:

Figure 5. Faculty stipend tiers

| Grant Year	1	2	3
Stipend amount	$5,000.00	$2,500.00	$1,000.00

Although no faculty refused to meet with the program manager to talk about adaptive courseware, faculty with strong relationships with publisher representatives were more responsive to publishing representatives introducing them to the adaptive features of courseware. Because of this, the program

manager worked with publishing representatives to approach faculty to pitch the use of adaptive courseware. Most large textbook publishers either have their own adaptive add-ons or partner with a company with an adaptive engine. For example, McGraw-Hill bought ALEKS, an adaptive tool that can be paired with a variety of textbooks in the disciplines of mathematics, sciences, and business. The adaptive tool created by Knewton will be used to power Pearson's MyLabs and Mastering programs until Pearson develops its own adaptive tool.

For most faculty, using the adaptive features of the courseware they had already chosen for their classes was a small ask. Faculty were happy to receive a stipend for work they already planning on doing such as being trained in the use of the courseware, modifying course content in the courseware, and integrating courseware practice and assignments into the course syllabus.

Early in the process of trying to gain faculty buy-in, it became apparent that instructor-rank faculty were far more interested in piloting sections with adaptive courseware (O'Sullivan, 2017). The chart below shows the institutional status of faculty participants in the grant. In the first year of the grant, only one faculty participant had research responsibilities.

Figure 6. Institutional status of faculty participating in grant year one
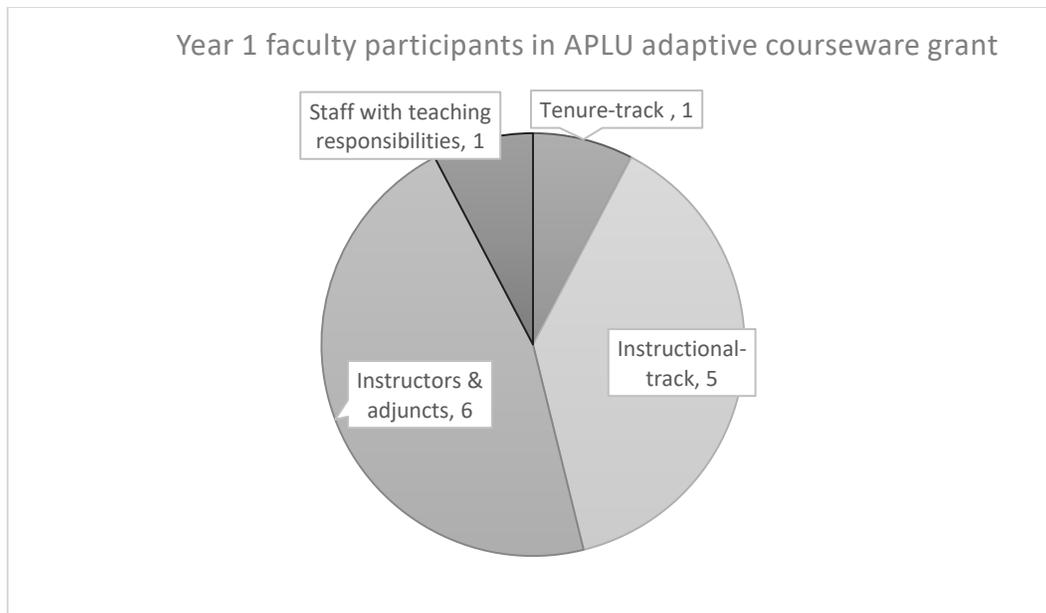
Year 2 of the grant showed an increase in faculty participants with research responsibilities. However, they still represent a minority of faculty taking part in the grant. Moving forward, the participation of tenure-track faculty is unlikely to increase due to a combination of factors:

1. The perception (and in many cases the reality) that adopting new teaching tools takes time and effort not recognized in the tenure and promotion process.
2. Underwhelming evidence that adaptive learning systems provide academic benefits correlating with time investment required to implement them.
3. The grant targets high enrollment, general education classes with a high Pell-eligible enrollment and significant DF rates. Tenure-track faculty do not teach the majority of classes that fit these criteria.

