



**The Future of Ed Tech Starts Here:
Identifying and Understanding Pragmatic Trends
in the Application of Technology to Improve
Learning Impact**



Analysis of the 2016 Learning Impact Award Winners



IMS GLOBAL[®]
Learning Consortium
Better Learning From Better Learning Technology

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Executive Summary

“Even though the future seems far away, it is actually beginning right now.”¹
This sentiment aptly describes [IMS Global Learning Consortium’s](#) (IMS Global) annual [Learning Impact Awards \(LIA\) competition](#). Technology continues to offer possibilities to enhance education’s future, providing the means—platforms, applications, tools, and devices—to create engaging, collaborative, and personalized learning experiences designed to improve student outcomes. But technology is just a tool. How technology is used to enable effective teaching and learning is what turns these possibilities into progress.

The annual LIA competition and this subsequent report are designed to help the education community assess the landscape of technology innovations and potential for learning impact. Since its inception in 2007, the LIA competition has generally been 3–5 years ahead of mainstream adoption of educational technology trends, showcasing leading edge, innovative solutions and their potential impact on the educational landscape. Through this work, IMS Global discerns groundbreaking education technology trends, compiling them into its Learning Impact Trend framework (Appendix A) through analysis of LIA finalists.

Each LIA entry aligns to at least one Learning Impact Trend category (Fig. 1) thus showcasing present day examples of these forward looking trends. This report takes the next step by exploring their potential learning impact for the education community.

Through analysis of the 2016 LIA entries, the Learning Impact Leadership Institute program tracks, and the ongoing work of IMS Global, the following five themes deserve highlighting:

Faculty Adaptive Digital Curriculum Enables Teachers to Easily Customize Curriculum as Learner Needs Evolve

Today’s teachers and students are no longer locked into inflexible courses and curriculum. Digital curriculum and associated tools that enable teachers to easily and dynamically customize content delivery to support specific learner needs, e.g., to reinforce a difficult concept or to support a different teaching approach, are emerging. Aligned with the competition’s Digital Resource, e-Text, and Learning App Innovation Impact Trend, 2016 LIA medalists [Florida Virtual School](#), [Santillana USA](#), and [QuaverMusic.com/Paradise Valley Unified School District](#) illustrate how faculty can adapt digital content to enhance student learning and progress.

Addition of Third Party Assessments Decoupled from the Learning Content Enable Adaptive Learning Scenarios Across Multiple Products to be Realized

Addressing learner needs in a classroom situation can be a challenging proposition, especially when knowledge levels vary significantly. While “self-contained” adaptive

¹ Quote by poet, Mattie Stepanek

learning software continues to grow, the use of third-party formative assessment addresses this issue by sequencing each learner's course content based upon his/her performance information. Aligned with the Adaptive Learning, Online Homework, and Formative Assessment Learning Impact Trend, three LIA entries [McGraw Hill Education/Lone Star College - North Harris](#) (a 2016 medalist), [Universitat Oberta Catalunya](#), and [University of Texas-Austin Learning Science](#) improved learner performance by creating self-paced, mastery-based learning environments with adaptive learning and assessment.

Learning Analytics Focuses on Acting on Student Behaviors in Their Use of Digital Tools and Applications

Learner interactions with technology-based learning tools, applications, and platforms produces an assemblage of data, while learning analytics analyzes these data for insights to improve student success. As the Learning Analytics field continues to evolve, today's high impact implementations are focused primarily on tracking learners' in-class use of digital products to gauge a lesson's effectiveness and to guide teacher's actions and/or recommend personalized resources. Three finalists, [KERIS](#), [Northern Beaches Secondary College](#), and [the University of Kentucky](#), align with the Learning Analytics Learning Impact Trend and present different ways of using learners' technology-related behavioral data to improve their learning experience.

Effective Digital Content Curation Fosters Dramatic Gains in K-12 Content Utilization

Multiplying third-party and internally created K-12 digital content resources can create organizational and access issues for school districts and teachers, as it can be hard to combine these disparate pieces into a course and access them all during a class. Integrating a standards-based digital content curation solution with a classroom system resolves this problem by creating a single, user-friendly access point to create and select curated digital content and tools. Four finalists, [Kennisnet](#), [Montgomery Public Schools](#), [Newton Public Schools](#), and [North East Florida Educational Consortium](#), demonstrate the academic benefits of tying together discrete educational technologies. All align with the Integrated Digital Curriculum and Formative Assessment to Enable Student-Centered Learning Impact Trend.

Next Generation Institution-wide App Platforms Are Emerging

While the Learning Management System has been the "owner" of course-based interactions and tool integrations for many years now, we are now experiencing a new generation of platforms that integrate applications at the institutional level. Aligned with the Educational Application, Content, and Media Infrastructure Learning Impact Trend, medalist [Classlink/Jeff Davis County Schools](#) and finalist [Deakin University](#) demonstrate the time and cost benefits derived from the integration of institution-wide apps into the learning infrastructure.

Other Notable Entries Create New Student Learning Experiences

The remaining 2016 LIA entries, including medalists [Western Sydney University, School of Nursing and Midwifery](#), [Career Education Corporation](#), and [DET Victoria](#), align with various Learning Impact Trends and showcase education technology’s broad impact on the student experience by enhancing student accessibility with blended learning and digital learning networks; create engaging, collaborative learning environments; and/or improving student success through digital assessment, digital credentialing, and student preparedness.

