Current Issues in Emerging eLearning

Volume 5
Issue 1 *Special Issue on Leveraging Adaptive Courseware*

Article 6

10-22-2018

Adaptable Selectivity: A Case Study in Evaluating and Selecting Adaptive Learning Courseware at Georgia State University

Megan M. Tesene
Georgia State University

ADAPTABLE SELECTIVITY: A CASE STUDY IN EVALUATING AND SELECTING ADAPTIVE LEARNING COURSEWARE AT GEORGIA STATE UNIVERSITY

Megan M. Tesene *Georgia State University*

INTRODUCTION

In the summer of 2016, the Association of Public Land-Grant Universities (APLU) awarded Georgia State University with a $515,000 grant to adopt, implement, and scale adaptive learning courseware in undergraduate general education courses. Funded by the Bill & Melinda Gates Foundation (BMGF), and with oversight by APLU's Personalized Learning Consortium, the three-year project aims to improve undergraduate education and promote student success through the implementation of adaptive learning courseware in high-enrollment, high-risk courses (APLU, 2016a). Georgia State's approach is both data-driven and collaborative, focusing on the exploration and piloting of adaptive courseware prior to scaling out the technology across five high-impact courses. This article highlights the work conducted at the Center for Excellence in Teaching and Learning (CETL) during Year 1 of the grant. Specifically, we offer an overview of the systematic exploration and selection of adaptive learning courseware. We hope that our extensive evaluative process can offer insights to individuals and institutions that are interested in navigating and experimenting with adaptive learning courseware. In outlining the steps taken to evaluate and select adaptive courseware, we provide a model that is both replicable and flexible.

ADAPTIVE LEARNING: A PROMISING TECHNOLOGY

The proliferation and advancement of high-quality learning technology in recent years has corresponded with a pronounced enthusiasm surrounding the potential of adaptive learning courseware (Fain, 2013; Waters, 2014; Zimmer, 2014). Organizations such as the Bill & Melinda Gates Foundation have made targeted investments in advancing the development of adaptive learning technologies and accelerating the implementation of those products in higher education (Fain, 2013; Waters, 2014; Zimmer, 2014). Academic administrators seem to share excitement for the technology. Indeed, a recent survey conducted by Inside Higher Ed and Gallup found that two-thirds of university and college presidents recognized adaptive learning technologies as having the potential to "positively influence higher education" (Lederman & Jaschik, 2013; Stokes, 2013; Zimmer, 2014).

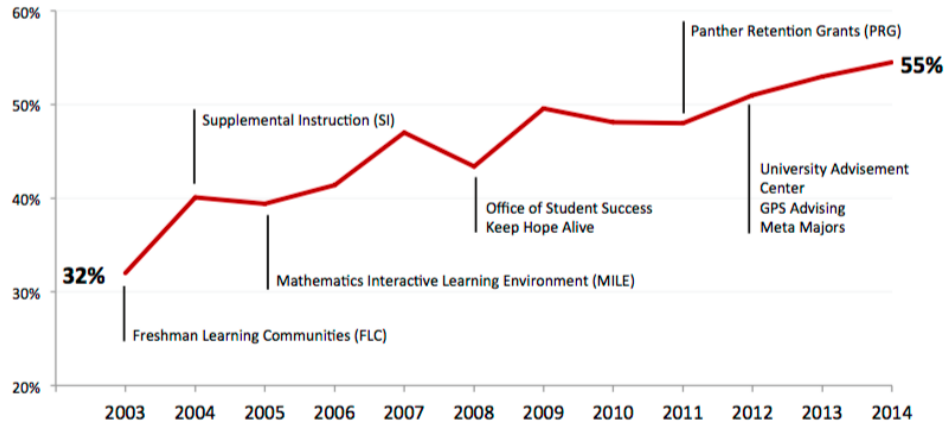
According to proponents of adaptive learning, the technology has the ability to profoundly enhance undergraduate teaching and learning while simultaneously liberating us from higher education's "iron triangle" of cost, quality, and access (Tyton Partners, 2013; Zimmer, 2014). If such claims are accurate, adaptive learning technologies may have the potential to improve the overall quality of teaching and learning while offering students and faculty products that are both affordable and accessible (Ekowo, 2017; Tyton Partners, 2013; Zimmer, 2014). Perhaps the technology's greatest potential lies in its ability to offer a personalized learning experience to students. As student populations become increasingly diverse, so too does the aptitude and skill level in the college classroom. Within this environment, reformers note the need for moving away from a one-size-fits-all approach to education (Alli, Rajan, & Ratliff, 2016; Tyton Partners, 2013). Learning theorists have long argued for a push towards differentiated, personalized learning, noting that individual learners have unique cognitive needs and aptitudes (Bloom, 1971; Cronbach, 1957). Advancing technologies, and adaptive learning courseware in particular, are being hailed within the higher education community as a means to offer personalization to these diversified student bodies (Alli et al., 2016; Dziuban, Moskal, Johnson, & Evans, , 2017; Murray & Pérez, 2015).