Figure 7. Institutional status of faculty participating in grant year 2
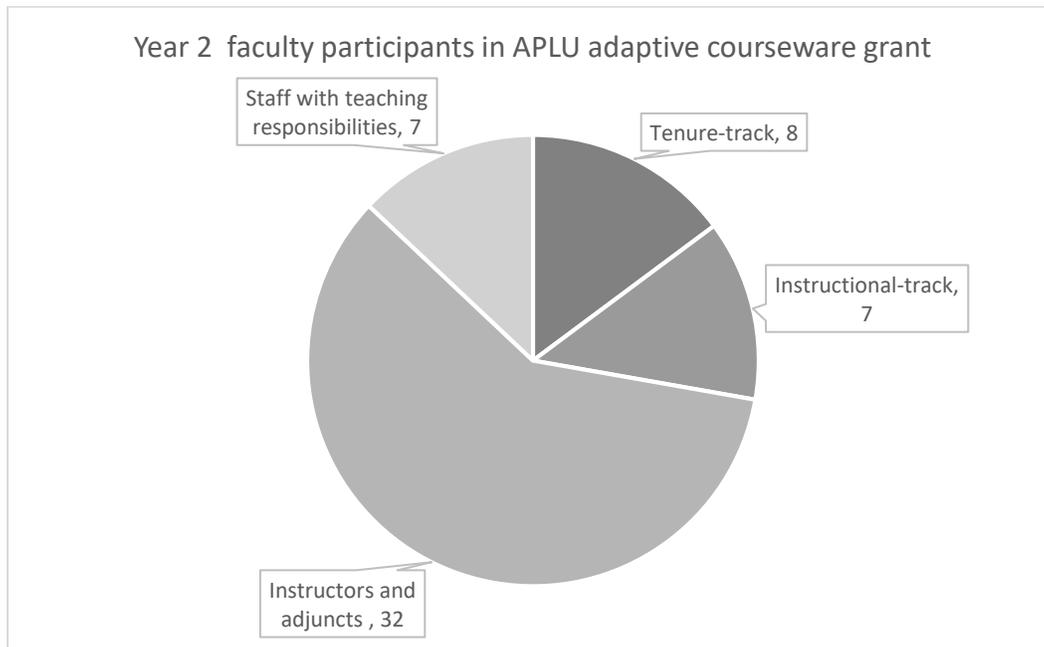
Stipend incentives for faculty during the first year of the grant were quite high based on an assumption that only nine courses and twenty faculty would be included in the grant. However, when faculty participation more than quadrupled from Year 1 to Year 2 of the grant, the program manager reduced stipends and created a tiered system to better reflect the work faculty were putting into their course redesign.

Figure 8. Faculty stipend tiers

Grant Year	1	2	3
Category 1: Off-the-shelf course product	$2,000.00	$2,000.00	$1,000.00
Category 2: Modified course product	$3,000.00	$2,000.00	$1,000.00
Category 3: Full build of course	$4,000.00	$3,000.00	$1,000.00

While the majority of courses using adaptive courseware (23 of 29) relied primarily on off-the-shelf courseware and content provided by a textbook publisher, three courses fall into category 2, a modified course product: First Year Writing I, Academic Success, and Introduction to Sociology. Course directors in the first two courses worked with Lumen Learning to adapt OpenStax content to the learning objectives of their respective courses, while an Assistant Professor of Sociology is modifying OpenStax content in the Realizeit Learning platform for her sections of Introduction to Sociology. Instructors in pharmacy and engineering worked respectively with Realizeit Learning and Smart Sparrow to fully build their courses with Open Educational Resources (OER).

The remaining courses in the grant are off-the-shelf products from large publishers. As the chart below indicates, faculty have chosen large textbook publishers Pearson (MyLabs and Mastering), McGraw-Hill (ALEKS and LearnSmart), WileyPlus, and Cengage over content-agnostic vendors who provide authoring tools to build a course with either OER or original content. The reasons given by faculty for choosing publisher content include a preference for courseware tied to a particular textbook, a preference for fully built systems maintained by the publisher, and familiarity with particular vendors and products.