Each of the above highlights represent an evolution of some of the Learning Impact Trends summarized in Figure 1, and each year’s LIA competition demonstrates this evolution. The latest categories and their definitions are outlined in the Learning Impact Trend Framework Categories table (Appendix A).

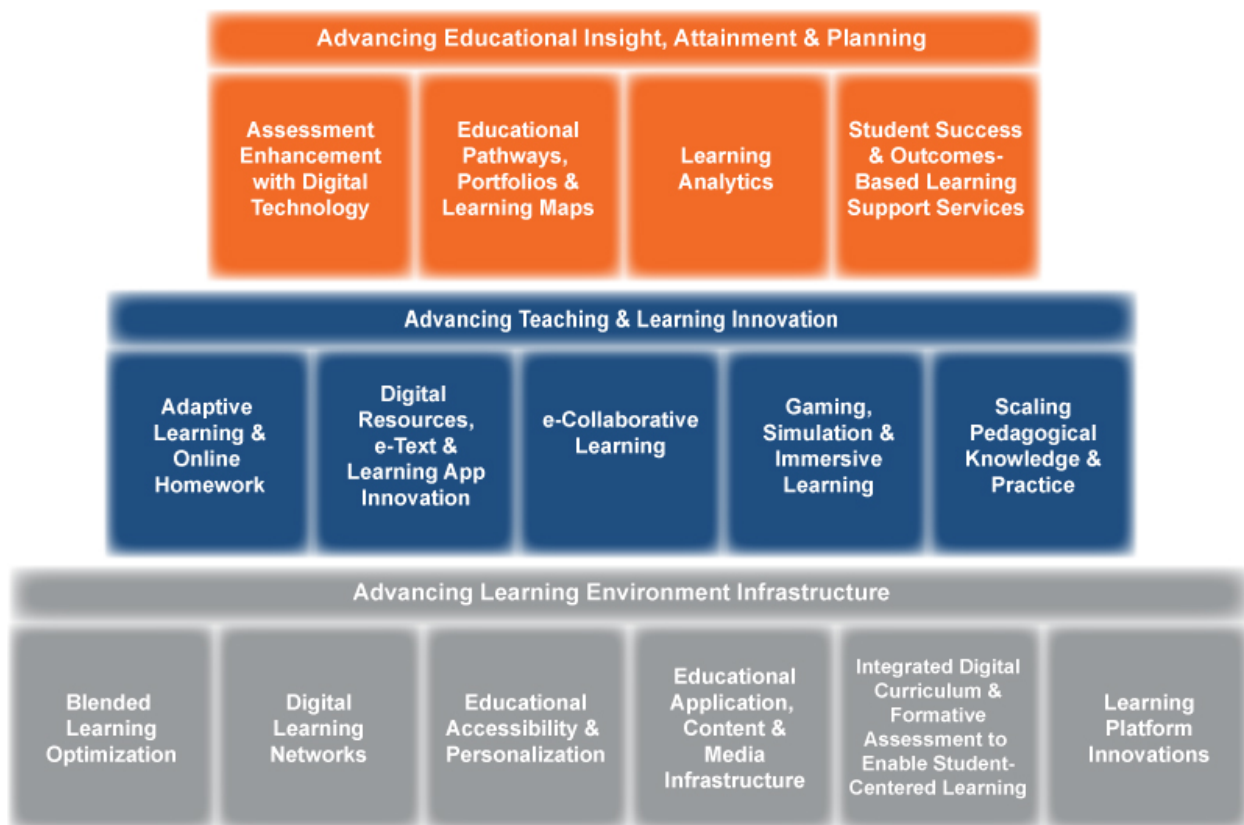


FIGURE 1. LEARNING IMPACT TREND FRAMEWORK CATEGORIES

The [2017 LIA entry submission](#) process opens in early January 2017; closes on February 20, 2017; with medalists chosen at the Learning Impact Leadership Institute, May 16-19, 2017 in Denver, Colorado.

2016 LIA Finalists: Present Day Examples of Forward Thinking Trends

IMS Global’s annual [Learning Impact Awards Program](#) is conducted on a global scale to recognize outstanding, innovative applications of educational technology to address significant educational challenges. Regional winners, along with other finalists selected by LIA evaluators, all advance to the final round of competition, which is held in conjunction with the annual Learning Impact Leadership Institute. Evaluators assess LIA entries based on the use of technology in an educational institution context, using eight Learning Impact [evaluation criteria](#), as illustrated in Figure 2. The platinum, gold, silver, and bronze medalists are announced at the Leadership Institute.



FIGURE 2. LEARNING IMPACT AWARD EVALUATION CRITERIA

Analysis of the 2016 LIA entries shows these five distinct education technology solution themes:

Faculty Adaptive Digital Curriculum Enables Faculty to Easily Customize Curriculum as Learner Needs Evolve

Education technology provides teachers with an increasing array of innovative course design options, as these 2016 LIA entries show. Aligning with the Digital Resource, e-Text, and Learning App Innovation Learning Impact Trend, these medalists illustrate the wide variety of available external content, access, and delivery solutions that enable teachers to calibrate customized curriculum with learning outcomes. Some entries focus on dynamic course content; others deliver entire courses. Some focus on a single subject area; others offer a broad selection.

Teachers may incorporate their own content to varying degrees, depending upon the solution. But all provide innovative ways to use content effectively to enhance student learning.



[unLOcked by Florida Virtual School \(FLVS\)](#)

[New/Research Projects]



Learning Impact Trend: Digital Resource, e-Text, and Learning App Innovation

Issue: Florida Virtual wanted to open access to tens of thousands of online FLVS K-12 standards-aligned lessons, while retaining control of the publishing mechanism and copyright, and to do so in a way that districts and teachers can adapt content to specific curriculum and student learning needs.

Solution: With unLOck FLVS, content is no longer locked into a prescribed sequence; teachers can reorder, remix, and mash-up content for use in the way they or their school sees fit in any LMS. It enables dynamically controlled content delivery and course features, allowing for customized in-content navigation, removal of numbering and lesson sequencing, delivery of state specific content, a cleaner look and feel, and the enablement of personal curriculum plug-ins within the content. unLOck is LTI[®] and Thin Common Cartridge[™] compliant, so it works with virtually any learning platform, enabling schools to leverage their LMS adaptive technology, and thus eliminating the need for third-party expensive adaptive engines. Schools can use FLVS content in these systems as a backbone, then enhance the content with open resources, making the experience seamless for the learner in his/her LMS.

Learning Impact: UnLOck has reduced FLVS's development costs for state specific deployment upwards of 66%, resulting in equated savings of \$360,000 in the first six months of deployment.

"This new dynamic of a learning object repository enabled FLVS to distribute content worldwide while retaining confidence and control over usage and copyright. UnLOck allows teachers to pivot learning around the student, rather than the student pivoting around sequence-locked content." –Florida Virtual School 2016 LIA Submission



[Personalized Spanish Class Experience](#) by Santillana USA [Established Projects]



Learning Impact Trend: Digital Resource, e-Text, and Learning App Innovation

Issue: Español Santillana offers a turnkey, flexible online Spanish course. Its customizable content and IMS-compliant LMS compatibility enables districts, schools, and teachers to adapt the course as required to suit their learning situation and outcomes.

Solution: Español Santillana, Santillana USA's Spanish e-learning resource, is available through Wicco, a CMS that enables teachers to customize their class experience with the materials and tools within an easy to use single environment. Wicco is Common Cartridge® compliant, so it channels the distribution of educational content in a simple, fast, and universal way, and it gathers all digital content in the education industry in one place and makes them available in any IMS-compliant LMS. The content is presented as small packages, so teachers can easily select what to use in class, discard any unwanted elements, or integrate Santillana resources with their own created content. Español Santillana includes e-books, workbooks, interactive activities, editable assessments, teacher resources including teacher guides, lesson plans, gradebooks, and a teacher dashboard that displays questions, student answers, grades, and attempts. The assessments and the teacher dashboard in the LMS grade book are seamlessly connected.

Learning Impact: Customizable content and plug and play system integration help spur Español Santillana's U.S. adoption to 125,000 active users and 5,000 courses in the first year of launch.

"Español Santillana is an All-in-One solution: LMS + CMS + Metrics + Assessment Generator + Content + Training + Reliable Service + Outstanding Technical Support, at no extra cost. And if teachers are using their normal LMS, a nearly nonexistent learning curve allows them to start teaching from the very first day. Teachers can enjoy a completely open program that combines powerful instructional materials, teachers' own content, and easy use by students." –Santillana USA's 2016 LIA Submission



[Music Education Content Delivery and Learning Platform](#) by QuaverMusic.com and Paradise Valley Unified School District [Established Projects]



Learning Impact Trend: Digital Resource, e-Text, and Learning App Innovation

Issue: Paradise Valley Unified School District’s music program needed an affordable, accessible, and scalable solution to address expanding class sizes and shrinking budgets.

Solution: Paradise Valley Unified School District opted for a cloud-based solution—QuaverMusic.com—that delivers standards-based content for students to use in a variety of learning situations. Teachers customize their lessons to respond to specific learner needs. Examples of customizations include launching classroom presentations via a computer or an interactive white board and assessing student comprehension and posting grades to a digital grade book automatically. Quaver Music.com is compatible with common standards like LTI®, Common Cartridge®, and OneRoster™, and supports single sign-on integration using Clever and SAML (Security Assertion Markup Language) and other technologies.

Learning Impact: The percentage of teachers who rated Quaver’s impact as “excellent” or “very good” in a pre-and-post school survey: coverage of state/national standards: 96%; positive student response to program: 87%; positive response to program from special needs students: 73%; and impact on teacher lesson planning: 91%. The Paradise Valley Unified School District purchased projectors and interactive whiteboards for their music classrooms with the money saved from by using QuaverMusic.com.

“Teachers use the time saved by Quaver.com to focus on innovative instruction, enhanced student learning, and the joy and fun of making music in the classroom.”
–QuaverMusic.com and Paradise Valley Unified School District 2016 LIA Submission

Addition of Third Party Assessments Decoupled from the Learning Content Enable Adaptive Learning Scenarios Across Multiple Products to be Realized

These 2016 LIA entries align with the Adaptive Learning, Online Homework, and Formative Assessment Learning Impact Trend; and use assessment to create self-paced, mastery-based, and/or continuous feedback learning environments for students and to provide progress information for teachers.



[New ALEKS Student Module by McGraw Hill Education and Lone Star College – North Harris \[New/Research Projects\]](#)



Learning Impact Trend: Adaptive Learning, Online Homework, and Formative Assessment

Issue: Student engagement and learning in large groups can be problematic, especially when students exhibit vastly different prior knowledge of the same course material. Advanced students may become bored, while struggling students may experience anxiety trying to keep up.

Solution: ALEKS (**A**ssessment and **L**earning in **K**nowledge **S**paces) provides individualized student instruction in grades 3-12 and higher education math and chemistry with its artificial intelligence-based, online, adaptive assessment and learning program. Students complete an Initial Knowledge Check to determine what they know, don't know, and are ready to learn next. Results are displayed in a pie chart, and students work through learning the course material efficiently—easiest topics are queued up first. As students 'learn' topics within their individualized learning paths, they must demonstrate complete 'mastery' periodically throughout the learning experience. ALEKS functions as a software as a service model, accessible on tablets and personal computers with internet access, and supports adoption in a single classroom adoption, an entire institution adoption, or state-wide adoption. It can be integrated with learning management systems using LTI[®] v1.0 or v1.1.

Learning Impact: Available in English and Spanish, ALEKS is aligned with the Common Core State Standards, individual state standards, and instructor-driven learning objectives. ALEKS is used by millions of students and instructors in grades 3 through higher education for math and chemistry in the U.S. and internationally.

"Based on extensive research primarily with the students, we have created an adaptive, online learning environment that engages students and presents them with learning moments optimized to each student's individualized knowledge. Research with instructors and educators helped to round out the New ALEKS Student Module learning experience to address pedagogical best practices, standards, and market-driven requirements. However, the focus of the New ALEKS Student Module is on students and helping them achieve dramatic learning outcomes in their current course, as well as a strong foundational knowledge for future courses." –McGraw-Hill/Lone Star College-Harris 2016 LIA Submission

[Universitat Oberta de Catalunya \(UOC\)](#)'s Mobile App Ecosystem is set of interconnected mobile apps for anytime/anywhere course assessment. Students submit their work and receive teacher feedback and test scores with the Submissions App; teachers download tests and send reviewed tests and feedback through the Assess App; and record video, voice, and text annotations on top of the students' work PDFs with the Explica! App. The Mobile App Ecosystem works across the different classrooms and subjects, and does not require learner training since it utilizes UOC's web-based LMS user interface. Now students and teachers are able to perform their continuous assessment related tasks from any mobile device.

[University of Texas at Austin - Learning Sciences Department and D2L's Brightspace LeaP](#) created Pharmacy Adaptive Learning (PAL) to equalize incoming University of Texas Doctor of Pharmacy students' knowledge for first semester biochemistry, anatomy, and biopharmaceutics courses. PAL's LeaP adaptive learning engine assesses students' knowledge and gears them to appropriate content. It is deployed as an LTI® integration with the University's Canvas platform and imports assessment items in QTI® format. Over time, as more students complete paths through the content, the LeaP engine evolves to deliver content sequences that have been identified as being more effective. PAL students exhibited significant differences in performances of those who did not participate in the program. This entry aligns with Adaptive Learning and Online Homework Learning Trend.

Learning Analytics Focuses on Acting on Student Behaviors in Their Use of Digital Tools and Applications

Today's technology-based learning environment creates a plethora of data that can be used to understand student behavior, evaluate resource effectiveness, and to improve teaching and learning. These three finalists present ways to harness student behavioral data through learning analytics, and align with the Learning Analytics Trend.

The proof-of-concept entry from [KERIS, University of Seoul, and Intercode](#) aims to tackle the problem of learning analytics interoperability. Today's learning environment generates data from different activities and resources, making it hard to gather learning data in a systematic way and to develop an appropriate learning pathway with digital resources at a specific point in time for learners. This entry aims to resolve this problem through independent Lego-like blocks of processes, e.g. data capture, data storing and filtering, analysis, visualization (or reporting) and recommendation that can work together via open frameworks like Caliper Analytics®, open specifications like xAPI, and open source software like Hadoop. The group is piloting the concept currently at a university as well as a STEM program at primary schools.

[LearnMeter and Northern Beaches Secondary College's SchoolViewer](#) provides a "bottom up" refinement of teaching, where teachers access real time class learning analytics, such as student engagement, attention span, distractibility, and real time resource use. Teachers can instantly see whether or not the lesson plan is encouraging students to move through the subject matter and can adjust their teaching resources and learning design accordingly. SchoolViewer's dashboard and

reports help teachers and administrators understand students learning behaviors in a digital environment and provide objective data to make evidence based decisions about improvements to education methodology. LearnMeter is working with world-leading researchers to ensure that SchoolViewer data is useful to teachers, and that the information is academically validated with sound learning analytics theories. SchoolViewer has already been implemented in research projects to significantly reduce the amount time and effort required to gain research data.

[Echo360 and University of Kentucky](#) created an integrated teaching learning platform that delivers lecture capture, formative assessment, collaboration, engagement, content management, and delivery over an analytic backbone measuring behaviors and enabling the optimization of teaching and learning experiences over time. At the heart of Echo 360 is live-streaming behavioral data points to analyze teaching and learning sessions and present students and faculty with "in the moment" and personalized suggestions to improve learning. In addition, it integrates students' real time student engagement data with more traditional sources like an LMS, data analytics platform, and CRM to identify at risk students and more effective content, tools, and teaching techniques. Echo360 leverages LTI® integration and the developing Caliper Analytics® framework. Research evidence suggests active learning improves retention and graduation rates; Echo360's ability to continually improve the teaching and learning effectiveness and efficiency over time should amplify those advantages.

