

Summary of Learning Impact 2007 Conference



Vancouver, Canada
16-19 April 2007

To access the complete *Achieving Learning Impact 2007* report, visit:
<http://www.imsglobal.org/learningimpact2007/li2007report.cfm>

Summit on Global Learning Industry Challenges

The following panel discussions were led by the individual contributors identified below.

What are the Successes of Open Initiatives in Education So Far and What is Coming Next? What Business Models are Working and Why?

- Ted Dodds, CIO, University of British Columbia
- Dr. Joel Greenberg, Open University's Director of Strategic Development, Learning and Teaching Solutions
- John Norman, Director of the Centre for Applied Research in Educational Technologies and 'Head of e-Learning', University of Cambridge and Sakai Board Chair
- Joel Thierstein, J.D., Ph.D., Associate Provost, Rice University, Executive Director, Connexions

Exploring Best Practices in Government Support for ICT

- Mr. Lawrence K. Grossman, Lawrence K. Grossman, Co-Chair of Digital Promise, former president of NBC News and PBS
- Sarah Porter, Head of Development, Joint Information Systems Committee, United Kingdom (JISC)
- Jonathan Shennan, Manager, Enterprise Architecture, New Zealand Ministry of Education
- Mr. Tae-Myung Han, Executive Director of Educational Information Center, KERIS

Performance vs. Prestige: Does the Work of the Spellings Commission Signal a New Era of Access, Affordability, and Accountability? Why or Why Not?

- Dr. Paula E. Peinovich, former President, Walden University
- Dr. Bernard Luskin, Executive Vice President, Fielding Graduate University, Director, Media Psychology Program, Founding President of Coastline Community College, including KOCE, TV in Orange County California, Orange Coast College and Founding Chancellor of Jones International University
- Dr. Arthur J. Lendo, President and Professor of Management, Peirce College, Philadelphia, PA

Will Technology Enable Higher Education to Solve the Access-Affordability-Quality Tradeoff?

- Dr. Nicholas H. Allen, Provost and Chief Academic Officer, University of Maryland University College
- Daniel J. Devine, CEO, Compass Knowledge Group
- Dr. Paul Clark, Pro-Vice-Chancellor (Learning and Teaching), The Open University
- Kendrick McLish, Vice President, Product and Marketing, eCollege

The Evolving Business Model(s) of Learning Content: Does Free or Ad-Supported Equate to Better? Why or Why Not?

- Ray Henderson, Chief Products Officer, Angel Learning
- Sebastian Vos, Vice President of eEducation, Elsevier
- Jim Behnke, Pearson Higher Education's Chief Publishing Officer
- Dr. Mark R. Nelson, Digital Content Strategist, National Association of College Stores



Program Track Summaries

During Learning Impact 2007 attendees were invited to participate in four Program Tracks running in parallel. Each track offered a different theme with presentations from IMS GLC member organizations about the current state of the art and best practices in products, services, and trends. The Program Tracks included:

- What's Next in Learning Systems
- What's Next for Digital Learning Content
- The Academic Enterprise: Assessment, Analytics and Student/Institutional Performance
- Progress in Open Source, Open Content, and Open Services

A summary of each program track follows.



What's Next in Learning Systems

Introduction

Challenge Question: What have been the primary impacts of instructional, learning, and course management systems to date and what new innovations will become mainstream in the next two years?

The executive panel sessions at the Summit on Global Learning Industry Challenges included representatives from several of the largest distance learning providers in the world including the Open University UK and the University of Maryland University College (UMUC).

Participants in the learning systems program track at the LI 2007 event were tasked at defining the current state-of-the-art and establishing a way forward for the next 24 months. A series of perspectives from Open University UK, Sakai, Wimba, Tegrity, Blackboard, Ucompass, Giunti Labs, and ANGEL Learning were provided to prompt the discussions. Further perspectives were presented as part of the Summit on Global Learning Industry Challenges in which a panel of experts discussed the question of whether technology can enable education providers to solve the access-affordability-quality tradeoff.

The Context

During one of the conference keynotes and the Summit on Global Learning Industry Challenges, Bernie Luskin of the Fielding Graduate University, referenced the data from the Sloan-C that over three million students involved in post-secondary degree programs in the U.S. took at least one fully online course, which is

nearly one in every five students, in the Fall of 2005. Data from a variety of Sloan-C studies and others has indicated that in the postsecondary segment, there is no substantial difference between outcomes in online and traditional classroom settings, assuming use of best practices are adhered to. The most recent National Survey of Student Engagement report included a finding that distance learners engaged more often in deep learning activities than campus-based students. In addition, course management systems are deployed in nearly all U.S. postsecondary institutions to support instruction in a variety of ways. In short, Internet Assisted Learning is already a staple of U.S. higher education.