Figure 9. Courseware selections, year two
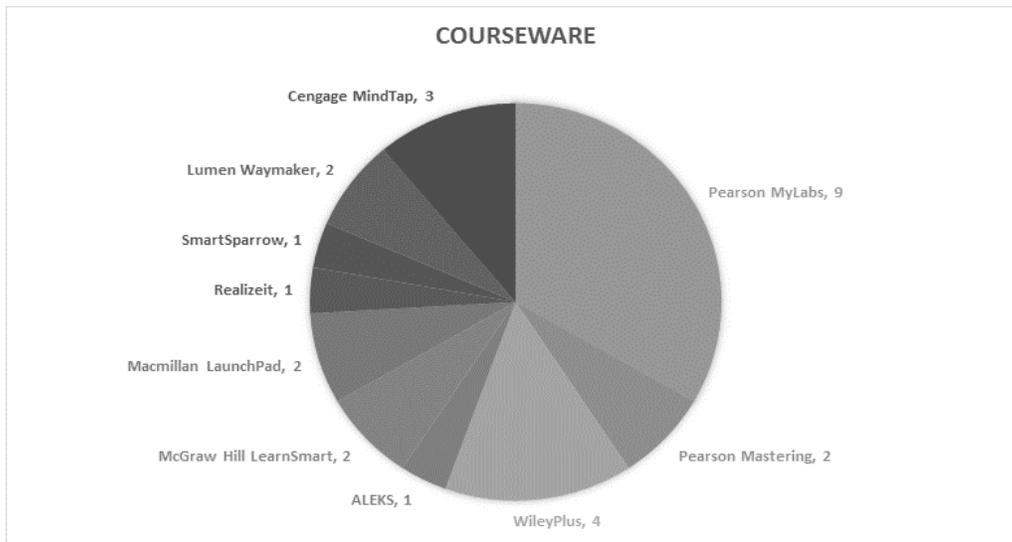
In addition to stipends to incentivize faculty, the program manager established several awards associated with the grant. The awards ranged from participation trophies to teaching and course redesign awards worth $2,000.00 each. These were presented at an awards ceremony attended by upper-level administrators. The impact of the awards and the awards ceremony cannot be underestimated. The event raised the visibility of the work of the grant within the campus community, it provided upper administrators, deans, and department chairs the opportunity to show their support of the work of the grant to faculty, and it celebrated faculty innovators in a public setting.

During the first semester of pilots, the program manager met individually with each faculty member to learn how the pilot was progressing and what faculty needed to sustain the pilot. These meetings were helpful in determining how faculty were using the courseware in their courses and whether the data generated by the courseware was proving useful in managing high-enrollment classes.

At the end of each semester, the program manager invites all participating faculty and department chairs to a luncheon in which they share their challenges and solutions with each other. Following the first pilot semester, the conversation centered on concerns faculty had regarding their comfort level in using the courseware to achieve course goals such as communication with students, remediation for struggling students, and customizing content and assessments in the courseware. In subsequent semesters, the faculty conversation is driven by student feedback on adaptive courseware derived from student focus groups and an end-of-semester student survey.

During the first full semester of the grant, the bulk of faculty development programming included information sessions and vendor demonstrations of adaptive courseware. The second semester included much of the same programming, with the addition of sessions on OER resources, active learning, and flipped classrooms. The program manager works closely with the Center for Excellence in Teaching and Learning to develop and carry out local faculty development programming. The PLC has also provided opportunities for faculty to experience personalized-learning strategies including a workshop on active learning held at the University of Louisville and a symposium on technological innovation in digital education held at the University of North Carolina at Chapel Hill. Finally, the program manager funds faculty travel and registration for conferences that feature sessions on personalized learning.

DEPARTMENTAL RELATIONSHIPS

Long before implementation of adaptive courseware pilots, the program manager met with department chairs and course directors to discuss the goals of the grant and potential benefits for the department. Department chairs provided insight into which faculty would be good candidates to pilot adaptive courseware and which courses would benefit from a course redesign.

Within departments, course directors were instrumental in gaining buy-in from instructors and arranging course-specific vendor training. Several course directors have taken on the role of in-house trainer in the use of the adaptive features of courseware, while others are more comfortable leaving all training matters to vendor representatives.

Faculty development at the department level has consisted exclusively of vendor demonstrations and training. However, some departments have requested discipline-specific training in active learning strategies and learning analytics. We are currently in the planning stages for a vendor workshop in learning analytics with a cooperative learning format in a TEAL room (Technology Enhanced Active Learning) for the departments of physics, chemistry, and biology.

The PLC grant includes funds for departments to hire graduate assistants to pull data from the courseware to assist faculty with learning analytics. None of our departments have used the funding in this way, however the department of chemistry is using grant funds to hire undergraduate teaching assistants to help with active learning in a class with 150+ enrollments. We have also used grant funding to pay for faculty travel and conference registration, and to provide learning analytics from adaptive courseware to inform Supplemental Instruction (SI) sessions in which students lead other students in understanding and practicing course concepts.

ADMINISTRATIVE RELATIONSHIPS

Without supporting larger institutional goals such as improving retention and graduation rates and improving access to education through cost saving and academic support, academic innovation programs are unsustainable. The PLC grant requires administrative support, but for institutions implementing adaptive learning programs without a grant, it is essential to include upper administrators in early conversations about how these course tools can move the institution closer to its goals.

Our program reports out to the provost's office after each semester with data from institutional research on student outcomes from sections using adaptive courseware, with student feedback from a semester survey and focus groups, and with program activity updates. We are also involved in promoting the university's

Quality Enhancement Program (QEP) by sponsoring faculty development events and faculty learning communities on the QEP topic: critical thinking. In the planning stages of the QEP, we presented to the QEP committee how adaptive learning supports the QEP in two ways: by providing students with data on how they learn and by liberating instructors from worries over content coverage, so they can incorporate critical thinking activities during class time.

In addition to tying implementation to the institutional strategic plan, adaptive learning also supports the goals of key support units such as student advising and success, the Center for Excellence in Teaching and Learning (CETL), the Center for Academic Innovation, and Institutional Research and Effectiveness Planning (IREP). Our program advised the Office of Student Success in choosing courseware for their college success course and we sought guidance from their advisers on how to implement personalized learning strategies to maximize student success in the general education curriculum. We have also partnered with CETL and the Office of Academic Innovation in providing faculty development programming and funding support for faculty engaged in Scholarship of Teaching and Learning related to adaptive learning. An additional partnership with CETL promotes the use of learning analytics in Supplemental Instruction. Finally, by tracking student outcomes in 100 and 200-level courses that use adaptive courseware and sharing that data back to departments and administrators, we are supporting the mission of IREP.

STUDENT RELATIONSHIPS

Because they are the stakeholders with the most to gain (or lose) from adaptive learning platforms, students' feedback on implementation is essential to the program. We are particularly interested in how students feel about the cost of courseware, their user experience with the various technologies, the courseware's effectiveness as a learning tool, and how instructors integrate courseware into their courses. We solicit student feedback in four ways: 1) an end-of-semester survey sent out to all students enrolled in a course that requires adaptive courseware, 2) course-based student focus groups, 3) a student forum in which a select and diverse panel of students share thoughts on the learning process, and 4) a student advisory board that meets with the adaptive learning program team three times each semester.

PEER RELATIONSHIPS

Relationships with peers doing similar work at other institutions has been essential in understanding and accomplishing the work of an institution-wide implementation of adaptive courseware (Duff, 2017). For the eight program managers involved in the PLC grantee cohort, our monthly virtual meetings and bi-annual in-person meetings have allowed us to share lessons learned and insights gained in the implementation process.

After spending the first two years of the grant helping each other with implementation, program managers in the PLC cohort are now collaborating on related research projects and an implementation guide. Based on work already begun at the University of Mississippi, program managers at Colorado State University and Georgia State University are working together to share student feedback data in a collaborative publication. Also, all eight program managers are together writing an implementation guide under the direction of the PLC and a partner organization, the Digital Learning Solutions Network.

In addition to the PLC grantee cohort, the program manager and several faculty are involved in discipline-specific learning communities with membership across the nation. The program manager benefits from learning from change managers involved in both adaptive learning and other academic innovation projects and is currently collaborating through the Empirical Educators Project with faculty and staff at University of Central Florida, Colorado Technical University, Carnegie Mellon University, and Realizeit Learning. Faculty enjoy discipline-specific learning communities in which members discuss use cases with specific digital products and discuss teaching and learning strategies that work particularly well in their discipline.

VENDOR RELATIONSHIPS

Vendors are an important partner in adaptive courseware implementation, serving in several important roles including training, tech support, course redesign, and price and purchasing negotiations. For institutions with little instructional design infrastructure, vendors can provide product-specific training sessions for faculty and student users. Vendors of products not specifically endorsed by a university's IT program are also in the best position to provide tech support for faculty and students, and many of them have both online and call-in services to assist users even during non-business hours. Vendors focused on digital learning solutions rather than publishing textbooks tend to invest heavily in providing support to faculty for course redesign. At UM, faculty have worked closely with Lumen Learning, Realizeit Learning, and Smart Sparrow on full course builds involving OER, faculty-generated, and third-party content. A key focus area of the implementation program is increasing student access to education through reducing the price of course materials. Vendors such as Realizeit Learning, Lumen Learning, and Smart Sparrow have worked with faculty to price access to their courseware based on student feedback. In addition, both Realizeit and Lumen have assisted the program manager in negotiating pricing and purchasing options for students with the university bookstore. Both vendors have also worked with the program manager to establish direct-pay purchasing to relieve students from steep bookstore mark ups on access codes.

CHALLENGES TO IMPLEMENTATION

LACK OF COORDINATED FACULTY SUPPORT

An early and ongoing challenge to implementation of adaptive learning systems at the University of Mississippi is a lack of coordinated support staff for faculty. In its first eighteen months, the grant program leading implementation was housed in the College of Liberal Arts, and currently the program is housed in the Department of Writing & Rhetoric. Both units have successfully overseen other teaching and learning initiatives; however, the College of Liberal Arts does not employ instructional design staff to assist faculty with educational technology, and the one instructional designer in the Department of Writing & Rhetoric is dedicated to technology and design efforts in that large department. Two University-wide faculty support centers, the Faculty Technology Development Center, reporting to IT, and the Center for Excellence in Teaching and Learning, reporting to the Provost's Office, provide only limited support for the adaptive learning implementation program, as neither has experience with adaptive learning systems or the personnel to dedicate to working one-on-one with faculty to choose a system or develop and assess a pilot with it.

LACK OF AWARENESS

In addition to faculty support units not being adequately equipped to assist faculty with implementation, in the first year of the grant, faculty knowledge of adaptive learning systems was all but non-existent aside from a handful of early adopters. Indeed, when the grant program manager reached out to faculty whose course materials selection indicated they were using adaptive courseware, most faculty had not heard of the term. Those few who were familiar with adaptive learning had no common definition of the term and no understanding of how it differed from an e-textbook. This challenge should have been easily overcome with vendor demonstrations of courseware, but it soon became apparent that vendors also did not agree on a definition of adaptivity in their products, and they often oversold features of their products that later proved underdeveloped or underwhelming in terms of functionality and ease of use.

MANAGEMENT OF LOWER LEVEL COURSES

Individual departments at the University of Mississippi have discretion over hiring instructors for departmental courses and managing courses with multiple sections. Some departments highly coordinate learning objectives, course policies, and course materials across multiple sections while others leave those decisions to individual instructors. As might be supposed, highly coordinated courses provide favorable conditions for training instructors and scaling the use of courseware across all sections. On the other hand, uncoordinated courses allow interested

faculty to adopt adaptive course materials without obtaining the permission of a course director.

As implementation of adaptive courseware expands, courses that have scaled or plan to scale because of highly coordinated course management include First Year Writing I, Introduction to Chemistry, Statistics, Human Biology, The Environment, Biological Sciences I and II, Anatomy and Physiology I and II, Pharmacy Ethics, and Elementary and Intermediate Spanish. An uncoordinated course management approach has allowed faculty teaching General Chemistry, Organic Chemistry, Introduction to Sociology, Fluid Mechanics, Management Information Systems, Trigonometry, Microeconomics, Business Statistics, and College Success, to implement adaptive courseware is their particular sections of a course with multiple sections and instructors.

The high management approach can be a barrier to adoption if a course director is not in favor of implementing adaptive courseware. Likewise, the uncoordinated course management approach can also create a barrier when so few faculty are interested in using courseware that the ROI for training and implementation is not feasible.

LESSONS LEARNED FROM THE FIRST YEAR OF IMPLEMENTATION

1. *Faculty autonomy* over all aspects of course structure and course content makes course coordination difficult in some departments.

    What we learned: Respecting departmental culture and faculty autonomy is essential to creating buy-in for new initiatives.

2. Implementing student success programs involves changing *faculty attitudes* from that of gatekeepers or sage on the stage to facilitators of learning.

    What we learned: Faculty respond to the example of other faculty rather than to evidence-based pitches about teaching and administrative change management initiatives (Herckis, 2018). When faculty exemplars are recognized and rewarded at the highest levels of university administration, we can maximize the effect of the faculty exemplar.

3. *Limited resources* make it difficult to provide extensive faculty onboarding and faculty development.

    What we learned: We had to identify high-impact uses of grant money and forge partnerships with vendors and other support units to accomplish our faculty development goals.

MOVING FORWARD

The reflection process after three semesters of course pilots with adaptive courseware includes qualitative data from eight student focus groups, qualitative data from two student feedback surveys, and general data from the grant budget, feedback from faculty development programming, and feedback from external conference/meeting presentations. From these data, three areas of improvement have emerged.

1. *More effectiveness research needs to be done, particularly at departmental and course levels*. Faculty and course directors are largely making decisions regarding courseware materials and teaching format without evidence of effectiveness. Adaptive courseware is no magic bullet, and the simple replacement of non-adaptive courseware with adaptive courseware holds little promise of improving student learning. However, research in cognitive science and the scholarship of teaching and learning have demonstrated over and again how low stakes practice, delayed retrieval, and chunked delivery of content can improve learning. Adaptive courseware provides these cognitive benefits, particularly in content-based courses. While technology-enhanced active learning teaching methods are increasingly being adopted by STEM faculty in biology, engineering, physics, and pharmacy, most high enrollment courses at UM are still taught in a lecture format with minimal implementation of student engagement strategies that reach the back rows of a lecture hall. More importantly, courses with little student engagement are not optimizing success for key populations at the heart of the grant's mission: first generation college students, underserved students, and minority students.

2. *Courseware implementation needs to be tied to other goals* such as lowering DF rates, increasing student engagement, and improving interventions for at-risk students (Hinton, 2012). After listening to student feedback in the focus groups, we realized we had done a poor job of explaining the purpose of the grant to faculty and training them to use courseware data effectively. Some faculty are not using the courseware to engage students in the classroom or to identify students at risk for failing the course. Of more concern is how some faculty are implementing courseware as a supplement to the course rather than integrating it in the course. In these classes, students expressed frustration that the work they do in the courseware has little to no connection to the class lecture and does not prepare them for high-stakes exams. Exacerbating that frustration is the high cost of access codes for a tool faculty are ill-trained to use and for online work that does not significantly count toward a final grade.

3. *Teaching and learning platforms need improving in two critical areas: faculty ability to customize content in the courseware and alternative purchasing options for students.* Faculty using off-the-shelf products distributed by large publishers such as Pearson, McGraw-Hill, and Cengage have expressed dissatisfaction with being locked into publisher-determined content arrangement and assessment questions. Faculty are seeking a balance between the time commitment required to build their own course in adaptive authoring platforms, which give them full autonomy over content and assessments, and courseware that provides a complete course package requiring little time to learn how to use, but that is not customizable. Although they are happy for the extra money the grant stipends provide, faculty tell us what they truly need in order to build or to customize a course is time.

In addition to the need for flexibility in courseware authoring, there needs to be more flexibility in courseware purchasing options. Students in our focus groups voiced frustration in being forced by the campus bookstore to purchase courseware bundles that include a physical textbook they do not use and that constitutes a significant portion of the overall cost of the bundle. Another point of frustration for students is a lack of guidance from faculty on which course materials to purchase when they are available unbundled through online bookstores. Students trying to save money bought only the courseware access code but discovered weeks into the course they should have also bought the companion e-book. In another instance, a faculty member chose an OER textbook for his physics class, and the bookstore printed and bound a PDF copy and is selling it to students who do not know it is a free online resource. A final point of frustration for students regarding the purchase of course materials involves the amount of time access codes are available. While a handful of vendors sell access to courseware for an unlimited timespan, most vendors limit access between six months and two years. Students spoke of the need for guidance on which package to purchase, and also noted a desire for reduced rates for courseware in a class they were repeating. Finally, students purchasing access for two-semester courses using the same courseware (General Chemistry I and II for example), wanted the option to pause access if their schedule could not accommodate completing the second part of a course in a consecutive semester.

When we began implementation of the adaptive courseware grant, it was clear we were undertaking to change the culture of teaching and learning at the University of Mississippi. Personalized learning includes adaptive courseware, which can provide students, faculty, and administrators with actionable data about how students learn and how courses might be redesigned to optimize learning.

However, the technology alone is insufficient in addressing key barriers to success including a lack of preparedness for college, a lack of engagement in learning, and a lack of resources to help balance the responsibilities of school, work, and family (Horton, 2015; Lake Research Partners, 2011).

We purposefully named the grant management program to include adaptive teaching so the focus would not be on the tool, but on the evolving range of student-centered teaching practices that engage students in high-enrollment classes. Case studies from institutions implementing personalized learning as early as 2012 indicate it is a combination of digital adaptive learning systems and high-touch student engagement practices that yields positive change in student success in barrier courses (Boschmans & Beaudrie, 2014; Neff, 2016).

Implementing adaptive courseware in nearly 30 courses across a dozen departments is no small accomplishment, and yet it is only one step, built on countless others preceding it, in creating a culture of student success. We have a long way to go in moving from adaptive courseware implementation to the full set of personalized learning practices that will benefit our most vulnerable students, but the APLU adaptive courseware grant has set us on a path to realize that goal.

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