Effective Digital Content Curation Fosters Dramatic Gains in K-12 Content Utilization

The Integrated Digital Curriculum and Formative Assessment to Enable Student-Centered Learning trend category first appeared in 2015 as districts began pursuing personalized learning. These 2016 entries demonstrate that K-12 continues to intensely pursue effective curation and selection of digital learning resources by tying together discrete educational technologies—typically involving the learning management system (LMS) or Learning Object Repository (LOR)—into a single, user-friendly access point for students and instructors. Quicker, easier access to course resources results in more time for studying and learning, routing students through resources helps their learning.

With [Kennisset's Personalized Learning Lab](#), students conduct a self-assessment of their learning progress. Kennisset analyzed the Dutch curriculum, defining 200 topics and achievement standards for each subject; connected past exam questions to the curriculum; and created benchmarks based on past scores. Students answer test exam questions; a personal dashboard compares their results to the benchmark, and students receive relevant study suggestions from their textbooks and OERs in areas of needed improvement. The system is data-driven and provides better learning suggestions with each new user and each new exam question answered.

Maryland's [Montgomery Public Schools implemented McGraw Hill Education's Engrade](#) is a learning management and assessment solution that enables personalized learning. It provides a real-time view of student achievement, helping

instructors to make informed decisions about the effectiveness of curriculum and assessment strategies. Instructors define their standards for achievement in the system, and then grade students against those standards, enabling them to provide more personalized instruction to help each student progress toward mastery of standards. The Engrade LMS integrates with the district's SIS. Montgomery County plans to replace high school final exams with online tests administered through Engrade for the 2015-2016 school year.

[Learning.com and North East Florida Educational Consortium](#) implemented the Curriculum Foundry, a web-based solution that provides school districts with curriculum building tools to access, organize, and share digital curriculum resources with the entire district or select campuses. Curriculum Foundry includes a vetted repository of K-12 Open Educational Resources (OER), free content, and licensed content in a variety of presentation modalities such as text, audio, video, animation, simulation and project-based learning. Teachers can create digital content, too, and use single sign-on to access repository resources. The Curriculum Foundry integrates with Learning.com, Google Apps for Education, and/or any Common Cartridge® supported LMS. The Curriculum Foundry's tools help districts use digital content to meet their instructional goals, facilitate personalized learning, and address budget challenges.

Together, [SAFARI Montage and Newton Public Schools](#) created a best-in-breed, standards-based learning platform. SAFARI Montage is the learning object repository that holds licensed, subscribed, and internally created content that can be organized, archived, indexed, and delivered via a reliable and holistically managed infrastructure. It operates autonomously or cooperatively with an LMS. Newton Public Schools plans to add metadata to the learning objects and itemized assessments to align content with learning and provide learning analytics to teachers. In addition, the district has successfully integrated SAFARI Montage, its LMS, SIS, and assessment solution, to create a platform that manages lesson delivery, content creation, assessment, and attendance. All this is possible with the incorporation of IMS and other interoperability standards.

Next Generation Institution-wide App Platforms Are Emerging

Effective education technology encompasses not only learning tools but also behind the scene resources. These 2016 LIA entries provide infrastructure or tools to connect students easily to resources that facilitate their daily academic activities, and align with the Educational Application, Content, and Media Infrastructure Learning Impact Trend.



[IMS Global standards in a rural, South Georgia School District](#) by ClassLink and Jeff Davis County Schools [New/Research Projects]



Learning Impact Trend: Educational Application, Content, and Media Infrastructure

Issue: Jeff Davis County Schools, a rural county school system of 3,200 students, lacked the funding and skilled technology expertise to integrate digital learning into their curriculum. The district needed highly-scalable technology solutions without the accompanying demands for implementation, training, and utilization.

Solution: Jeff Davis County Schools opted for a standards-based approach, adopting ClassLink's OneClick single sign-on solution and worked cooperatively with ClassLink to develop a working instance of the OneRoster™ framework. Through ClassLink, teachers and students have OneClick access to resources, and through OneRoster, roster data is delivered automatically into learning applications.

Learning Impact: Through ClassLink, teachers and students have streamlined, single sign-on access to more than 3,000 applications, adding minutes of productive class time. In addition, OneRoster enables Jeff Davis County Schools IT organization to provide "zero day" rostering, making applications and tools ready to use at the beginning of each school year. Technology utilization is enhanced without amplifying the burden to the IT team.

"The realignment of district priorities to an enhanced digital learning environment is currently underway. The implementation of ClassLink and OneRoster continues to be a critical component as the District begins to build a school-based, digital curriculum that embraces numerous software tools, often from different vendors. To be successfully implemented and integrated in a timely fashion, the use of OneClick and OneRoster is critical." –ClassLink and Jeff Davis County Schools 2016 LIA Submission

[Deakin University developed DeakinSync](#), a personalized digital learning hub that provides Deakin students, including 15,000 off-campus students, convenient and seamless access to all university services and content whenever they need them. DeakinSync integrates numerous applications from the LMS to live-streamed and recorded classes, library and learning support services, digital resources, and university information. Content is differentiated based on a student's personal

context: e.g., student lifecycle stage, degree program, campus and other factors. Degree program and subject leaders can use LMS and DeakinSync analytics data to monitor student engagement and access to subject sites and learning resources. Seamless integration was achieved by employing a modular, service-based architecture that connects standards compliant and non-compliant applications with an open source middleware layer and a highly configurable presentation layer that presents content and services to the learner.

Other Notable Entries Create New Student Learning Experiences

In addition to the five themes outlined above, these entries, aligned with various Learning Impact Trends, demonstrate education technology's broad reach in today's student experience. They enhance accessibility to programs and resources; create engaging, collaborative learning environments; and/or provide ways to improve student success in the classroom and throughout life.

Blended Learning Optimization

Education technology continues to evolve traditional educational delivery models, supporting effective combinations of online, classroom and in-context learning. These 2016 LIA entries align with the Blended Learning Optimization Learning Impact Trend and demonstrate innovative and transformative impact on these career-oriented higher education programs.



[Blended Learning Experience](#) by Western Sydney University, School of Nursing and Midwifery
[Established Projects]

WESTERN SYDNEY
UNIVERSITY



Learning Impact Trend: Blended Learning Optimization

Issue: Western Sydney University, School of Nursing and Midwifery want to enable learners to access quality learning more conveniently.

Solution: Since 2013, Western Sydney University's School of Nursing and Midwifery has implemented a blended learning strategy that replaced all face-to-face classes with online learning. Every student and staff member received a free iPad loaded with thousands of free learning objects. The School designed learning activities using free Apps and made required publisher textbooks available on any

device. All blended learning material and activities come in many formats including PDF & HTML5, and are fully integrated with the School's Blackboard 9 LMS and interoperable with most learning systems. The LMS also provides analytics on user engagement and interaction, which are used to benchmark performance across the university and against national and international standards. Building staff capabilities and organizational learning has been a major goal, and Western Sydney University's BLADES network (Blended Learning Advisors, Designers and E-learning Specialists) meets and collaborates on many projects around blended learning.

Learning Impact: The Western Sydney University, School of Nursing and Midwifery program is the largest blended learning program and iPad rollout by an Australian university, involving seven campuses and serving 45,000 students and staff. The program has the lowest dropout rates in the university. In addition, the online program and free iPads increased student accessibility by making the program more affordable, enabling instant engagement, and providing more learning opportunities.

"[Blended learning] has enabled learners to access quality learning more conveniently. Replacing lectures with online learning provides more opportunity for innovative, flexible, and responsive learning experiences for our students." – Western Sydney University, School of Nursing and Midwifery 2016 LIA Video Submission

[SkillsCommons and Colorado Community College System](#) (CCCS) delivers blended learning courses of online learning and lab-based authentic applications of theories, and aligns with the Blended Learning Optimization trend. Each blended course is composed of synchronous and asynchronous learning opportunities with clearly stated learning outcomes by modules. These courses have been developed as OERs, hosted on SkillsCommons as fully contained course cartridges, and available at no cost to the institutions or even interested learners. The courses use international metadata and content standards so content can be shared, loaded into, and extracted to numerous learning management systems. Using SkillsCommons enabled CCCS to expand capacity, and to share resources without increased curriculum development costs for institutions utilizing the 80% OER blended courses. The web-based, blended learning courses help adults prepare for 21st century jobs without geographic barriers.

Digital Learning Networks

Sharing digital learning infrastructure enables an institution to achieve scalable deployment of educational resources, tools, and services. This 2016 LIA medalist illustrates the access and learning benefits of creating a single digital learning network for a diverse student population.



[The Virtual Classroom](#) by Career Education Corporation (CEC) [Established Projects]



Learning Impact Trend: Digital Learning Network

Issue: Colorado Technical University (CTU) and American Intercontinental University (AIU) students and faculty used different classroom platforms based on online or on-campus classes, causing user and technical support frustration. In response, CEC, together with CTU and AIU, developed a single digital learning platform, the Virtual Classroom.

Solution: The Virtual Classroom addresses CEC's need to integrate with third-party tools; to provide an intuitive and personalized learning environment for different school brands and delivery choices; to collect analytic data for reporting and assessment; to provide collaboration tools; and to improve accessibility. Available in both desktop and mobile versions, the Virtual Classroom categorizes content and features in a way that is intuitive, efficient, and fun to use. Important features are just one click away and users may access collaborative tools through a seamless integration with third parties such as LoudCloud, Adobe Connect, and Office 365.

Learning Impact: Over 30,000 students and faculty from CTU and AIU currently use the CEC Virtual Classroom, and nearly 40,000 users are expected by year's end.

"The Virtual Classroom has had a positive impact on students and faculty due to the improved student and faculty user experience and the solution's scalability that enables CEC to easily add new academic content and features as curriculums grow and change. This allows the universities to determine best practices for learning material—including assignments, quizzes and exams—and share them with similar classes. This helps enable quality and consistency throughout each university." – Career Education Corporation 2016 LIA Submission

e-Collaborative Learning

Technology provides students and faculty new ways to work together and to learn from each other—in the same classroom or halfway around the world. The following notable entries align with the e-Collaborative Learning trend and demonstrate the potential for improving learning impact by deploying innovative types of student collaboration versus simply using a collaborative application within a course.



[Global Linking Youth through Net Communications Project](#) by DET Victoria [New/Research Projects]



Department of
Education & Training

Learning Impact Trend: e-Collaborative Learning

Issue: DET Victoria wanted to provide their students with authentic global learning experiences to prepare them for the 21st century workplace, and to do so at minimal cost.

Solution: DET Victoria teamed up with schools in South Korea, Japan, and China to create Global LYNCs, a project that provides global learning experiences via telecommunications and virtual learning. Global LYNCs uses free or low-cost tools including the Zoom teleconferencing tool, existing Polycom or CISCO videoconferences systems in schools, Polycom Real Present and Polycom RP iPad applications, and the Microsoft Lync conference client. Schools engage in a wide range of curriculum sharing, using iPads and PCs. Teachers from the different countries work together to create opportunities for both partners to attend the same specialist content virtual events from their respective locations in areas such as drama, music, martial arts, culture, and geography. Global LYNCs provides instructional resources. Teachers receive pedagogical training to enhance their ability to engage with students in another location. Rubrics are available on the project's blog to assist with planning evaluation and assessment. Teachers share ideas and best practices in a monthly newsletter (in both English and Korean).

Learning Impact: Global LYNCs now involves 38 schools with telecommunications partnerships with schools in Australia, Korea, China and Japan, and is starting to receive formal support from education organizations, for example, the signing of an MOU between the Australian Department of Education and Training's South Western Victoria Region and Deagu District Office of Education in South Korea. The project provides a supportive introduction to the power of the global classroom. Students gain skills and knowledge that will help them in a 21st century workplace, e.g., diplomacy, communications, technology and Asian literacy.

"It's a magical opportunity at our school. Students are enthusiastic and engaged. They have a great passion for learning more about Korea and developing their language and cultural knowledge." –Acting Principal, Chelsea PS, from DET Victoria's 2016 LIA Video.

Aligned with the e-Collaborative learning impact trend, [SuiteC \("Collabosphere" Project\) - UC Berkeley](#) is a fluid, interactive space that supports collaborative content curation, remixing, and multimodal production. Students select and share content in the Asset Library, either through the LMS's native assignment submission process or by uploading or clipping images, texts, and media files, which are stored in the LMS's file system. Once objects are in the asset library, students are able to comment on and rate each other's submissions. This form of peer assessment is itself tracked as analytic activity, and the Engagement Index is a dashboard of various course activities shared among all class participants. Students form teams using the Whiteboard tool to remix and enhance assets from the Library and collaborate in real time. The Collabosphere tools use LTI® v1.x to integrate with the Canvas LMS. All of the tools have been instrumented to emit xAPI and Caliper Analytics®. Collabosphere is integrated with the Canvas LMS which serves the entire UC system. The same implementation will expand to serve between 15-20 additional institutions in a spring 2016 pilot program, and if successful, will continue to expand.

Gaming, Simulation, and Immersive Learning

The Gaming, Simulation, and Immersive Learning trend first emerged in 2010, bringing technology-based experiential learning experiences to the classroom. This trend continues to evolve beyond simple usage of games, and the following two entries demonstrate how gaming motivational theories can be applied effectively to education.

[University of Texas at Austin - Learning Sciences Department's](#) entry, the Countdown Game, is designed to help students in large enrollment classes master foundational knowledge in any subject area. The activity is presented to students as a gamified, ungraded pre-test. As a result, much of the material presented within will be unfamiliar to the student. Students earn points by completing a timed matching game and are then ranked on a class leaderboard. To move to a higher ranking, students must attempt the game multiple times and improve their performance. The Countdown Game's instructor analytics dashboard presents data on numerous areas including missed concepts by unit, number of rounds per student, and the leaderboard. Currently the game has been deployed to general chemistry students at the University of Texas, totaling approximately 2,000 students. In addition, the game is used in dual-credit courses at high schools around the state of Texas.

[WeDu communications Co., Ltd's](#) entry is the development of a mathematics entertainment service designed to engage students with gamification and individualized content selected by behavioral learning analytics. Since dropouts can occur frequently in mathematics, the service uses a storytelling technique based on a fantasy world to foster user engagement. The service is built on HTML5, Common Cartridge®, and CSS3.0 standards, with the goal of providing a low-cost, accessible service for all learners around the world.

Assessment Enhancement with Digital Technology

Emerging in 2015, the Assessment Enhancement with Digital Technology Learning Impact Trend continues to demonstrate more sophisticated student appraisal and

analysis. For example, this 2016 entry uses CAT (computer adaptive testing) models, meaning that summative testing can be more efficient and adapted to formative assessment results.

[College voor Toetsen en Examens \(CvTE\)](#) is responsible for the national tests in the Netherlands, and developed Facet, a computer based testing system to provide more flexibility in scheduling and support adaptive testing. Facet is based on the QTI® open standard as the exchange format for content and a QTI extension, called DEP, which allows for different types and sources of testing content. Open standards mean Facet can integrate easily with other assessment or learning systems. Facet's online practicing environment, adaptive diagnostic tests and detailed test reporting contribute to improved results for students. In 2016, most of the 1,300 high schools and all 300 of the Netherlands' vocational schools will use Facet for national computer based testing.

Student Success and Outcomes-Based Learning Support Services

Student success is not confined to the classroom. Education technology can help students thrive throughout their entire education experience—helping them to prepare for college studies and to record their lifelong learning achievements. The following two entries, aligned with Student Success and Outcomes-Based Learning Support Services trend, highlight the potential role of specific learning outcomes and competencies to enable student success.

[National Institute for Digital Learning, Dublin City University](#) produced a suite of eight online readiness and preparation tools to help flexible students, e.g., part time, off campus, online, transition to and succeed in higher and continuing education. Many flexible students do not make it through their first year, and these online tools are designed to help them during the early part of their student life cycle. This cycle includes higher or continuing education contemplation, preparation, registration, and the first few weeks of study. The tools are OERs for use by any institution or program in whatever way they judge appropriate. While at this stage the project's tools have been piloted on a small scale, the high level of interest from major online providers indicates wider deployment by institutions throughout Ireland and beyond.

[Learning Objects and University of Maryland University College \(UMUC\)](#) are developing the eT (Extended Transcript) and Competency-based Education (CBE) digital credentials, which is a digital credential ecosystem that records a person's lifetime knowledge and skills. Digital credentialing begins the day a student enrolls at an institution in a particular program, recording not only course grades, but competency badging, credential stacking, and micro-credentialing from multiple and varied sources. eT and CBE digital credentials are official institutional records, backed by the Registrar's Office and digitally certified. Digital credentials build on and leverage LTI®, Caliper Analytics®, and emerging competency metadata, learner competency profiles, and digital credential standards and specifications. This proof-of-concept is intended to be an institution wide implementation at UMUC, and eventually could be adopted by the University System of Maryland to facilitate competency data exchange and articulation between institutions at scale.

Resources to Help Build Your Education Technology Future

The LIA Learning Trends and Competition Entries offer inspiration for future education technology planning. Analysis of the 2016 LIA entries and insights from the 2016 LIA competition help institutions and educational authorities determine if they have considered a broad range of potentially impactful technology innovations. But the next step—how to turn inspiration into action—oftentimes can be a sticking point. IMS offers many resources to help the educational community realize their education technology future faster.

IMS Key Initiatives

IMS Global members have prioritized a complete set of institutional initiatives to make it easier for institutions around the world to create and scale efficient and effective digital teaching and learning environments. IMS Initiatives include:

- [Integrated and Effective Digital Curriculum](#)
- [Institution and Sector Wide Plug & Play Ecosystem of Learning Platforms, Apps and Tools](#)
- [Integrated and Actionable E-Assessment](#)
- [Integrated Digital Credentialing, Badges and Competency-based Education](#)
- [Real-time, Cross Application Educational Data and Analytics](#)

Communities of Practice

Communities of Practice are aligned with IMS Key Initiatives and provide interactive forums for K-12 and higher education institutional representatives to work collaboratively on the accelerated adoption of next generation teaching and learning. Community members articulate best practices and develop an easy to use playbook, a set of resources designed to shorten the learning curve around interoperability standards and help institutions to build an integrated education technology ecosystem. Most importantly, these communities advocate vendor adoption of IMS standards. The [K-12 Playbook](#) and the [Higher Education Playbook](#) are publicly available to the entire education sector.

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Appendix A: Learning Impact Trend Framework Categories

Category	Definition
Advancing Teaching & Learning Innovation	
Adaptive Learning & Online Homework	Providing students with self-paced learning, feedback, and adaption while providing the teacher with information on individualized student progress.
Digital Resource, e-Text, and Learning App Innovation	Innovative learning resources, tools, and applications aimed at improving access, affordability, and quality of education. Includes data gathering to measure student engagement, progress towards desired outcomes, program effectiveness, and usage of digital resources.
e-Collaborative Learning	Providing students & faculty with applications and opportunities to participate in and improve achievement via effective collaborative learning activities that complement traditional forms of delivery.
Gaming, Simulation, and Immersive Learning	Applications that give students and teachers opportunities to participate in effective experiential learning that is better than traditional alternatives.
Scaling Pedagogical Knowledge and Practice	Providing efficient and effective support to teachers and faculty in significantly improving facilitation and delivery of learning experiences.
Advancing Learning Environment Infrastructure	
Blended Learning Optimization	Evolving traditional educational delivery models, featuring seamless technology environment for teachers and students to support effective combinations of online, classroom and in-context learning.
Digital Learning Networks	Achieving scalable deployment of educational resources, tools, and services toward specific and measurable access, affordability, and quality objectives.

Category	Definition
Educational Accessibility and Personalization	Technology-based solutions that ensure accessibility and personalization for all students, especially those with physical and learning disabilities.
Educational Application, Content, and Media Infrastructure	Technology infrastructure for enabling efficiencies in content development, searching, delivery, and mobile devices.
Integrated Digital Curriculum and Formative Assessment to Enable Student-Centered Learning	Architectures, software platforms, and infrastructures that enable creation and selection from a wide range of curated digital content and tool alternatives by institutional users (faculty and students) with the help of digital assessment.
Learning Platform Innovations	Architectures and software platforms for managing the creation and delivery of learning experiences, including personalization, accessibility and mobility
Advancing Educational Insight, Attainment & Planning	
Assessment Enhancement With Digital Technology	Applications and tools to assess student performance and outcomes.
Educational Pathways, Portfolios, and Learning Maps	Applications to help students navigate their educational experience to improve success and outcomes based workforce needs.
Learning Analytics	Collection, viewing and analysis of learning-related data to: (a) understand student behaviors and progress, (b) understand digital product and pedagogy use and effectiveness, and (c) improve teaching and/or learning.
Student Success and Outcomes-Based Learning Support Services	Applications and processes to enable teaching, learning, and placement tied to explicit outcomes and achievements.

About IMS Global Learning Consortium

IMS Global is a nonprofit organization that advances technology that can affordably scale and improve educational participation and attainment. IMS members are leading suppliers, institutions and government organizations that are enabling the future of education by collaborating on interoperability and adoption initiatives. IMS sponsors the Learning Impact Leadership Institute, a global program focused on recognizing the impact of innovative technology on educational access, affordability, and quality while developing the people and ideas that are going to help shape the future of educational technology.

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