During the program track, Joel Greenberg from Open University UK asked the question, "Are we there yet?" Well, as indicated in the Luskin keynote, the executive panel sessions, and a white paper distributed to conference attendees developed by educational researcher and IMS GLC CEO, Rob Abel, entitled, *What's Next in Learning Technology in Higher Education?*, it appears that over the last ten years the Internet has enhanced access to resources that support higher education, and this has improved and increased the scale of use of distance learning in the post-secondary segment. This same feature of course management systems (also called learning management systems and virtual learning environments in some regions) is useful in the on-campus learning environment primarily as a convenient communication hub where materials and discussions that support learning are organized in a way that facilitates more flexible use of time and space.

Therefore, considering the state of the key parameters of access, affordability, and quality, learning technology to date has had the most influence on access. The required resources to support education, including interaction with instructors, instructional materials, interactions with peers, plans of study, and the credential granting institutions themselves, are all more readily accessible. Technology has improved efficiency for the learners, removing access barriers of space and time.

It was generally agreed that the environment in which education occurs is an important factor. Depending on the needs and objectives of the learner, different types of environments can contribute to the 'quality' and success of the educational experience.

In general, technology has not radically changed *what* the learning activities are but rather *how* they are accomplished.

For instance, for students having the need for socialization in order to develop group skills, a robust face-to-face experience may be a critical factor in quality. For other students who may already have these skills but lack the time to assimilate knowledge, a distance program that saves the time associated with campus activities may produce a higher quality experience. However, in general, technology has not radically changed *what* the learning activities are but rather *how* they are accomplished.

Technology has not radically impacted the affordability of the educational experience either in that the costs of most of the resources supporting the educational experience have not been radically changed. However, since the overall cost of access (in terms of efficiency) is lower, quality and access are no longer as difficult to achieve simultaneously as they

once were when access was place and time dependent. Technology has been slow to show it can help improve the efficiency of most faculty, teachers, or instructors.

The State-of-the-Art

Bob Alcorn from Blackboard discussed how the course management system has become the most mission critical information system in higher education in terms of the essential 24x7 operation and the most used of any system among faculty and students. It is interesting to note that five years ago the notion of 24x7 support for these systems was considered a daunting challenge. The ability to keep a very large scale course management or portal environment operational on a global basis 24x7, while impressive, is no longer pushing the envelope of innovation: it is the expectation. The emphasis today, in contrast, appears to be on how the learning environment is used. Several extremely large-scale and impressive deployments of learning platforms were LIA Honorable Mention winners: *Desire2Learn at Office of Open Learning, University of Guelph*, *ANGEL at Penn State*, and *Meeting the Needs of a Global Student Body with Jenzabar at Park University*.

Between the LIA finalists showcase and the program track, a dizzying array of innovations was presented. A theme of many presenters in terms of what is coming next featured the reality of rapidly emerging and pervasive technologies that may have implications for support of education and instruction.

Blackboard emphasized the need to integrate results, such as gradable events and student portfolios, from the various innovative technologies, in order for their use to be of *strategic* use in the learning

enterprise. John Norman of University of Cambridge and Sakai indicated that Sakai is working to support the new IMS GLC Enterprise interoperability standard to enable real-time exchange of information between course management platforms and administrative systems. Norman also discussed what seems to be an important trend of integrating new tools to facilitate scholarship, termed a 'scholar's workbench'. Sakai also demonstrated at the conference the use of the IMS GLC LTI (Learning Tools Interoperability) specification for enabling portlet integration into Sakai.

The potential opportunity to exploit the ease with which video can be produced to enhance the instructional experience was discussed by Tegrity. Tegrity's LIA Bronze winner (*Tegrity Campus 2.0 at Saint Mary's University*) featured the ability for faculty to make searchable lecture recordings automatically available online without having to change how they teach. Interestingly, the approach used by Tegrity also has been proven to address the mission criticality issue, with the platform being used to rapidly support moving to a distance mode when a campus was forced to shutdown due to Hurricane Katrina.

Wimba discussed new approaches for integrating collaborative 'Web 2.0' features into the learning environment, including instant messaging, wikis, digital world features (identity, emotions), blogs, and other collaborative tools. Wimba's LIA Bronze winner, *Wimba's Course Genie: An Authoring Tool for Common Cartridge at Langside College*, featured IMS GLC's new digital learning content standard, Common Cartridge, which facilitates integration of learning tools, assessments and discussion forums.

Ucompass introduced integration of learning tools with the user's desktop environment, making the use of learning tools more intuitive. In addition, Ucompass demonstrated a prototype application interface and web service to launch and "play" learning applications in the new Common Cartridge standard format.

ANGEL Learning discussed a host of new features including full incorporation of Common Cartridge into the next release of ANGEL, the launching of a new digital world in Second Life to support learning, and full support of the latest version of the IMS GLC Question and Test specification, enabling faculty and teachers to more readily find and use test items. ANGEL also introduced new accessibility features, including a new wizard to create learner profiles that enables use of the IMS GLC Access for All accessibility specifications.

Open University UK discussed several innovations that they are targeting for current and future development. Open U has become an important contributor to Moodle enhancements, therefore, the Open U work may portend some future evolution of the Moodle platform. Open U brought to LI 2007 a half dozen courses from its new *OpenLearn initiative* (winner of a LIA Platinum) in the new Common Cartridge format. These were demonstrated to work in Sakai, ANGEL, and Ucompass platforms. Open U is innovating with respect to using the learning management system for 'activity-centric' learning.

There was much speculation at LI 2007 that the IMS GLC Learning Design specification could be coupled in some way with Common Cartridge to specify sequencing of learning activities, including online

and in-class, for export and import. Open U also reinforced the previous themes of improving accessibility via IMS GLC Access for All and incorporation of wikis and blogs into the learning environment. Open U is also grappling with something of major importance to institutions that publish online and in print, which is the inclusion of document management capabilities based on open standards. Elements of the importance of incorporating document management into the learning environment were reiterated by the selection of LIA Gold winner *HarvestRoad Hive & the Resource List Management System at the University of Western Australia*.

Fabrizio Cardinali of Giunti Labs described the need to move beyond traditional pedagogical content and self-generated content to personalized learning based on competencies, performance, and skills management. Giunti Labs presented an innovative approach to learning in context using mobile devices with GPS (Global Positioning System) to activate learning materials based on location, such as when touring a museum. Several presenters mentioned the pervasiveness of mobile devices in the hands of students. Giunti introduced the term “personal ambient learning”



and “blended publishing” to capture the essence of Cardinali’s earlier characterization toward a “Learning 3.0”. Giunti captured a LIA Silver with *Using Giunti*

Labs learn eXact LCMS at the UK NHS and Royal College of Radiologists R-ITI Project.

The Challenges & Opportunities

A key point of Alcorn (which he characterized as ‘from island to archipelago’) was that to enable new innovations greater interoperability, integration, and federation of new capabilities with established platforms, transparent to the many users who are used to their now familiar environment, is going to need to be a key focus going forward. The need to incorporate ideas and tools from the emerging web world into an integrated learning experience that is easy to use for faculty/teachers and strategic for the institution present both an opportunity and a challenge. The relative stability of the course management platforms in the higher education segment and the emergence of easier and more pervasive ways to author and collaborate via the web seems to portend, potentially, a new phase of integration into the learning enterprise. It is clear that although many of these new capabilities will be ‘tested’ with respect to instructional use in a non-integrated way (for instance, see the high ratings of Wikipedia, iPods, and Google in the February 2007 IMS GLC LearnSat Report <http://www.imsglobal.org/ltst/ltsttt.cfm>), the pervasive view at LI 2007 is that these capabilities will be brought into an integrated learning experience.

The executive panel sessions at the Summit on Global Learning Industry Challenges highlighted what some specific opportunities for application of technology to enhance the quality of the learning experience. And clearly one emphasis for the future is enhancing the quality of learning that can be achieved at reasonable cost. The areas of opportunity highlighted were:

- Enhancing student interaction
- Improved student study tools
- Assessment, especially formative assessment
- Improved resource searching and evaluation of online resources

Clearly, the presenters in this program track appear to be largely in sync with the views expressed by the ESC on the strategic investment in technology. It is also fascinating to note that the top ranked LIAs went to entries that had made outstanding progress in these areas. In addition to those already mentioned:

- LIA Platinum winners *ETS Criterion Online Writing Evaluation service at Farragut High School, Knox County Public Schools* and *Cyber Home Learning System of Korea* both exemplify improved study tools with formative assessment.
- LIA Gold winner *The California State University (CSU) Math and English Success Websites and the CSU Fresno Fast Forward Program* exemplifies using self-assessment to ascertain performance to college standards.
- LIA Silver winner *Microsoft Research ConferenceXP at Australian School of the Air and Classroom Presenter at University of Washington* exemplifies collaborative learning both at a distance and in the classroom.

Influence on IMS GLC Initiatives

From the perspective of IMS GLC the call to action includes the following:

- Content management, document management, resource lists, and repositories based on standards; including clarifying best practice for effective adoption. This is a potential topic for the IMS GLC Learning Object Discovery and Exchange workgroup currently under formation.
- Incorporating interoperability of a broad set of collaborative learning tools into the newly chartered Learning Tools Interoperability (LTI) workgroup.
- The importance of defining quality of the overall educational experience and how technology can support and enable higher quality. This is a potential topic for the Technology-Enabled Flexible Learning workgroup currently under formation.
- The importance of tying assessment into the learning interactions continues to grow and it is clear from this track and the academic enterprise that there needs to be greater integration between gradable events and other evidence of learning from learning platforms and tools and the enterprise administrative systems. Therefore, taking the next steps to integrate IMS GLC Question and Test Interoperability (QTI) with the latest Academic Enterprise work in IMS GLC is key.



What's Next for Digital Learning Content

Introduction

Challenge Questions: What will predominate the future of educational content and why: recorded lectures, supplementary cartridges, web sites, web searches, or adaptive learning support systems, or something else?

Daniel Rinn and Tom Grega of Thomson Higher Education chaired this session which delivered a number of informative perspectives on the future direction of digital learning content (see the list of presentations below). Throughout the session, four key themes emerged; institutional issues, innovative tools, understanding end-users and system architectures. The coverage of these themes is summarized below, followed by a list of the key *what's next issues* that emerged.

The Context

The value of technology to support and enhance learning often is intricately tied to the quality of the presentation of the learning materials. While at many points in the last ten years we have heard the famous cry "content is king", it has not been a straightforward matter to adapt web-based or web-delivered content to the needs of learners. We have also relearned a lesson known for a long time: most content by itself does not sufficiently support an educational experience. This is why proliferation of libraries by itself did not change the need for institutions of learning and so forth. For this reason, high production value content that succeeds in the marketplace has been rare, with simpler content that is better conceived to be valuable in an

instructional context has proliferated. As a result, content providers and authoring tool providers have the challenge of fitting into a variety of accepted instructional creation and delivery modes.

The State-of-the-Art

Institutional Issues. As online delivery of education has become a mainstream activity for institutions, the expectation of what the technology should be capable of achieving has similarly risen. Features once on the wish list for the future are now setting a new bar for suppliers to meet. Learning content is now expected to be:

- Capable of being personalized
- Assessable, including being adaptable for individual remediation
- Gradable (measurable)
- Portable
- Interoperable
- Suited to the construction of hybrid courses, comprised of lecture notes, services, learning content etc. to augment classroom experience

Daniel Rinn described how Thomson Higher Education are working with Sakai on their *ThomsonNow* offering to address these very issues, building on a number of IMS GLC standards. Tom Grega went on to highlight how learning systems are increasingly expected to integrate with the institutional infrastructure to ensure security and protect student privacy. He referenced work with Sakai and Unicon to achieve single sign-on authentication with the Thomson Homework management system and the need to adopt a

federated identity management service to meet institutional requirements on privacy protection.

Bryan Eldridge of Giunti Labs focused on the problems institutions can experience attempting to integrate a learning system with the broader institution and achieving a real cost benefit. Bryan stated that these issues often arise from a general lack of coordination across the enterprise with little understanding of how systems actually need to interoperate. This is compounded by a dearth of available case studies by which implementers could learn from the experience of others. But perhaps few would be sufficiently brave to publish the full facts of a costly nightmare project (inevitably, such cases might be the most illuminating).

Giunti Labs has devised a methodology (the *exact Method*) which institutions can follow to work through these issues and encourage an ongoing process of planning, tracking, and improvement to achieve continuous improvements to institutional learning management systems. Giunti Labs received a LIA Silver for the work it had done with its *Learn eXact LCMS for the UK NHS on the Royal College of Radiologists R-ITI Project*.

Greg Flesher described how Elsevier is moving from being product focused to being more consultative, offering a mix and match of products and services to meet the needs of the institution. Their "Evolve" Solutions products are living up to their name—evolving to provide solutions for institutions creating the virtual university. But equally important are the services to back these up. Faculty need training and 24/7 support in order to be effective in this new regime.

Core print products are increasingly being complemented with digital resources such as simulations, case studies (e.g.,

for the medical arena), and diagnostic testing and evaluation tools offering remediation. The IMS GLC Common Cartridge (CC) standard offers a solution for distributing these resources. CC combines interoperability specifications enabling content providers, developers, and users (faculty/teachers) to access and distribute these resources without having to conduct significant conversion activities prior to distributing or installing content. This is of great value in the context of integrating LMSs within the institution or at the system level as the CC standard provides the ability to exchange institution-specific or vendor provided content packages among disparate LMS systems, reducing the cost required to develop, maintain, manage, share, and house/store these resources. It also provides access to quality content resources that occurs as vendor-provided and faculty developed, scrutinized, and approved resources accumulate.

Innovative Tools. Chris Moffatt of Microsoft introduced the *ConferenceXP Research Platform*, offering high quality broadband video conferencing and application sharing. The platform harnesses the Classroom presenter, Conference XP client and Microsoft OneNote applications and appears to build on the premise that, far from eliminating student-to-student interaction, online learning needs to be augmented with collaborative tools that offer communication at least as rich as face-to-face interactions. