LEARNING TO ADAPT 2.0:

THE EVOLUTION OF ADAPTIVE LEARNING IN HIGHER EDUCATION
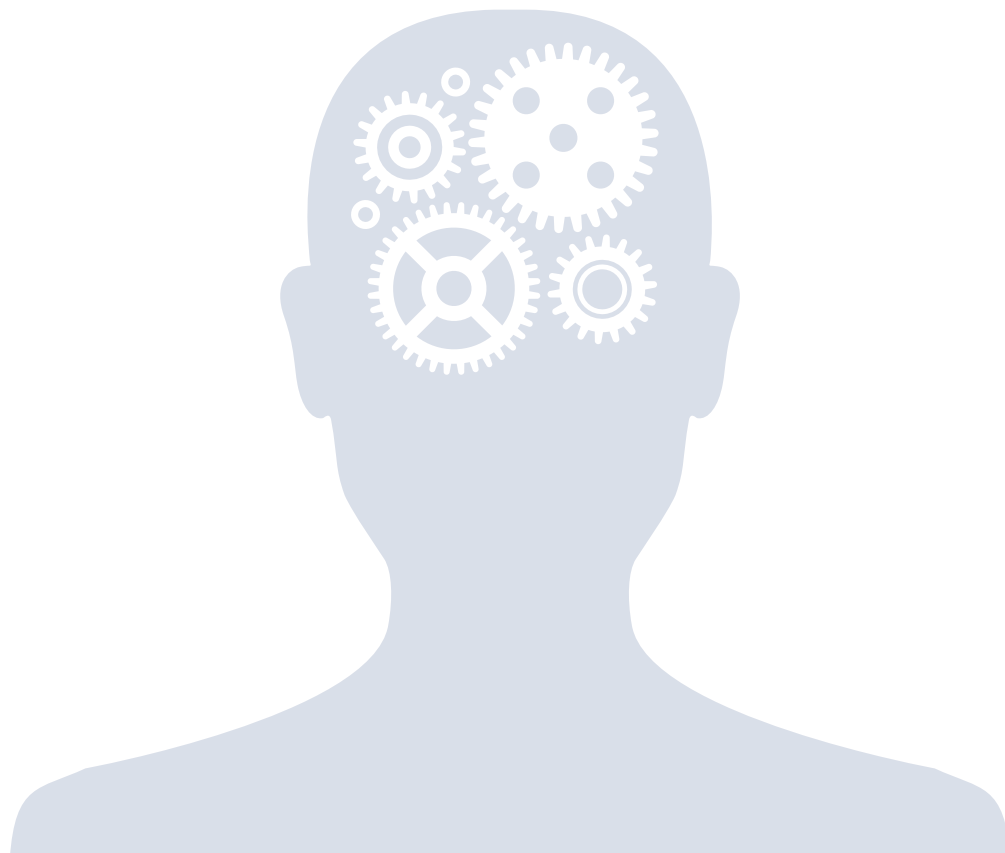
TABLE OF CONTENTS

INTRODUCTION

"Rethinking Higher Ed: A Case for Adaptive Learning"
"The Adaptive Learning Revolution"
"The Death of Textbooks?"
"L'adaptive learning, la révolution qui vient"

Breathless headlines like these from the past three years have heralded the great potential for adaptive learning to transform higher education. Nonetheless, investors, policy makers, pundits, and institutional leaders continue to ask whether the rhetoric behind this market is becoming a reality.

- Is adaptive learning on its way to becoming a mainstream product offering?

- Is it supporting productive new ways of teaching and learning?

- Is it addressing higher education's current pain points— affordability, poor outcomes, and limited access?

In 2012, Tyton Partners embarked on a comprehensive study of adaptive learning in higher education, which we define as:

Solutions that take a sophisticated, data-driven, and in some cases, non-linear approach to instruction and remediation, adjusting to each learner's interactions and demonstrated performance level and subsequently anticipating what types of content and resources meet the learner's needs at a specific point in time.

This study sought to characterize adaptive learning as one approach within a broader personalized and online learning landscape. As part of our search for adaptive products available for institutional adoption, we reviewed offerings from over 70 companies and organizations, ultimately highlighting 10 that we found best represented the state of the market at the time. We also developed a product taxonomy for institutions to use to guide the product selection process. The results of our research were published in a series entitled "Learning to Adapt."

In all, we concluded in 2012 that adaptive learning was a nascent market spring-loaded with potential. To what extent has this changed today?
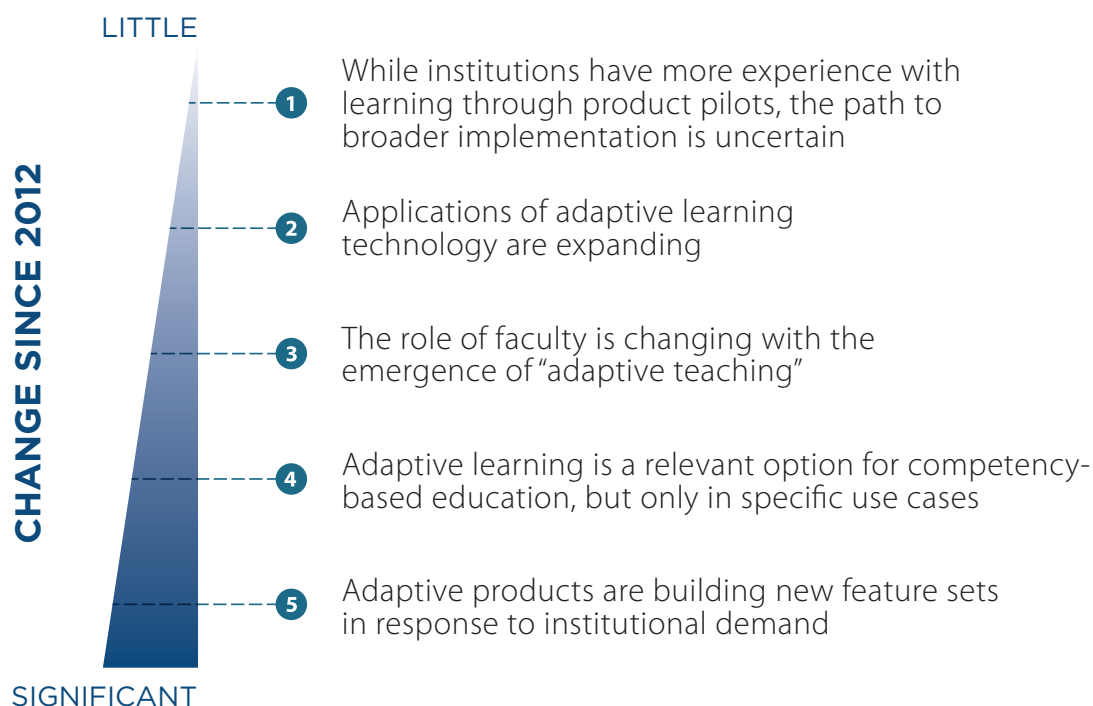
In 2015, we returned to adaptive learning in higher education in an effort to capture ways in which this market has evolved over time, and to consider the potential impact of these changes on the future adoption of this technology. This publication presents findings from our research, including insights from qualitative interviews with leaders from over 20 institutions about their experiences with adaptive learning, and survey responses from 35 suppliers with adaptive solutions in the market.[1]

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1. A request for information was sent to approximately 80 suppliers, which yielded 35 responses. Of the respondents, we identified 20 with meaningful traction in higher education that were illustrative of the types of solutions offered today, and we have profiled them as part of this research effort.

SUMMARY

Over the past three years, adaptive learning has gone from an ill-defined concept in higher education to an important category of teaching and learning technology. This publication categorizes this evolution across five themes observed in our research, some of which have not changed much since 2012 and others of which have changed dramatically. It also presents recommended best practices for institutional leaders based on findings from our research, along with an adaptive product matrix and supplier profiles. In appendices 1 and 2, we provide additional resources for institutional decision-making and product selection.

FIVE EMERGENT THEMES FACING ADAPTIVE LEARNING TODAY

LITTLE

CHANGE SINCE 2012

1. While institutions have more experience with learning through product pilots, the path to broader implementation is uncertain

2. Applications of adaptive learning technology are expanding

3. The role of faculty is changing with the emergence of "adaptive teaching"

4. Adaptive learning is a relevant option for competency-based education, but only in specific use cases

5. Adaptive products are building new feature sets in response to institutional demand

SIGNIFICANT

EXPLORING THEMES

THEME #1: WHILE INSTITUTIONS HAVE MORE EXPERIENCE WITH ADAPTIVE LEARNING THROUGH PRODUCT PILOTS, THE PATH TO BROADER IMPLEMENTATION IS UNCERTAIN

The adoption of instructional technology follows a life cycle from product exploration and discovery to pilot, review, and eventually implementation. In 2012, adaptive learning was beginning its journey into higher education with a number of institutions experimenting with products and in some cases leading to pilots, but with very few implementations in play. Today, more institutions than ever are in the product and pilot phases, though implementations at large scale are still few and far between.

TECHNOLOGY ADOPTION LIFE CYCLE

PHASE	DESCRIPTION	OUTCOME
PRODUCT *(Exploration & Discovery)*	• Build awareness • Host product demos • Select products to pilot	Cease process, or proceed to pilot phase
PILOT	• Apply product in an informal or formal setting • Facilitate informational and user-training sessions • Establish a time frame for review and adoption	Return to product selection phase, or proceed to review phase
REVIEW *(Road to Adoption)*	• Assess outcomes of pilot • Collect insights, experiences, and lessons learned • Work with supplier to make improvements	Return to earlier phases, or proceed to implementation phase
IMPLEMENTATION	• Integrate product into broader technology ecosystem • Facilitate user training and knowledge sharing • Invest in customizations, integrations, and improvements	Continuously measure and improve product applications

There are many reasons why institutions are still slow on the road to adoption. For one, institutions face significant difficulties integrating adaptive learning solutions into existing tools, particularly learning management systems, and into faculty and student workflows. Despite efforts to address issues such as interoperability and standardization of data flow between systems, students and faculty are often still forced to maintain multiple sign-ons and user profiles, resulting in a less-than-seamless user experience.

Of course, the current state of technical integration very much depends on whom you talk to. On the one hand, vendors report support for the most widely used technical standards, as well as support throughout the process of technology integration and implementation. On the other hand, institutions report that technical integration is a major challenge – particularly in the pilot phase of adaptive learning products. In the excitement to experiment with something new, institutions may not fully address integration concerns in the pilot phase, which can create even larger barriers to a successful full-scale implementation.

Faculty skepticism on the whole also remains high. Faculty still commonly object, for instance, to the ways in which adaptive learning alters the process and practice of teaching. Other concerns revolve around the complexity of using these products and the added workload.

Notwithstanding these challenges, the institutions we spoke with continue piloting adaptive products, even if the outcome remains unclear. Some have even moved to defining new approaches to teaching with this technology, which are providing coherence to the practice of adaptive learning and are resonating with some faculty (see theme #3).

AMERICAN INTERCONTINENTAL UNIVERSITY™

MOVING BEYOND THE PILOT:
AMERICAN INTERCONTINENTAL UNIVERSITY

"IMAGINE TEACHING IN A SETTING WHERE YOU KNOW WHAT THEY KNOW. YOU'RE GOING TO TEACH VERY DIFFERENTLY WHEN YOU HAVE THAT INFORMATION. SOME INSTITUTIONS WANT TO UNBUNDLE THE FACULTY ROLE WITH THIS TECHNOLOGY – WE HAVE DONE THE OPPOSITE, WE HAVE EMPOWERED FACULTY TO COLLABORATE MORE ACTIVELY IN EVERY FACET OF TEACHING/ LEARNING, FROM COURSE DESIGN, TO SHARING BEST PRACTICES IN TEACHING WITH EACH OTHER, TO COORDINATING WITH ACADEMIC ADVISORS."

Chief Academic Officer, *American InterContinental University*

Some institutions we spoke with have managed to address faculty resistance and to advance beyond the pilot phase. One such institution is American InterContinental University (AIU), which offers a helpful perspective on key inputs to fuel the road to adoption. What spurred AIU's journey to implementation? Buy-in from the top, and a strategic effort to engage faculty early and often throughout the process.

Relying on the pilot experience of its affiliated institution, Colorado Technical University, AIU elected in 2012 to forgo a pilot altogether in favor of moving to full-scale implementation across multiple programs (Criminal Justice, IT, General Education, Undergraduate Business, MBA, and Master in Education). Such a rapid expansion was illustrative of the kind of transformation adaptive learning can enable, but the implementation also brought disruption that elicited concerns among faculty, particularly about the additive nature of using this technology on top of an already demanding teaching workload.

For AIU, a critical strategy was for its chief academic officer to engage faculty, both to hear their concerns and, more importantly, to enable them to "own" the process of adoption and the tool itself. The chief academic officer also worked with faculty to facilitate training in order to chart a path forward built on using adaptive learning tools to improve the faculty's teaching. In this case, faculty were informed, prepared, and empowered, were given the chance to weigh in and to receive ample training, and were able to guide the process from the perspective of subject matter experts and teaching practitioners.

AIU offers one of the earliest examples of full-scale implementation, and the institution is now using adaptive learning across 90 courses and has 40 full-time and approximately 280 adjunct faculty using the platform for online instruction, with plans to expand its use of adaptive learning in the future.

THEME #2:   APPLICATIONS OF ADAPTIVE LEARNING TECHNOLOGY ARE EXPANDING

Adaptive learning has many possible applications in an instructional environment. In 2012, these were mostly limited to non-credit-bearing environments, such as developmental education. Nonetheless, applications are expanding today to include non-credit-bearing and credit-bearing course environments, and to address various learning needs.

CREDIT-BEARING

HOMEWORK TOOL

COURSE PROJECTS

SIMULATIONS

PRACTICE OR STUDY AID

FULL COURSE DELIVERY

NON-CREDIT-BEARING

PRE-MATRICULATION COURSES AND ASSESSMENTS

REMEDIAL COURSES

DEVELOPMENTAL EDUCATION

Institutions are using adaptive solutions, for instance, as homework tools and practice or study aids to guide learning throughout a course, and in some cases to support whole course delivery. Others are using them for remediation and proficiency-based assessments both for less-advanced students needing to reach a higher level of proficiency prior to enrolling or while enrolled in a course or program, and more-advanced students needing to demonstrate prior learning in a subject in order to accelerate time to completion. In most cases, these applications are voluntary, but have led to some notable gains in student performance, as in the case of the University of Texas's use of LeaP by D2L in its Doctor of Pharmacy program.

TEXAS
The University of Texas at Austin

PILOTING ADAPTIVE LEARNING IN A NON-CREDIT ENVIRONMENT: UNIVERSITY OF TEXAS AT AUSTIN

"A PILOT WAS A CRITICAL FIRST STEP FOR OUR PROGRAM, AND WE HAVE LEARNED A LOT. A CRITICAL LESSON LEARNED IS THE NEED TO COMMUNICATE THE IMPORTANCE AND BENEFITS OF THE PRE-MATRICULATION PROGRAM TO BOTH UPPERCLASSMEN AND INCOMING STUDENTS."

To bring incoming students to a similar level of proficiency across core prerequisites and to reduce the amount of time spent on remediation during the first-year curriculum, the University of Texas at Austin (UT) piloted LeaP in 2015 with a group of 125 entering Doctor of Pharmacy students. The program was integrated into Canvas LMS using LTI 1.1/1.2.

This application utilized LeaP to offer incoming students a six-week course broken up into four subject areas: chemistry, biology, information literacy, and math. As a part of the pilot, the incoming pharmacy cohort also completed non-cognitive surveys embedded within the platform, including a mindset survey, a self-efficacy survey, and a math anxiety survey.

Overall, statistically significant learning gains were seen, mostly in students in the chemistry module, which had the most participation. Chemistry findings even remained valid when controlling for PCAT score (the pharmacy school entrance exam).

Still, challenges persist, largely around encouraging students to use this voluntary resource. For instance, students with high math anxiety, as determined by the non-cognitive surveys issued to the incoming pharmacy class, were less likely to engage with the adaptive learning program. In light of this, program administrators are planning to improve communication to incoming students and upperclassmen to ensure that the benefits of the program are well understood, and are also considering making participation mandatory.

THEME #3: THE ROLE OF FACULTY IS CHANGING WITH THE EMERGENCE OF "ADAPTIVE TEACHING"

The growing universe of applications for adaptive learning is changing not only the way students learn but the way faculty teach. In 2012, most attention was paid to the benefits of adaptive solutions for students, with less attention paid to its benefits for faculty. Today, we see the emergence of a faculty focused practice called "adaptive teaching," in which faculty are *empowered through the use of technology to guide individual learner pathways and to direct and re-direct learning outcomes*. In some contexts, adaptive teaching is helping to support faculty buy-in by further articulating the value of adaptive learning and providing transparency into how adaptive solutions work.

With adaptive teaching, instruction becomes:

1. **Active**, insofar as it uses technology to add focus to the role of faculty as instructors who shape the "journey" and outcomes of learning

2. **Relational**, as faculty are empowered to work as subject matter experts, coaches, and guides alongside students who are progressing through an adaptive curriculum or assessment

3. **Involved** through the use of digital features and functions that enable faculty to direct learners through a module, course, or program and to stage interactions and interventions as needed

4. **Insightful at scale** through the use of analytics, dashboards, and learning maps that provide faculty with greater transparency into student progress, and the use of indicators or flags to suggest potential interventions to improve the likelihood of student success
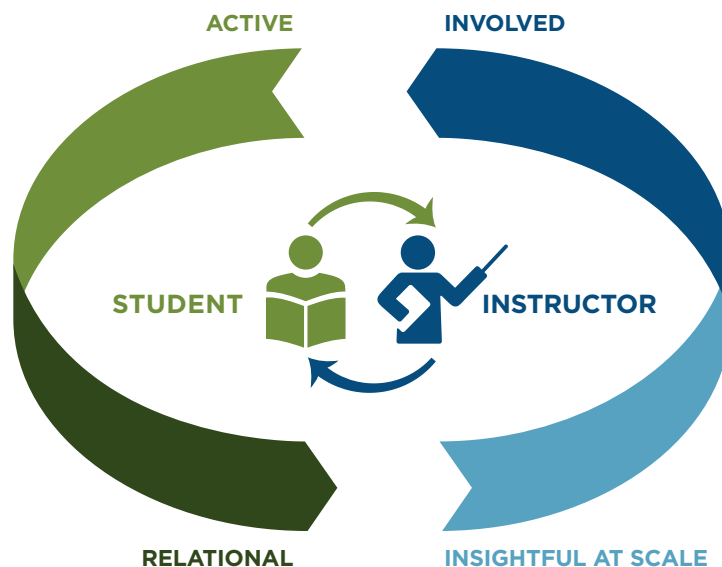
The idea of adaptive teaching would not be possible without significant progress on the part of both institutions and vendors. Through conversations with institutional leaders, we learned of various efforts to create more (not less) faculty autonomy and control over the extent of adaptive teaching. We also observed efforts to introduce faculty to adaptive learning exclusively as a method of facilitating adaptive teaching. In some cases, this helped faculty new to this technology (and even to more active forms of instruction) to feel more confident in its use and even to weigh in on its potential use and benefits. Vendors have also made strides to address these and other faculty concerns through new product features and enhancements, which aim to define and better enable adaptive teaching practices (see theme #5).

THEME #4: ADAPTIVE LEARNING IS A RELEVANT OPTION FOR COMPETENCY-BASED EDUCATION, BUT ONLY IN SPECIFIC USE CASES

With hundreds of institutions reportedly experimenting with personalized and outcomes-based learning models, adaptive learning is gaining traction, especially in competency-based education (CBE) environments. In 2012, many leaders of CBE programs had trouble accepting adaptive technology as more than a targeted study aid or resource for remediation or supplemental instruction. Today, this is starting to change with the emergence of new use cases that showcase the applicability of adaptive learning technology in CBE.

TYTON PARTNERS ASKED SUPPLIERS, "DOES THE PLATFORM SUPPORT 'AUTHENTIC ASSESSMENT' INCLUDING THE CREATION OF STUDENT PORTFOLIOS AS A MEANS OF ASSESSMENT?"

VENDORS' MEANS OF SUPPORTING AUTHENTIC ASSESSMENTS
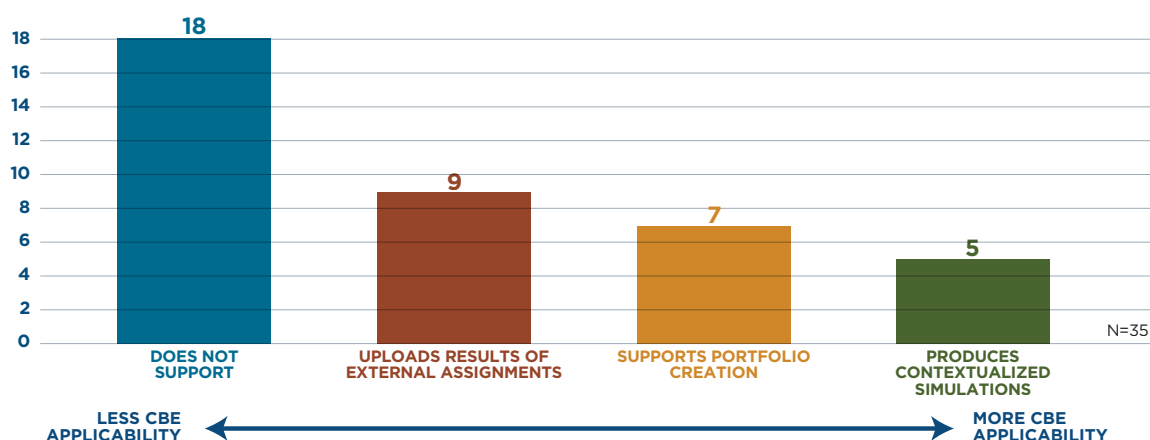
For instance, adaptive products that support authentic forms of assessment (i.e., sophisticated assessments intended to measure real world knowledge and skills) are able to more explicitly assess competency. Our findings among suppliers included some that make use of simulations and portfolios within their platform. When coupled with inputs from an adaptive teaching process, these assessments may offer a powerful means of improving the quality of interaction between students, faculty, and learning coaches. They may also be useful in cases in which more robust forms of prior learning assessment are needed, and for signaling competency to current and potential employers using more complex and sophisticated methods. Nonetheless, the number of suppliers offering these features is low. Just over half, in fact, report an ability to support authentic assessments.

THEME #5:   ADAPTIVE PRODUCTS ARE BUILDING NEW FEATURE SETS IN RESPONSE TO INSTITUTIONAL DEMAND

Overcoming barriers to adoption places as much burden on institutional leaders to engage faculty as it does on technology suppliers to evolve their products. In 2012, we observed some progress among suppliers to address institutional demands for more "faculty-friendly" products that were engaging, intuitive, and most of all, user-friendly. Today, institutional demands and vendor responsiveness are evolving in tandem with one another, leading to a host of product enhancements and extensions that promise to increase adoption.

In our survey of vendors, we observed notable progress in three key areas: collaboration, customization, and content.

TYTON PARTNERS ASKED SUPPLIERS, "WHICH TYPE OF ONLINE COLLABORATION DOES YOUR ADAPTIVE SOLUTION FACILITATE?"
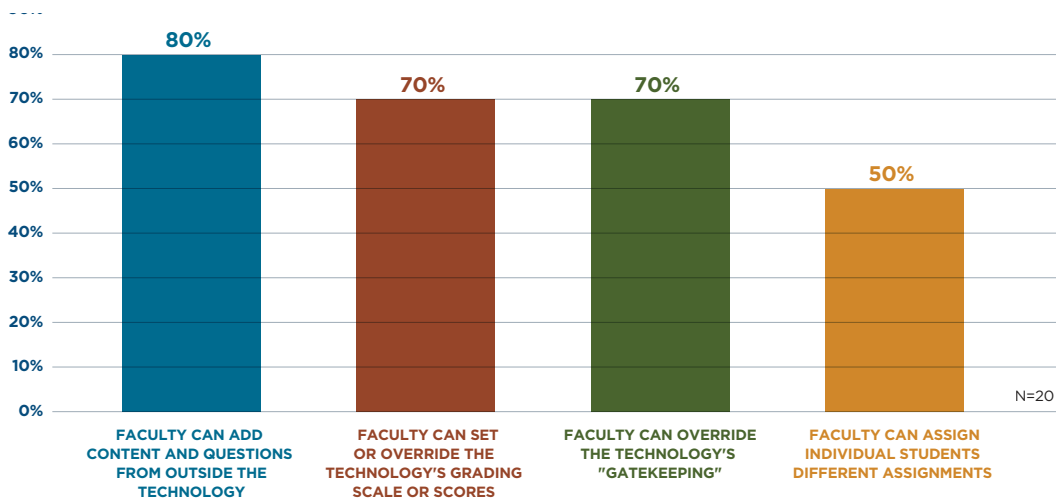
PERCENTAGE OF PROFILED VENDORS WITH SELECT COMMUNICATION AND COLLABORATION FEATURES

N=20
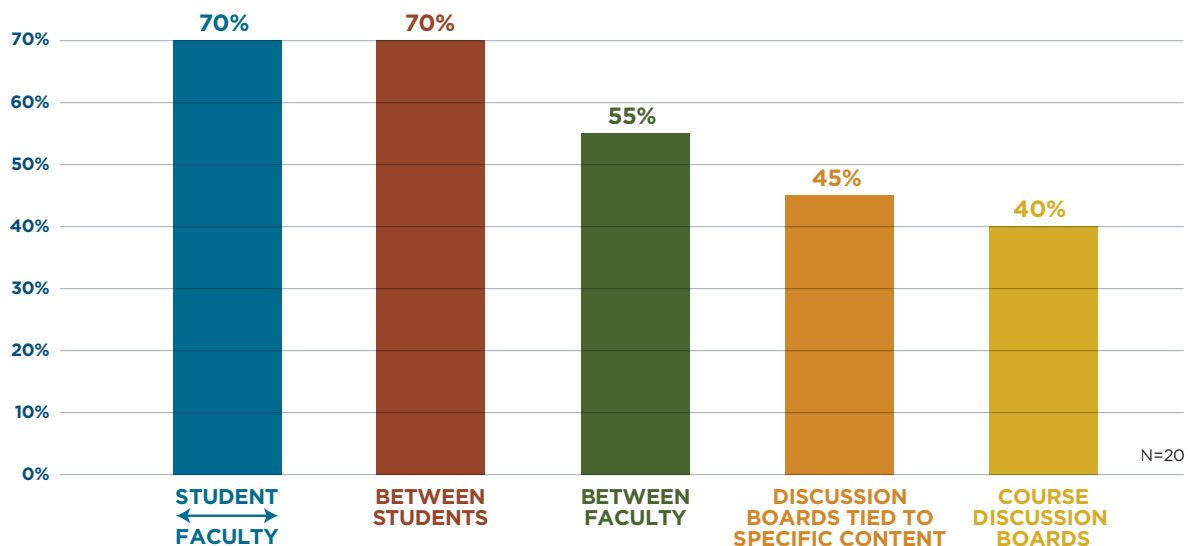
When asked about **collaboration** features, most suppliers confirmed that they are offering features for direct communication between faculty and students and within these two groups. These features promise to improve faculty's ability to stage interventions with struggling students, and to boost social learning and collaboration among peers, which helps promote the feeling of a conventional class experience within the adaptive environment – something that is often lacking in more conventional applications of these solutions.
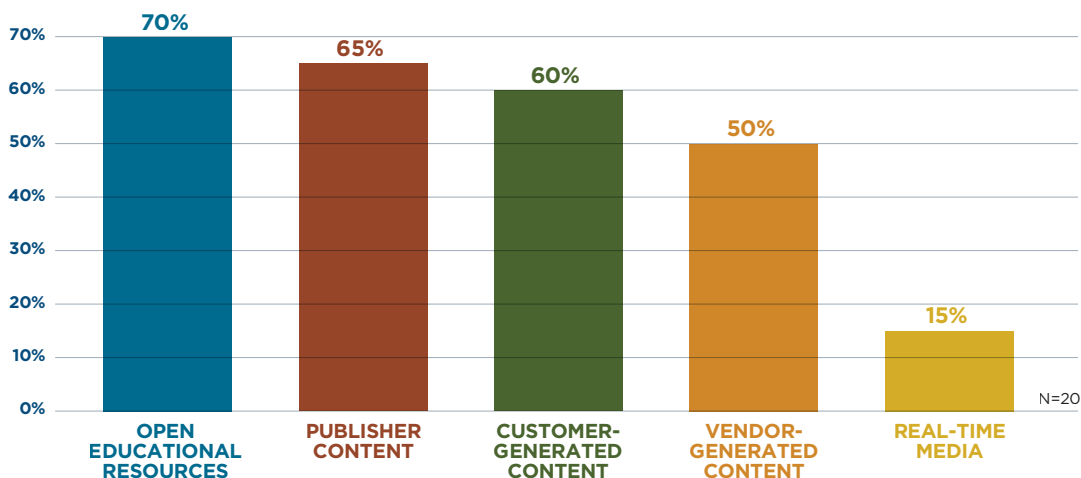
TYTON PARTNERS ASKED SUPPLIERS TO DESCRIBE THEIR PLATFORM'S CONTENT MODEL AND CUSTOMIZATION FEATURES

PERCENTAGE OF PROFILED VENDORS WITH SELECT FACULTY CUSTOMIZATION CAPABILITIES

FACULTY CAN ADD CONTENT AND QUESTIONS FROM OUTSIDE THE TECHNOLOGY	80%
FACULTY CAN SET OR OVERRIDE THE TECHNOLOGY'S GRADING SCALE OR SCORES	70%
FACULTY CAN OVERRIDE THE TECHNOLOGY'S "GATEKEEPING"	70%
FACULTY CAN ASSIGN INDIVIDUAL STUDENTS DIFFERENT ASSIGNMENTS	50%

N=20

* Note: Overriding "gatekeeping" refers to allowing students to skip content that the technology does not think that the student has mastered.

PERCENTAGE OF PROFILED VENDORS USING SELECTED SOURCES OF CONTENT

OPEN EDUCATIONAL RESOURCES	70%
PUBLISHER CONTENT	65%
CUSTOMER-GENERATED CONTENT	60%
VENDOR-GENERATED CONTENT	50%
REAL-TIME MEDIA	15%

N=20

* Note: Vendors, on average, reported the use of 2-3 different sources of content.

Another notable evolution has been in **content model** and **customization features**. A wide range of products are being offered today, from ready-made, off-the-shelf courses with varying degrees of possible customization to products that provide a platform on which faculty, subject matter experts, or an instructional design team can create a custom adaptive learning experience using a variety of resources.

Incorporation of open educational resources (OER) is also becoming more vital, both as a means of customization and a way to reduce costs. Many suppliers are now offering content that can be remixed, edited, and distributed freely. Adaptive platforms that leverage OER are helpful to developers and advocates of OER who look for ways to have their content more widely accessible. OER also allows new suppliers to have access to quality educational content, which can be difficult and expensive to procure without a publisher partner or in-house capabilities.

Taken together, these three areas of significant progress in product offerings portend how vendors will compete in the next phase of market evolution. The adaptive learning providers have different approaches to their algorithms, but increasingly they are also seeking differentiation in other capability areas in response to customer demand.

RECOMMENDATIONS AND LESSONS LEARNED FROM EARLY ADOPTERS

Throughout our research, we asked institutional leaders and decision makers who have piloted or implemented adaptive technology what lessons they learned along the way, and what they would recommend to other institutions that are in the process of adopting adaptive learning. While many agreed that adaptive learning has the potential to transform higher education all emphasized that to make adaptive learning work, certain best practices should be carefully followed.

First, **pilot with full implementation in mind**. Think further out and avoid the tendency to keep this technology in the "innovation" box or to make light of its capabilities and potential contribution. Doing so creates a pilot that is not a true representation of the full implementation experience. Instead, showcase this technology early and often, and work to ensure that its breadth and capabilities are transparent and understood. Afford users multiple opportunities to test-drive new products and to weigh in on which products were most engaging and effective. Also, tackle integration issues early on. Not doing so will result in a poor user experience from the start, which can tip the scale for an institution deciding to adopt adaptive solutions.

Second, **engage faculty early and often throughout the product selection and piloting process**. While building transparency and trust among faculty is important, it is equally critical to establish a shared understanding of the impact of adaptive products on the teaching process. An honest discussion about what "adaptive teaching" might look like at the institution is a good starting point. From there, to augment the chances of faculty buy-in, ensure that the process is driven by faculty input from start to finish. This includes involvement in the product selection process, training on new products, and opportunities for faculty to learn from one another, share experiences, and build a common language and set of practices.

Third, **ensure a coherent process of decision-making and product selection**. Take context into account when selecting a product, and ensure that the process reflects the needs and expectations of all stakeholders involved. Also, make sure that everything from vision to product selection reflects the character, conditions, and needs of the institution. See "A Framework for Institutional Decision Making" (appendix 1), which offers a brief self-assessment to be used by institutional decision makers before beginning the product selection process.
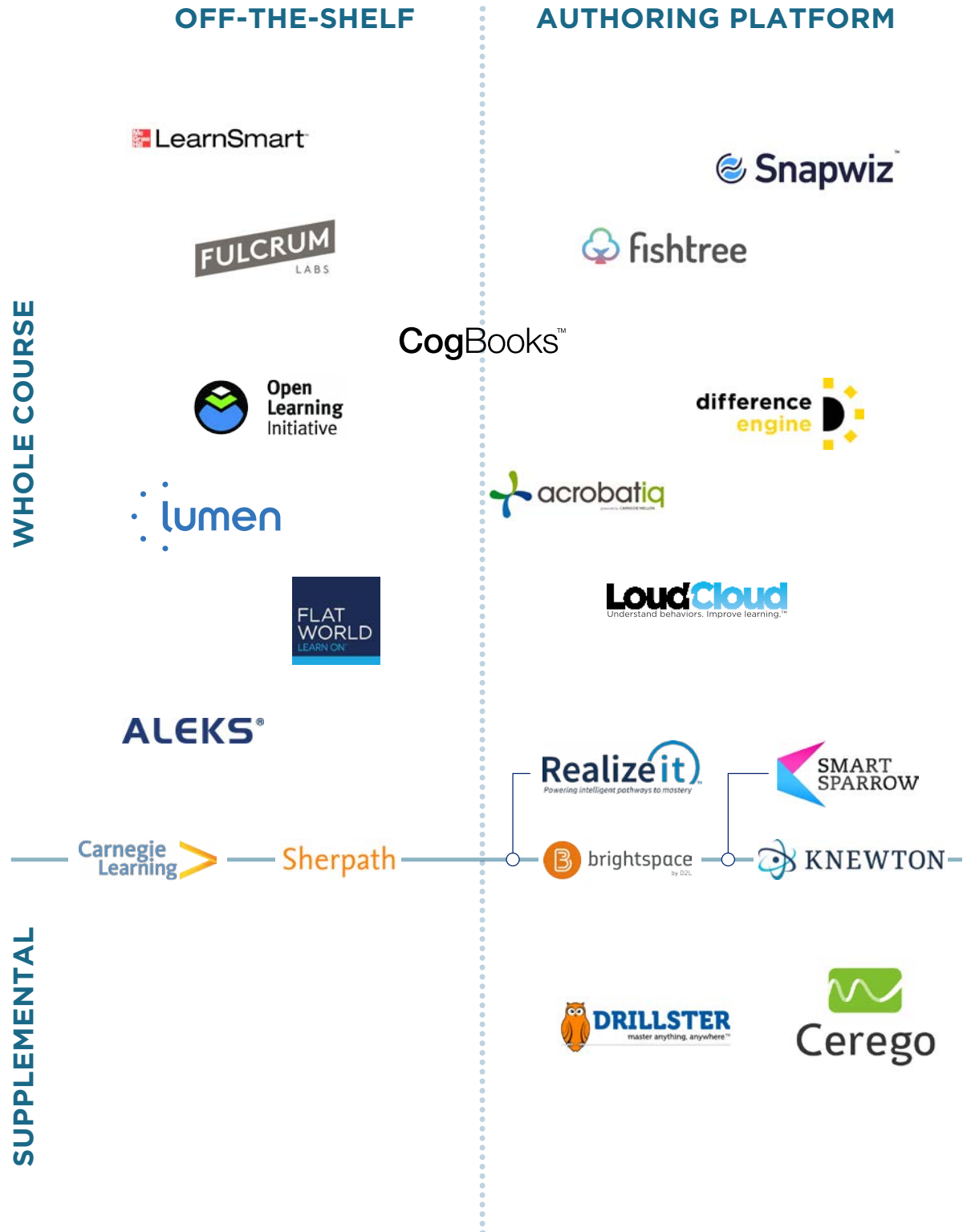
Finally, **execute on a product selection process with a firm awareness of the product landscape.** Address how adaptive learning technology itself works (i.e., how it creates a more personalized teaching and learning environment, what concepts and techniques it applies, how adaptive algorithms work); what product offerings are available; and how these products differ from each another (our previous research referred to these as the "how" and "what" of adaptive learning). Take note of unique features and functions across different products, and ensure that these align with stakeholders' needs and expectations.

Recognizing that suppliers have made significant improvements to their products based on institutional demand (see theme #5), we have updated our product taxonomy to provide an additional tool to support institutional decision-making and product selection (see appendix 2). This resource offers a fuller picture of how suppliers are distinguishing themselves today and provides a tool for decision makers involved in the product selection process to ask more informed questions.

UNDERSTANDING THE 2016 SUPPLIER LANDSCAPE

OFF-THE-SHELF | **AUTHORING PLATFORM**

WHOLE COURSE

SUPPLEMENTAL

LearnSmart

Snapwiz

FULCRUM LABS

fishtree

CogBooks™

Open Learning Initiative

difference engine

lumen

acrobatiq

FLAT WORLD LEARN ON™

LoudCloud
Understand behaviors. Improve learning.™

ALEKS®

Realize it
Powering intelligent pathways to mastery

SMART SPARROW

Carnegie Learning

Sherpath

brightspace by D2L

KNEWTON

DRILLSTER
master anything, anywhere™

Cerego

acrobatiq
powered by CARNEGIE MELLON

OVERVIEW

Acrobatiq's cloud-based Smart Author adaptive learning platform, Smart Courseware content library, and professional services enable institutions to rapidly develop, deliver, and continually improve high-quality online courses and programs. Institutions can build their own custom courses or modify courses in the Acrobatiq content library. Acrobatiq's solutions can help institutions increase access to quality higher education, improve retention, and contain the cost of instructional delivery.

PLATFORM

Two Offerings - **1.** An authoring platform and instructional design service works with an institution/faculty member to create a customized offering **2.** Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Student hint requests; Question part attempts

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can set the sequence of learning objectives
- Other: Faculty can schedule assignments and the number of attempts a student has to achieve a desired score

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PRODUCT LAUNCHED
2013

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
OER (open educational resources), faculty/institution-built instructional content, premium publisher content, Acrobatiq-developed content, and third-party applications (e.g., Panopto lecture capture)

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/ Course Development Services

INTEGRATION
LTI 2.0, APIs

COLLABORATION
Smart Author enables course development collaboration, including sophisticated role management, and APIs enable interoperability with numerous ed tech applications.

ALEKS®

OVERVIEW

ALEKS is a web-based learning and assessment program that uses big data and Knowledge Space Theory to determine precisely which topics each student knows and which topics the student is ready to learn. The closely interwoven content, platform, and pedagogy provide data-driven, adaptive learning for students, as well as actionable, detailed insights for instructors. ALEKS seeks to address the large number of students who arrive in college without adequate knowledge, preparation, or skills. ALEKS closes the gap in readiness among college students and seeks to be a personalized and adaptive alternative to the high cost of one-on-one tutoring.

PLATFORM

Off-the-shelf courseware, pre-loaded with content that cannot be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware*
- Faculty can add questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can tailor non-adaptive assignments (homework, tests, and quizzes) that use non multiple-choice algorithmic content

* Faculty can add content from outside the courseware, but not questions.

PRODUCT LAUNCHED
1999

INSTRUCTION COVERAGE
Whole Course

COURSES
Math, Science,
Accounting, Statistics

CONTENT SOURCE
ALEKS develops comprehensive content, including all questions.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services (custom basis), In-Person Professional Development, Instructional Design (custom basis)/Course Development Services

INTEGRATION
LTI 1.1, Shibboleth

COLLABORATION
Student-to-Student, Student-to-Faculty, Faculty-to-Faculty, Course discussion board for faculty and students

brightspace by D2L

OVERVIEW

With Brightspace LeaP, the goal is to deliver the right content, at the right time, so that students can learn more and learn at their own pace. Brightspace LeaP enables instructors to deliver more personalized experiences within their courses and to create more engaged, successful students.

PLATFORM

An authoring platform and instructional design service that will work with an institution/faculty member to create a customized offering

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can resequence content
- Other: Faculty can influence the starting learning paths, practice questions, and quizzes

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PRODUCT LAUNCHED
2015

INSTRUCTION COVERAGE
Whole Course or Supplemental

COURSES
Science, Arts/Humanities, Social Sciences

CONTENT SOURCE
Lesson material, including OER and publisher content sources, can be created or imported into Brightspace. LeaP also indexes pre-existing content in the Brightspace Learning Object Repository.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, In-Person Professional Development, Instructional Design/ Course Development Services

INTEGRATION
LTI, QTI, Caliper

COLLABORATION
Student-to-Faculty

Carnegie Learning >

OVERVIEW

Carnegie Learning provides an effective and efficient way for students to learn mathematics, through a blended learning product that combines face-to-face collaboration and print materials with an intelligent tutoring system that adapts to individual strengths and weaknesses, as well as preferences.

PLATFORM

Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Specific strategies or choices made in the steps of a multi-step problem (e.g., hints are responsive to the approach taken by the student)
- Other: Error diagnosis and just-in-time feedback for common errors

FREQUENCY OF ADAPTIVITY:

LOW ——— MEDIUM ——— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty or institutions can add, remove, or sequence topics within the curriculum, with warnings on missing prerequisites or topics that are presented in an illogical order, and can automatically sequence courses to correct problems
- Other: Faculty can add both pre-tests, which can be prescriptive, and post-tests

Cerego

INSTRUCTION COVERAGE
Supplemental

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Standards-aligned content, OER, real-time media, teacher lesson plans, premium publisher content, and learner-generated materials

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/ Course Development Services

INTEGRATION
LTI 1.0 & 1.1, Common Cartridge

COLLABORATION
Student-to-Student
Student-to-Faculty
Faculty-to-Faculty

OVERVIEW

Cerego seeks to relieve the cognitive burden associated with self-paced instruction – the difficulty of knowing what to learn and review, as well as when – by providing a dynamic profile of what the learner knows and how long they will be proficient with that knowledge.

PLATFORM

An authoring platform and instructional design service that will work with an institution/faculty member to create a customized offering

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can remix content (foundational elements called items) into a discrete "playlist" that can be assigned
- Other: Faculty can control the kind of assessments offered for each item type – turning on/off various assessments for groups of learners that will be automatically taken into account by the learning and scheduling algorithms

CogBooks™

OVERVIEW

CogBooks focuses on improving both the success of the student and the teaching experience of the instructor. The student learning experience is effective for a wide range of students and can be applied in settings with non-traditional learners, student populations that have a high propensity not to complete, or with traditional students. The CogBooks platform has recently been expanded to support student collaboration, motivational tools, instructor insight dashboards, and data analytics.

PLATFORM

Two Offerings - **1.** An authoring platform upon which institutions/ faculty can create customized courses **2.** Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/ faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Knowledge space/probabilistic techniques

FREQUENCY OF ADAPTIVITY:

LOW ——————— MEDIUM ——————— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can configure the sequence and content of courses, including learning activities and assessments

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PRODUCT LAUNCHED
2005

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
CogBooks, OER, faculty, various customers, or publishers

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, In-Person Professional Development, Instructional Design/Course Development Services

INTEGRATION
LTI 1.1 & 1.2, Common Cartridge, QTI, LIS, XML import/export; Coming in 2016: Caliper, Experience API, OAAI

COLLABORATION
Student-to-Student, Student-to-Faculty, Faculty-to-Faculty, Embedded discussion boards tied to each specific learning activity within the adaptive path, Course discussion board for faculty and students

difference engine

INSTRUCTION COVERAGE
Prior Learning Assessment or
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Proprietary client content, OER,
or third-party content from one
or more publishers.

PROFESSIONAL SERVICES
Technology Integration Services,
In-Person Professional Development,
Instructional Design/Program and
Course Development Services,
Curriculum Alignment Analysis,
Curriculum/Program Learning Efficacy
Evaluation, Assessment Consultation
and Authoring, Learning Activity
(Multimedia) Production, OER Curation

INTEGRATION
LTI 1.2 & 2, QTI 2.1, Common Cartridge
1.0, Caliper 1.0, IMS CBE / Extended
Transcript (eT) / Digital Credentials
(actively participating in development
of standards and proof of concept)

COLLABORATION
Student-to-Student, Student-to-Faculty,
Faculty-to-Faculty, Embedded discussion
boards tied to specific pieces of content,
Course discussion board for faculty and
students, Blogs and wikis, Multimedia
assignment feedback

OVERVIEW

Difference Engine is a set of design tools used by Learning Objects in partnership with clients to design and create instructionally aligned, personalized, and adaptive learning experiences that drive learners effectively and efficiently to the achievement of competencies and related knowledge, skills, and abilities. To achieve this, Difference Engine combines both personalized and adaptive learning elements to drive unique learning plans for each learner. Learning plans are personalized in terms of placement, path, and pace (relative to targeted capabilities). "In September 2015, Learning Objects was acquired by Cengage Learning.

PLATFORM

An authoring platform and instructional design service that will work with an institution/faculty member to create a customized offering

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: IRT difficulty levels; Zone of proximal development; Inductive logic programming; Cognitive scaffolding; Bayesian predictive modeling

FREQUENCY OF ADAPTIVITY:

LOW ——————— MEDIUM ——————— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments

DRILLSTER
master anything, anywhere™

OVERVIEW

Drillster is designed to address knowledge anchoring and retention. In addition to providing personalization in the development of knowledge and awareness, Drillster can calculate how and when knowledge will decline if it is not maintained. On a personalized level, Drillster can call the student back to the learning material just before the student tends to forget, so knowledge can be kept fresh.

PLATFORM

An authoring platform and instructional design service that will work with an institution/faculty member to create a customized offering

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: External third-party data (experience data)

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can modify the learning objective and the elements of a course path that are compulsory or optional

PRODUCT LAUNCHED
2012

INSTRUCTION COVERAGE
Supplemental

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Publisher content on the Drillster, Faculty, Publishers platform can either be closed to the general public (and only accessible to the publisher's customers via the publisher's learning portal) or it can be publicly available in the Drill Store.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, Instructional Design/Course Development Services

INTEGRATION
SCORM

COLLABORATION
Student-to-Student
Student-to-Faculty
Faculty-to-Faculty

fishtree

OVERVIEW

Fishtree is built to scale one-to-one instruction – solving Bloom's two sigma problem and allowing personalized instruction in a traditional classroom/course. Fishtree is a competency-based instructional platform that allows courseware creation, modification, and delivery in a synchronous or asynchronous fashion – complete with adaptive learning capabilities, gated assessment delivery, and analytics. Fishtree has the ability to align all resources, including real-time content, to any competency or standard and then to the Learning DNA (profile) of every student.

PLATFORM

An authoring platform upon which institutions/faculty can create customized courses

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Content difficulty level (e.g., reading level)

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments

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PRODUCT LAUNCHED
2012

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
All content and modes, including standards-aligned content, OER, real-time media, teacher lesson plans and premium publisher content

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, In-Person Professional Development, Instructional Design/Course Development Services

INTEGRATION
LTI 2.0, QTI, SCORM, Common Cartridge, XAPI

COLLABORATION
Student-to-Student, Student-to-Faculty, Faculty-to-Faculty, Embedded discussion boards tied to specific pieces of content, Context-based messaging between faculty and students

FLAT WORLD LEARN ON™

PRODUCT LAUNCHED
2015

INSTRUCTION COVERAGE
Whole Course, Competency, Certificate, or Full Academic Program

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Flat World eBooks, OER, Publisher Content (via VitalSource)

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/Course Development Services

INTEGRATION
LTI 1.1, SSO, Caliper, XML, JSON Webservices, CRM, SIS, Shibboleth SAML for SSO, LaTeX

COLLABORATION
Student-to-Student, Student-to-Faculty, Faculty-to-Faculty, Embedded discussion boards tied to specific pieces of content, Course discussion board for faculty and students, Group projects

OVERVIEW
Flat World enables competency-based learning through a combination of big data and algorithms, which credit hour model allows the student to operate outside the traditional credit hour. Flat World's algorithms pull the instructor in as needed, meeting substantive faculty-student interaction on a regular basis and tracking satisfactory academic progress (SAP) when used with Federal Student Aid.

PLATFORM
Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE
Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———————— MEDIUM ———————— HIGH

FACULTY CUSTOMIZATION
- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can facilitate A/B testing, or the department can lock the competencies after publishing

FULCRUM LABS

OVERVIEW

Fulcrum Labs (formerly Adapt Courseware) has developed a set of adaptive, standards-based, general education courseware that has demonstrated an increase in student engagement and performance to a quantifiable level of mastery. The Fulcrum Labs solution can be deployed at scale, helping to lower costs and expand access. This courseware helps higher education institutions increase course completion and enrollment retention by raising self-efficacy. Fulcrum Labs courseware can stand alone or can replace textbooks with a more efficient, effective, and affordable learning tool.

PLATFORM

Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can create, edit, omit, or reorder any content modules
- Other: Faculty can reorder adaptive stack and/or set dependencies unlocking specific competencies once others have been mastered
- Other: Faculty can adjust the mastery/competency goal for the entire class or for groups of students

PRODUCT LAUNCHED
2010

INSTRUCTION COVERAGE
Whole Course

COURSES
General Education

CONTENT SOURCE
Subject matter experts (PhD level), peer reviewers (PhD level) aligning to AP and CLEP standards. All courses ACE approved.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/Course Development Services

INTEGRATION
LTI, SCORM, LDAP, XAPI, SAML

COLLABORATION
Student-to-Student, Student-to-Faculty, Embedded discussion boards tied to specific pieces of content, Course discussion board for faculty and students

KNEWTON

OVERVIEW

Knewton technology is designed to improve outcomes and ensure that no student slips through the cracks. Knewton provides in-application content recommendations to students; inferred, predictive learning analytics to help students plan their studies and to help teachers better manage the classroom (positioning them to thoughtfully intervene where needed most); and content insights to publishers, which provide visibility into how well pieces of content are contributing to learning outcomes.

PLATFORM

A platform that works with publishers and other educational content providers and that does not generally sell to postsecondary institutions/faculty

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores*
- Faculty can override the courseware's "gatekeeping"*
- Faculty can assign individual students different assignments*
- Other: Knewton.com, a direct-to-consumer product, allows instructors to bring their own content, which can ultimately be incorporated into the adaptive flow

* Note: This functionality does not apply to all Knewton partner products

McGraw Hill LearnSmart™

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Content is generated by a team of highly vetted subject matter experts and is based on market-leading commercial texts.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Instructional Design/Course Development Services

INTEGRATION
Working toward LTI 2.0 support

COLLABORATION
Student-to-Student

OVERVIEW

LearnSmart aims to assist students in achieving true concept learning and retention. LearnSmart constantly reassesses students' progress to pinpoint knowledge gaps, adjust objectives, and map out a personally tailored instructional path. The tool then adjusts the learning content based on students' knowledge strengths and weaknesses, as well as their confidence level around that knowledge.

PLATFORM*

Off-the-shelf courseware, pre-loaded with content that cannot by modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ——————— MEDIUM ——————— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores*
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can resequence content
- Other: Faculty can control the depth with which the content is assessed for mastery

* In Summer 2015, through the work of its Learning Science Platforms initiative, McGraw-Hill launched and is now actively piloting features that enable incorporation of third-party content within the LearnSmart platform.

LoudCloud

Understand behaviors. Improve learning.™

OVERVIEW

LoudCloud is designed to improve learning outcomes and to allow students to learn more quickly and efficiently. In March 2016, LoudCloud was acquired by Barnes & Noble Education.

PLATFORM

An authoring platform upon which institutions/faculty can create customized courses

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———————— MEDIUM ———————— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can create customized learning pathways based on assessment inputs and behavioral inputs

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PRODUCT LAUNCHED
2014

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Standards-aligned content, OER, real-time media, teacher lesson plans, and premium publisher content

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, Instructional Design/Course Development Services

INTEGRATION
LTI, SCORM, Common Cartridge

COLLABORATION
Student-to-Student, Student-to-Faculty, Faculty-to-Faculty, Embedded discussion boards tied to specific pieces of content, Course discussion board for faculty and students

PRODUCT LAUNCHED
2002

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Newly developed content, OER, pre-existing author materials, and external pre-developed learning activities

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Instructional Design/Course Development Services

INTEGRATION
LTI 1.1 Tutor Message Format 1.0

COLLABORATION
Faculty-to-Faculty, Platform does not directly facilitate collaboration but can incorporate third-party technologies that do (e.g., Knowledge Forum for collaborative knowledge building, DANCE for collaborative discussion/chat)

OVERVIEW

Open Learning Initiative (OLI) is designed to support not-for-profit higher education in collaborative improvement of teaching and learning as a community-based research activity. The OLI platform supports a science-based approach to the development, delivery, and improvement of courseware, embedding learning science principles; using rich data to drive feedback loops to learners, instructors, course developers, and scientists; and supporting the exploration of new questions and challenges in learning science.*

PLATFORM

Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— (HIGH)

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can include, exclude, and restructure content at the module level
- Other: Faculty can create custom courses by incorporating content from multiple course/domain offerings (e.g., combining subset of modules from psychology and statistics to create an educational research methods course)

* The Open Learning Initiative (OLI) was founded in 2002 at Carnegie Mellon University. In September 2013, the OLI Founding Director moved to Stanford University and founded OLI at Stanford. OLI at Carnegie Mellon University and OLI at Stanford are distinct organizations working toward a shared mission through collaboration on various projects and shared content.

Realize it
Powering intelligent pathways to mastery

OVERVIEW

Realizeit helps institutions improve student engagement and achievement by enabling individualized learning, adaptive teaching, and institutional effectiveness through its comprehensive learning measurement system. Realizeit is being used to address a variety of challenges in areas such as learning analytics, competency-based education, high school completion, college readiness, persistence, college completion, and academic effectiveness

PLATFORM

An authoring and delivery platform with instructional design services that will work with an institution to create and deliver adaptive offerings

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Observed effectiveness of learning modality for the individual

FREQUENCY OF ADAPTIVITY:

LOW ——— MEDIUM ——— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can choose competencies and learning objectives, add specific question templates, design assessments, upload learning material, and build rubrics, etc.
- Other: Faculty can plan lessons, decide on sequencing, and create tests and quizzes

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PRODUCT LAUNCHED
2011

INSTRUCTION COVERAGE
Whole Course or Supplemental (Traditional or Competency)

COURSES
Any and All Course Types: Content-agnostic capabilities

CONTENT SOURCE
An institution's native content, open-source content, publisher content, and content from students and third parties. The system also integrates interactive media of all kinds, including Unity 3D interactions, virtual reality systems, and different widget-based assets.

PROFESSIONAL SERVICES
Instructional Design and Consulting, Course Development Services, Training Services, Technology Integration Services, Research Services

INTEGRATION
SCORM (2004), Common Cartridge 1.1.0 & 1.2.0, QTI, LTI 1.1 (covering 1.0), oAuth, ePub 2.0, API

COLLABORATION
Student-to-Student, Student-to-Faculty, Embedded discussion boards tied to specific pieces of content

Sherpath

PRODUCT LAUNCHED
2015

INSTRUCTION COVERAGE
Whole Course or Supplemental

COURSES
Nursing, Allied Health

CONTENT SOURCE
Elsevier

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/ Course Development Services

INTEGRATION
LTI 1.0, 1.1, 1.2 & 2.0, Caliper 1.0, QTI

COLLABORATION
Student-to-Student
Faculty-to-Student

OVERVIEW

Sherpath is a digital first, mobile responsive teaching and learning solution developed specifically for health science education. It allows instructors to spend more time on teaching by reducing the complexity of designing, managing, and delivering course content and materials, while providing insight into where students need help. Sherpath helps students to become more organized, increases engagement, and allows them to more efficiently learn, accommodating both experiential and didactic learning. Sherpath personalizes instruction and helps health science students, particularly underperforming and non-traditional students, successfully achieve improved learning outcomes.

PLATFORM

Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Personalized to individual instructor's course objectives

FREQUENCY OF ADAPTIVITY:

LOW —————— MEDIUM —————— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can select lesson objectives, including in-class activities or case studies, and resequenced learning modules through a drag-and-drop interface"
- Other: Faculty can select lesson objectives, including in-class activities or case studies, and resequence learning modules through a drag-and-drop interface

SMART SPARROW

OVERVIEW

Smart Sparrow is a learning design platform for adaptive courseware. Users create engaging and adaptive learning experiences that utilize active learning pedagogy, and then continuously improve them using analytics. With Smart Sparrow, faculty are in control and students are better supported and more motivated to succeed.

PLATFORM

A platform and learning design service that works with an institution/faculty member to create a customized offering

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can change rules that drive adaptivity

PRODUCT LAUNCHED
2012

INSTRUCTION COVERAGE
Whole Course or Supplemental

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Faculty either create content using Smart Sparrow or import ii from a variety of sources. Any content that runs in a browser can be brought into the platform.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Online or Phone Student Support, Technology Integration Services, In-Person Professional Development, Instructional Design/ Course Development Services

INTEGRATION
LTI

COLLABORATION
Student-to-Student, Faculty-to-Faculty, Embedded discussion boards tied to specific pieces of content, Course discussion board for faculty and students

Snapwiz™

OVERVIEW

Snapwiz's learning platform empowers educators (publishers, administrators, and teachers) to personalize students' learning experience. Snapwiz's vision of personalized learning includes the ability to offer advanced levels of interaction (socially engaging content and tech–enhanced items), collaboration with peers and instructors, adaptive recommendations, and longitudinal reporting on student performance.

PLATFORM

An adaptive and collaborative learning platform that works with publishers and other educational content providers

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content
- Other: Learning rate of the student

FREQUENCY OF ADAPTIVITY:

LOW ——————— MEDIUM ——————— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: Faculty can deviate from the recommended lesson plan by removing or adding instructional content or assessment content

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PRODUCT LAUNCHED
2011

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Publishers (ePub, QTI content), premium content from publishers, and OER content.

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, In-Person Professional Development

INTEGRATION
LTI 1.2

COLLABORATION
Student-to-Student, Student-to-Faculty, Embedded discussion boards tied to specific pieces of content, Course discussion board for faculty and students

lumen

OVERVIEW

Waymaker is designed to address affordability issues in postsecondary education, completion rates, the problematic trend of eliminating teacher-student interaction in personalized/adaptive courses, and problems with the way traditional approaches to adaptive learning prevent students from developing learning-to-learn (metacognitive) skills.

PLATFORM

Off-the-shelf courseware, pre-loaded with content that can be modified by an institution/faculty member

LEARNER PROFILE

Inputs that influence adaptive capabilities

- Learner confidence level/self-assessment
- Time to complete learning exercises
- Performance on questions within the learning objective
- Learning style preference
- Mastery of prior learning objective(s)
- Past performance of students with a similar learner profile
- Elapsed time since last interaction with relevant content

FREQUENCY OF ADAPTIVITY:

LOW ———— MEDIUM ———— HIGH

FACULTY CUSTOMIZATION

- Faculty can add content/questions from outside the courseware
- Faculty can set/override the courseware's grading scale/scores
- Faculty can override the courseware's "gatekeeping"
- Faculty can assign individual students different assignments
- Other: All content is openly licensed and can be both resequenced and edited at the individual word level

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PRODUCT LAUNCHED
2015

INSTRUCTION COVERAGE
Whole Course

COURSES
Any and All Courses:
Content-agnostic capabilities

CONTENT SOURCE
Pre-existing OER, newly created simulation and other OER content, and premium video content from the BBC relicensed as OER

PROFESSIONAL SERVICES
Online or Phone Faculty Support, Technology Integration Services, In-Person Professional Development, Instructional Design/Course Development Services, Additional Training Services

INTEGRATION
LTI 1.1+, Common Cartridge 1.2 (specifically "Thin CC")

COLLABORATION
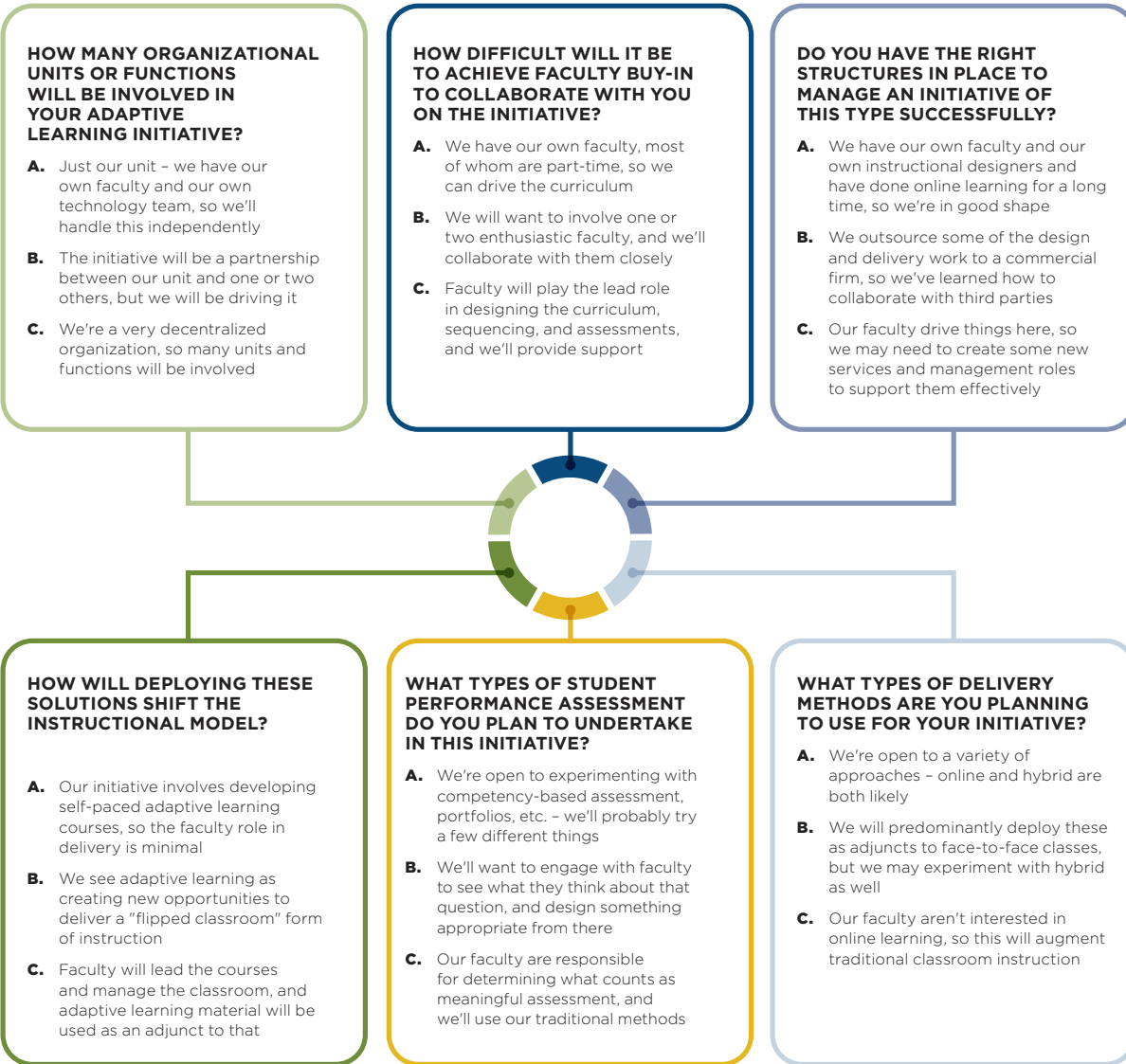Student-to-Faculty, Tools to help faculty identify students who need help

APPENDIX 1:

"A FRAMEWORK FOR INSTITUTIONAL DECISION MAKING"
(EXCERPT FROM OUR 2012 STUDY)

The following is taken from "Learning to Adapt: Understanding the Adaptive Learning Supplier Landscape."

The oft-cited mantra "Context is king" applies well to the adoption and implementation of adaptive learning by higher education institutions. As colleges and universities investigate adaptive learning, a thoughtful self-appraisal of key operating and instructional characteristics should shed light on which approach might best align with the institutional milieu and improve chances for successful implementation.

The chart on the next page offers a series of detailed questions in six core areas that aim to reveal an institution's decision-making character, ranging from "Autonomous" to "Collaborative" to "Highly Interdependent." What distinguishes these categories from one another is the way in which authority is distributed within a given organization. Understanding which model of authority and decision making predominates at your institution can assist you in considering how organizational complexity may open or foreclose certain types of adaptive learning approaches.

PLEASE CHOOSE THE RESPONSE THAT MOST CLOSELY MATCHES THE CONDITIONS FOR YOUR ADAPTIVE LEARNING INITIATIVE.

HOW MANY ORGANIZATIONAL UNITS OR FUNCTIONS WILL BE INVOLVED IN YOUR ADAPTIVE LEARNING INITIATIVE?

A. Just our unit – we have our own faculty and our own technology team, so we'll handle this independently

B. The initiative will be a partnership between our unit and one or two others, but we will be driving it

C. We're a very decentralized organization, so many units and functions will be involved

HOW DIFFICULT WILL IT BE TO ACHIEVE FACULTY BUY-IN TO COLLABORATE WITH YOU ON THE INITIATIVE?

A. We have our own faculty, most of whom are part-time, so we can drive the curriculum

B. We will want to involve one or two enthusiastic faculty, and we'll collaborate with them closely

C. Faculty will play the lead role in designing the curriculum, sequencing, and assessments, and we'll provide support

DO YOU HAVE THE RIGHT STRUCTURES IN PLACE TO MANAGE AN INITIATIVE OF THIS TYPE SUCCESSFULLY?

A. We have our own faculty and our own instructional designers and have done online learning for a long time, so we're in good shape

B. We outsource some of the design and delivery work to a commercial firm, so we've learned how to collaborate with third parties

C. Our faculty drive things here, so we may need to create some new services and management roles to support them effectively

HOW WILL DEPLOYING THESE SOLUTIONS SHIFT THE INSTRUCTIONAL MODEL?

A. Our initiative involves developing self-paced adaptive learning courses, so the faculty role in delivery is minimal

B. We see adaptive learning as creating new opportunities to deliver a "flipped classroom" form of instruction

C. Faculty will lead the courses and manage the classroom, and adaptive learning material will be used as an adjunct to that

WHAT TYPES OF STUDENT PERFORMANCE ASSESSMENT DO YOU PLAN TO UNDERTAKE IN THIS INITIATIVE?

A. We're open to experimenting with competency-based assessment, portfolios, etc. – we'll probably try a few different things

B. We'll want to engage with faculty to see what they think about that question, and design something appropriate from there

C. Our faculty are responsible for determining what counts as meaningful assessment, and we'll use our traditional methods

WHAT TYPES OF DELIVERY METHODS ARE YOU PLANNING TO USE FOR YOUR INITIATIVE?

A. We're open to a variety of approaches – online and hybrid are both likely

B. We will predominantly deploy these as adjuncts to face-to-face classes, but we may experiment with hybrid as well

C. Our faculty aren't interested in online learning, so this will augment traditional classroom instruction

FOR EACH ANSWER, SHADE IN AN APPROPRIATE BOX AND COMPARE RESULTS ON THE NEXT PAGE.

AUTONOMOUS

A
A A
A A A

COLLABORATIVE
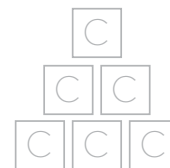
B
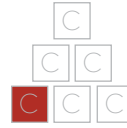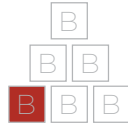B B
B B B

HIGHLY INTERDEPENDENT

C
C C
C C C

READING THE RESULTS

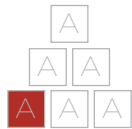**AUTONOMOUS** COLLABORATIVE HIGHLY INTERDEPENDENT

Benefits
Broad freedom to explore a diversity of adaptive learning models for students

Challenges
Operating as a silo means that adaptive learning successes may not transfer to the broader campus environment
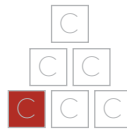

AUTONOMOUS **COLLABORATIVE** HIGHLY INTERDEPENDENT

Benefits
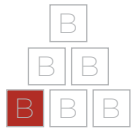Some flexibility to explore adaptive learning options, coupled with buy-in among key players across organizational functions

Challenges
Risk of low organizational ownership and potential for long delays in execution of plans

AUTONOMOUS COLLABORATIVE **HIGHLY INTERDEPENDENT**
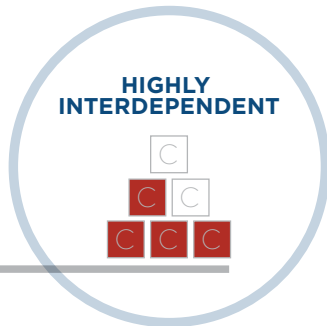
Benefits
Potential for stronger adaptive learning buy-in and more profound impact in core areas

Challenges
Adoption and implementation may well take longer to achieve, given the deliberative decision-making process

This self-assessment can be used to facilitate important discussions to inform an institution's consideration of adaptive learning models and can make the evaluation of prospective suppliers more productive.

APPENDIX 2:

USING TYTON PARTNERS' TAXONOMY TO MAKE PRODUCT SELECTIONS

The following product taxonomy has been updated from our 2012 study to reflect changes in the supplier landscape. It includes six attributes that illustrate pedagogical components of an adaptive learning solution. For illustrative purposes, we have included references to notable suppliers featured in our research (see "Understanding the 2016 Supplier Landscape").

ADAPTIVE TAXONOMY OVERVIEW

LEARNER PROFILE

| Student data informs initial placement | Student data drives adaptivity during a learning sequence | Student data is dynamic following each adaptive experience |

UNIT OF ADAPTIVITY

| Course prerequisite level | Unit/lesson level | Learning object level |

ASSESSMENT

| Infrequent/Benchmark | Formative | Adaptive/Continuous |

CONTENT MODEL & CUSTOMIZATION

| Closed, with some configurability | Authoring capability offered as a service | Open, with authoring platform |

INSTRUCTION COVERAGE

| Targeted study aid | Supplemental instruction | Whole course |

DOMAINS OF LEARNING

| Understanding/Remembering | Analyzing/Applying | Creating/Evaluating |

COLLABORATION

| Student ←→ faculty collaboration | Peer to peer and discussion boards | Suite of collaboration tools |

SERVICES

| Tactical remote support only | Instructional design or tech integration support | In-person faculty professional development and change management |

- **Learner Profile** is a structured repository of information about the learner that is used to inform and personalize the learning experience. For example, **CogBooks** uses a variety of inputs to develop learner profiles, such as the time spent to complete learning exercises and the past performance of students with a similar profile.

- **Unit of Adaptivity** refers to the structure of the instructional content and the frequency and scale at which that content is modified for specific learner needs. For example, **Knewton** and **Snapwiz** both feature a high frequency of adaptivity as learners engage with their products.

- **Assessment** is the frequency, format, and conditions under which learners are evaluated.

- **Content Model and Customization** describes the nature of the product's authoring environment to instructors or other users, and instructors' ability to add or manipulate instructional content in the system.

- **Instruction Coverage** refers to the pedagogical flexibility of a product to deliver an adaptive learning experience and the scope/scale of that experience within the context of a course.

- **Domains of Learning** (previously referred to as Bloom's Coverage) highlights to what extent a product can support the learning objectives within the Cognitive Domain of Bloom's Taxonomy.

- **Collaboration** describes the use of discussion boards and direct communication between and among students and faculty, which fosters engagement and allows faculty to intervene directly with struggling students. For example, **Fishtree's** product offers a suite of collaboration tools, including embedded discussion boards tied to specific pieces of content and context-based messaging for use between faculty and students.

- **Services** describes the nature and scope of engagement between institutional stakeholders and suppliers.

As institutional stakeholders progress through their review and evaluation process for adaptive learning solutions, our taxonomy provides a framework to help them make informed choices based on today's product norms and evolutions.

ACKNOWLEDGMENTS

BIOGRAPHIES

ADAM NEWMAN, *Managing Partner*

Adam Newman is a co-founder of Tyton Partners and has more than 20 years of experience in strategy consulting, market research, and investment banking supporting the education sector. Adam began his professional career as a K–12 educator and athletic coach at schools in Boston, MA, and New Orleans, LA.

GATES BRYANT, *Partner*

Gates Bryant is a general manager and strategy consultant with a successful 15-year track record of bridging the gap between innovative strategy and practical execution, while serving in various strategy, product management, and operational roles in the education market. He joined Tyton Partners as a partner in 2011.

BRIAN FLEMING, *Principal*

Brian Fleming is a principal in Tyton Partners' strategy consulting practice. With more than 10 years of experience, Brian has held numerous teaching, administrative, and leadership roles across all segments of the education sector. He joined Tyton Partners in 2015.

LAURA SARKISIAN, *Associate*

Laura Sarkisian joined Tyton Partners as an associate in 2014 to concentrate on supporting growth within the education sector. Her background is focused in finance and economics and includes research on the affordable housing and healthcare markets.

ABOUT TYTON PARTNERS

Tyton Partners, formerly Education Growth Advisors, is the leading provider of investment banking and strategy consulting services to the global knowledge sector. Built on the tenets of insight, connectivity, and tenacity, Tyton Partners leverages in-depth market knowledge and perspective to help organizations pursue solutions that have lasting impact.

As an evolved advisory services firm, Tyton Partners offers a unique spectrum of services that supports companies, organizations, and investors as they navigate the complexities of the education, media, and information markets. Unlike most firms, Tyton Partners understands the intricacies and nuances of these markets and plays an integral role in shaping the efforts that drive change within them. The firm's expertise is predicated on its principals' years of experience working across market segments – including the preK–12, postsecondary, corporate training, and lifelong learning sectors – and with a diverse array of organizations, from emergent and established private and publicly traded companies, to non-profit organizations, institutions, and foundations, to private equity and venture capital firms and other investors.

Tyton Partners leverages its deep foundation of transactional and advisory experience and an extensive global network to make its clients' aspirations a reality and catalyze innovation in the sector.

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