Given such proclamations, it is unsurprising that colleges and universities have made significant efforts to experiment with adaptive learning courseware (Waters, 2014). However, despite the increased application of these solutions, there remains a shortage of academic literature on the technology (Fain, 2013; Murray & Pérez, 2015; Tyton Partners, 2013). The collective research that is available fails to offer conclusive evidence regarding the ability of adaptive learning solutions to improve student learning and outcomes (Lederman, 2017; Murray & Pérez, 2015; Yarnall, Means, & Wetzel, 2016). While some studies show that adaptive courseware improve student learning (Nakic, Granic, & Glavinic, 2015; Popsecu, Badica, & Moraret, 2010), others indicate that the effect of these technologies is negligible (Griff and Matter, 2013; Murray & Pérez, 2015). Ultimately, the lack of consensus and consistency across the research on adaptive learning causes many to remain skeptical of the technology's potential (Lederman, 2017; Tyton Partners, 2013). As institutions of higher education continue to pilot and experiment with adaptive learning courseware, the validity of proponents' claims will be confirmed or disproven. By implementing a pilot study into the effectiveness of adaptive courseware across multiple sections and disciplines, Georgia State will contribute to the educational community's evolving understanding of these technologies.

THE SETTING

Georgia State University is an urban university that primarily serves low-income and minority students. With a student population that is 73% non-white and over 50% Pell eligible, it is recognized as one of the most diverse universities in the United States (GSU, 2017a). For more than a decade, Georgia State has implemented a variety of targeted and dynamic student success initiatives that have enabled the institution to dramatically improve graduation rates (See Table 1) and eliminate achievement gaps on the basis of race, ethnicity, and income (Gates, 2017; GSU, 2015). Perhaps one of the most successful initiatives has been the university's push for data-driven advising. The GPS Advising initiative uses predictive analytics to identify at-risk students so that advisers and faculty can provide students with personalized assistance that can reorient them to a path towards degree completion (GSU, 2017b).

Table 1: GSU Undergraduate Graduation Rates by Year (2003-2014)



Source: Georgia State University, Enrollment Services (2015)

The premise behind adaptive courseware is similar. As students interact with the technology, adaptive systems collect data and learn about the student so that meaningful resources, guidance, and interventions may be offered—placing the student on a path to course completion. Should adaptive courseware prove to effectively function in this manner, their implementation at Georgia State could fit into an existing ecosystem that uses data to identify and aid at-risk students with personalized, targeted assistance. Further, given the potential of such technologies to provide access and flexibility to non-traditional, lower-income, and traditionally marginalized communities (Dziuban et al., 2017), adaptive learning could benefit Georgia State's diverse community of students.

GEORGIA STATE UNIVERSITY ADAPTIVE GRANT STRUCTURE

Georgia State University's participation in the APLU adaptive grant is structured upon a targeted, three-year pilot-to-scale approach. Rather than immediately pushing to scale, we're following a methodic, collaborative, and evidence-based process that focuses on facilitating faculty and institutional buy-in via research. Participating faculty, supported by staff at CETL, will pilot adaptive courseware in five gateway courses in Economics, Political Science, and Psychology. Course selection was based on four main criteria:

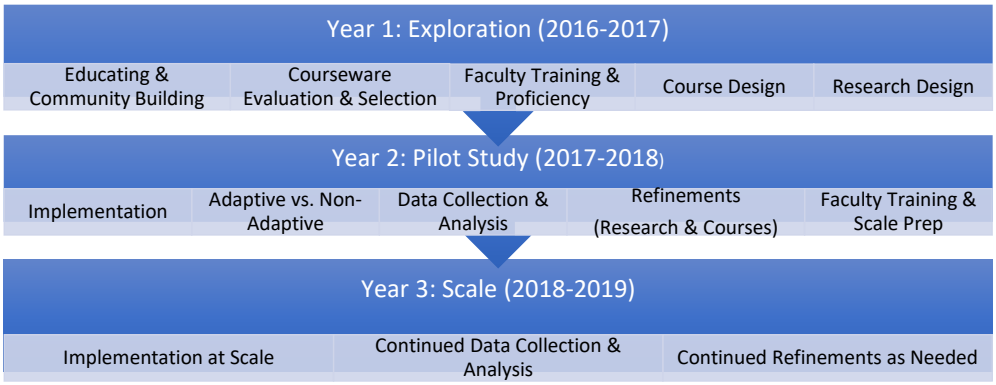
1. High enrollment courses that serve as gateways to progression for students in multiple majors
2. High DFW rates relative to the institutional average at the undergraduate level
3. Offered by departments with established track records in support of instructional innovation
4. Strong administrative and faculty leadership

Based on these criteria, as well as an interest in exploring adaptive technologies in predominantly social science courses, the following courses were selected to participate:

- Global Issues (POLS)
- Introduction to American Government (POLS)
- Principles of Macroeconomics (ECON)
- Principles of Microeconomics (ECON)
- Introduction to General Psychology (PSYC)

For each of the courses selected, faculty "course coordinators" were assigned to lead the initiative and their colleagues in selecting, implementing, and evaluating adaptive courseware. Course coordinators were selected because of their proven interest in and commitment to student success and instructional innovation. For the duration of the grant the course coordinators, along with support staff at CETL, work in collaboration to explore, pilot, and scale adaptive courseware across the five participating courses. By prioritizing faculty leadership and data-based decision-making, our three-phase process is designed to promote buy-in, increase the potential extent of adoption, and serve the interests of Georgia State students. The three-phase process takes place across each year of the three-year grant:

Table 2: Georgia State University Adaptive Grant Structure



THE YEAR 1 OBJECTIVE

In the first year of the grant, our team was tasked with evaluating and selecting adaptive learning platforms which would later be piloted during the 2017-2018 academic year. APLU provided grant recipients with a list of 21 approved courseware providers and their products (See Table 3). With the goal of piloting quality adaptive courseware in the following academic year (2017-18), we needed a way to narrow that list to a more manageable size—allowing us to closely evaluate those providers and platforms most appropriate for our faculty, students, and institution. Our approach was both collaborative and methodic.

Technical and support staff based at CETL developed a systematic and structured process to evaluate and select adaptive courseware products.

Table 3: APLU Approved Adaptive Courseware Providers and Products

1. Acrobatiq	12. McGraw-Hill Education ALEKS
2. Cerego	13. McGraw-Hill Education Smartbook
3. Cengage Learning Mindtap	14. Macmillan LearningCurve
4. CogBooks	15. Open Learning Initiative at Carnegie Mellon University
5. Fishtree	16. Open Learning Initiative at Stanford University
6. Fulcrum Labs	17. OpenStax Tutor
7. Knewton	18. Pearson MyLab and Mastering with Adaptive Practice
8. LeAP by D2L	19. Realizeit
9. Learning Objects	20. Smart Sparrow
10. LoudCloud	21. WileyPlus with ORION (Snapwiz)
11. Lumen Waymaker	

Adopted from Association of Public Land Grant Universities (2016b)

THE EVALUATION TOOL

The Courseware in Context (CWiC) Framework was "developed by Tyton Partners, in collaboration with the Online Learning Consortium, and with support from the Bill & Melinda Gates Foundation (the "Foundation") as part of the Foundation's ongoing efforts to support the development and adoption of high quality digital courseware" (CWiC, 2017 para. 1). The tool is designed to assist post-secondary decision makers in traversing and understanding the ever-shifting landscape of the adaptive market (CWIC, 2016 & 2017; Joo, 2017). The CWiC Framework consists of four main components: A Product Taxonomy, a Research Collection, a Course-Level Implementation Guide, and an Institutional-Level Implementation Guide (CWiC, 2016).

Given our task of evaluating and selecting adaptive courseware, we primarily worked with the CWiC Framework Product Taxonomy. The Product Taxonomy offers users an extensive list of product capabilities along with their underlying attributes that can assist decision-makers in evaluating adaptive products and providers (CWiC, 2016). The tool features three capability categories for consideration: functional, delivery platform, and procurement (See Tables 4-6). Each capability has a series of corresponding questions which help decision-makers in gauging whether the product or provider under consideration meets their needs and expectations. For example, in assessing a courseware's Adaptability capabilities, providers are asked "Does the courseware adapt the presentation of content based on learner declared goals?" or "Does the courseware adapt the complexity or presentation of content based on a learner's affective state?" (CWiC, 2016). (For a detailed and complete breakdown of capabilities and attributes, please see the CWiC Framework, 2016).

Table 4: Key capabilities in the CWiC Framework

Capability	**Focus**
Functional	Instructional Design, Software Interaction Design, & User Experience
Delivery Platform	Course Management
Procurement	Technical Considerations & Product Selection

Adopted from CWiC Framework (2016)

Table 5: Functional capabilities in the CWiC Framework

Functional Capabilities	Description
Adaptivity	The adjustment of presentations of content in relation to knowledge of learners
Collaboration	Collaboration is a requirement or opportunity for learners to engage with other people in the context of learning: peers, mentors, or educators
Customization Configuration	The ability for educators or course designers to alter learning or assessment content
Depth of Interaction	The presence of variety and higher-order learning skills in instruction
Feedback	The deployment of reports, notifications, or visualization to learners or educators
Learner Autonomy	The ability for learners to impact or augment instruction based on their choices
Measurement & Structure	The presence of academic structures and the capacity to assess learning in relation to them
Scaffolding	Support structures to help learners achieve and grow beyond their current proficiency
Usability	Features of software and user-centered design that support sustained engagement

Adopted from CWiC Framework (2016)

Table 6: Procurement & Delivery Capabilities in the CWiC Framework

Procurement Capabilities	Delivery Capabilities
Accessibility	Content Management
Browser/OS Compatibility	Course Administration
Interoperability	Reporting
Privacy & Security	
Scalability	

Adopted from CWiC Framework (2016)

THE PROCESS

BUILDING A COMMUNITY & KNOWLEDGE-BASE

One of the key barriers to adopting digital courseware is faculty resistance and reluctance (Johnson, 2012; Lederman 2017a, 2017b; Tyton Partners, 2014; Zellweger Moser, 2007). However, much of this resistance is due to a lack of time, training, and support (Johnson, 2012; Tyton Partners, 2014). Faculty need time to learn about and explore emerging educational technologies. They also need educational support to thoroughly examine new digital solutions (Johnson, 2012; Zellweger Moser, 2007). During the Fall 2016 Term, CETL hosted an Adaptive Learning Workshop Series which served to educate course coordinators and supporting staff. In doing so, we sought to foster faculty buy-in and commitment to comprehensively evaluating adaptive courseware in the pilot stage of the grant.

Workshops were designed to: (1) develop a basic understanding of adaptive learning courseware and its potential to improve undergraduate education; (2) establish and cultivate a community of scholarship around the exploration of adaptive learning; (3) offer advice from learning technologists about how to best approach the evaluation of adaptive courseware; (4) connect faculty with institutional experts who could advise our team on the design and implementation of an effective courseware pilot; and (5) offer a community-based dialogue about adaptive learning technologies to all interested GSU faculty and staff. These developmental opportunities provided a baseline education and served to prepare the course coordinators for the upcoming tasks of the grant: courseware selection and effectively implementing and evaluating adaptive courseware in their respective departments. Lastly, all workshops were open to the broader Georgia State community so that anyone interested in adaptive learning could participate and benefit from the series.

MODIFYING THE CWiC FRAMEWORK—A COMMUNITY ENDEAVOR

In addition to building a community of scholarship around adaptive learning, the majority of Fall 2016 revolved around the development of a high-quality evaluation tool. Such a tool was necessary to guide our community in systematically reviewing and making sense of the diverse range of products under consideration. Rather than starting from scratch, we chose to modify and build upon an existing evaluation tool: the Product Taxonomy feature from the Courseware in Context Framework. Although the CWiC Product Taxonomy is comprehensive as is, we saw it as a starting point. We chose to work with our faculty and technical staff to modify the tool—allowing us to ensure that the unique needs of individual faculty and our institution were represented in the questionnaire. Furthermore, expanding the Product Taxonomy assisted our community in obtaining pertinent, descriptive information that significantly

informed our decision-making process. While others could replicate this procedure—creating modifications that are specific to their individual and institutional needs—some may choose to use the evaluation tool in its current form. Either way, users can acquire a breadth of information to assist them in navigating the adaptive courseware market.

Through the CWiC website (http://coursewareincontext.org), we were able to obtain a Microsoft Excel version of the full Product Taxonomy—all capabilities and their underlying attributes included. We uploaded the file to the university file-sharing service (OneDrive) and directed all course coordinators and CETL support staff to review, edit, and add content. We advised the faculty course coordinators to primarily focus on the functional capabilities, while CETL technical staff targeted the delivery platform and procurement portions of the tool. Upon the completion of this task, the Adaptive Learning Program Manager reviewed, verified, and finalized each section of the evaluation tool (Referred to as the Provider Self-Assessment). In addition to the original capabilities and underlying attributes found in the CWiC Product Taxonomy, new sections and questions were included in the Provider Self-Assessment (See Appendix A). These additional sections revolved around product features that related to: Course Availability, Quality of Courseware & Content, Identifying the Underlying Adaptive System, Cost & Pricing, Support Services, and Data Access. Because the original Product Taxonomy only included 'yes' and 'no' responses to individual questions, we also included qualitative responses on the majority of functional capability questions. We wanted providers to explain how their product or company met the standards of the measurement. If for instance, a provider marked 'yes' on the question: "Can learners interact with peers during the learning activities?" They were prompted to "Please describe how your product is adaptive by this measure." The Adaptive Learning Program Manager entered a final version of the Provider Self-Assessment into Qualtrics and in early December 2016, she forwarded a Request for Information to all 21 providers. They were asked to complete and submit their responses within one month's time.

EVALUATING COURSEWARE PROVIDER SUBMISSIONS

Our Request for Information resulted in 16 complete submissions from 15 pre-approved providers. Upon receipt, the Adaptive Learning Program Manager converted the data into a format that enabled an easy, side-by-side comparison of provider responses on product capabilities. Microsoft Excel was used to host the information so that course coordinators could click through each capability category and compare providers' 'yes' and 'no' responses. In addition, PDFs were generated from the individual vendor submissions in Qualtrics. This allowed faculty to review the qualitative responses to questions where vendors explained how their product or company met that measurement. Faculty were asked to

review the information, connect with their departmental colleagues, and select their top choices for further consideration. The Adaptive Learning Program Manager compared faculty choices and identified the seven top-rated candidates, who would be invited to present to and meet with the adaptive grant community at Georgia State.

COURSEWARE FAIR—DEMONSTRATIONS AND ONE-ON-ONE MEETINGS

The seven providers who were ranked the highest by the faculty course coordinators were invited to participate in a Courseware Fair at Georgia State University in February 2017. The Courseware Fair was a two-day event. Day 1 consisted of back-to-back product demonstrations. While the purpose of the day was to give course coordinators and support staff a clearer understanding of the products and their features, the event was open to all Georgia State community members. Each provider was given a general guide (See Appendix B) to assist them in structuring their presentations. This ensured that our community was presented with structured product overviews that could easily be compared across vendors.

On Day 2 we scheduled one-on-one meetings between the course coordinators and vendors. The meetings were faculty-initiated so that course coordinators could speak with only those providers that they were interested in meeting. We used SignUpGenius to orchestrate these meetings, which were hosted on-site at CETL. The one-on-one meetings allowed course coordinators to highlight their unique departmental needs and expectations—as those details could not be covered in Day 1 demonstrations.

Sandbox Exploration

Upon determining which seven providers would be invited to campus for our Courseware Fair, each provider was asked to supply faculty and key CETL staff with sandbox accounts. Providers were asked to supply these accounts prior to their campus visit so that our team would have the opportunity to explore and experiment with the technology. We requested that when possible, faculty receive sandbox accounts in the specific courses that they would be piloting in 2017-2018. Having these accounts available ahead of the Courseware Fair helped faculty and support staff to familiarize themselves with the technology and ask pointed questions about each product. After the Courseware Fair, CETL arranged a Sandbox Field Day wherein all course coordinators could meet face-to-face, along with CETL staff, to explore courseware of interest and engage in collaborative dialogue with their peers. We suggest also inviting available faculty experts from the campus community, as they may offer insights to the learning science behind adaptive technologies as well as strategies for evaluation.

Finalizing Courseware Selections

After the provider Courseware Fair and additional sandbox review, course coordinators were asked to further evaluate vendors and communicate with colleagues in their home departments prior to finalizing their courseware selections. All courseware selections were submitted within one month of the Courseware Fair. From start to finish—educating our community, designing an evaluation tool, and evaluating and selecting courseware—the process took between six and seven months' time. We chose to take our time and to be systematic in this stage so as to ensure that faculty and staff had a strong understanding of adaptive learning and the current market of adaptive products. Providing faculty with the necessary time and support to explore and understand educational technologies is key to alleviating anxiety and promoting adoption of digital solutions (Johnson, 2012; Zellweger Moser, 2007). However, individuals or institutional leaders who are interested in experimenting with adaptive learning need not adhere to this same schedule. The process is flexible and can be accelerated or extended to meet the unique needs of the individual or institution.

THE TAKEAWAY—LESSONS LEARNED

Participating in an extensive educational and evaluative process such as this had many benefits to our community. By immersing ourselves in the evaluation of 21 vendors, we significantly increased the community's level of knowledge with respect to adaptive learning solutions. Additionally, this immersion and evaluation helped to provide a more realistic understanding of the current adaptive market. For instance: What features are available? How do vendors differ from one another? What's missing and what's on the way in terms of product capabilities? How can faculty and vendors work together to create new, high-quality courseware?

Another benefit is that conducting a side-by-side comparison of providers in this way encouraged faculty openness in strongly considering a range of products. Sometimes, faculty or administrators will select a particular product because it is what they are familiar or comfortable with—it is what they know. By systematically comparing products on a diverse range of capabilities and measurements, we facilitated a level of flexibility and openness that might not have otherwise existed. Seeing detailed product comparisons, along with educating community members about the technology, assisted with reducing anxiety and confusion around particular courseware. Finally, in conducting a deep dive and analysis into the products at hand, we found that faculty expressed confidence and commitment upon finalizing their courseware selections.

Despite these benefits, this process is in no way "fool-proof." Indeed, upon a challenging launch in one of the Fall 2016 pilot courses, our faculty and administration agreed to cancel the implementation of the courseware in those sections. When reviewing data from evaluation tools such as the one outlined in this article, it is important to keep in mind that the information was self-reported. At this stage, there may be little to no testing of the product at one's institution. Although the implementation of adaptive courseware is becoming more commonplace, the educational community still lacks a comprehensive source for high-quality and accessible product reviews. We suggest connecting with individuals and institutions that have experience working with providers and products of interest. In sharing our stories—positive, negative, and those in-between—we will continue to learn from one another and assist with shaping the quality of courseware being offered.

CONCLUSION

In providing this overview, we hope to offer a flexible model that others might learn from and adapt as needed. As our team dove into the adaptive market, searching for quality solutions, we learned much about what the market has to offer. We also gained a stronger understanding of the technology itself. In doing so, we created a collaborative environment wherein faculty became more confident and committed to their selected courseware—encouraging buy-in among faculty and other institutional stakeholders. Participating in a cross-disciplinary and cross-institutional grant such as the APLU adaptive grant highlights the benefit of sharing stories. Our story is but one example of how a teaching and learning community went about evaluating and selecting adaptive courseware. The environment, structure, and needs of each institution (or individual) are as diverse as the adaptive market itself. Therefore, we suggest learning from the experiences of others and developing an approach that reflects one's unique needs. As new stories emerge, the broader educational community will gain nuanced insight into the adaptive market and the implementation of this promising technology.

APPENDIX A: KEY ADDITIONS TO CWIC FRAMEWORK FOR PROVIDER SELF-ASSESSMENT

COURSE AVAILABILITY

- Of the following courses, for which do you have courseware? Please indicate all that apply: American Government, Global Issues, Macroeconomics, Microeconomics, Introduction to Psychology.
- For those courses for which you have available courseware, is the courseware available now? If not, when would be the estimated time of delivery?
- If you do not have available courseware for one (or more) of the courses listed above, what is the typical timeframe for development and delivery of a new courseware?
- Do you have the resources (staff, time) to take on developmental projects at this time? If yes, please explain how you are equipped to take on developmental projects.
- If you have a courseware in (American Government/Global Issues/Macroeconomics/Microeconomics/Introduction to Psychology), please identify the content source (textbook, open educational resources, etc.) for your courseware.

ADAPTIVE SYSTEMS

- In the EDUCAUSE Review article, "Adaptive Learning Systems: Surviving the Storm," Lou Pugliese outlines four different types of adaptive systems. Please identify which adaptive system you think best matches your model: Machine-Learning-Based, Advanced Algorithm, Rules-Based, or Decision Tree.

QUALITY OF COURSEWARE

- What are the academic credentials of the authors and content creators used in your courseware?
- What are the academic credentials of the designers of the adaptive learning software?
- Many publisher's supplemental materials (such as test banks) are so poor that they are not usable. Why is your adaptive piece going to be better?
- Have the authors and designers actually used the software in courses themselves? If so, please explain:
- Please describe your quality assurance process:

COST

- Is there a refund policy if the student drops the course?
- If a student drops the course and then decides to retake the course will the courseware be good for multiple semesters?
- If a student fails and retakes the course, will they be able to use the courseware again (with a one-time purchase)?
- Do you have a lifetime access option?
- Is there a print option available?

PRICING

- Each vendor was asked to describe their pricing structure.

SUPPORT SERVICES

- Is helpdesk support available for instructors? If yes, please describe the type of helpdesk and technical support available to instructors.
- Is helpdesk support available for students? If yes, please describe the type of helpdesk and technical support available to students.
- Is helpdesk support available for technical staff? If yes, please describe the type of helpdesk and technical support available to university technical staff.

DATA ACCESS & OWNERSHIP

- Where does the data generated by student users reside? Where is it stored and who owns it?
- Can institutions access student data, assessment, and other activity data for all courses/sections belonging to their institution in order to perform an analysis of student performance? If yes, please explain the process by which GSU may access the data.
- What experience do you have working on a university-led project involving the implementation of educational technologies?
- If you have not worked on such a project, please explain how you are equipped (staff, resources, etc.) to work on such a project.

QUALITATIVE RESPONSES

- For each yes response provided by a provider, they were asked to explain or give an example of how their product or company meets that measure.

APPENDIX B: PROVIDER DEMONSTRATION GUIDE

Please use this outline to assist you with the structure of your formal presentation to Georgia State faculty and staff. (Note: Presentations may be recorded).

INTRODUCTION (5 MINUTES)

- Presenter introductions
- Courseware availability:
    - Which courses currently available?
    - If not currently available, how quickly could it be developed & launched?
- What makes your courseware adaptive?
    - Description of Adaptive Model (Machine-Learning Based, Advanced Algorithm, Rules-Based, or Decision Tree)
    - USE EDUCAUSE article to frame the description: Pugliese, Lou. 2016. "Adaptive Learning Systems: Surviving the Storm." EDUCAUSE.

INSTRUCTOR/AUTHOR EXPERIENCE—A DAY IN THE LIFE (15 MINUTES)

- Demonstrate how an instructor will configure courseware
- Demonstrate how an instructor can edit content

STUDENT EXPERIENCE—A DAY IN THE LIFE (10 MINUTES)

- Demonstrate how a student will complete coursework
- Demonstrate how a student can use data/dashboards to track progress through the course

INSTRUCTOR EXPERIENCE (15 MINUTES)

- How does an instructor use data and dashboards to track students' progress?
- What type of interventions can the instructor make?
- How can the instructor use data/dashboards to evaluate the effectiveness of the courseware and/or course design?

Q&A (5 MINUTES)

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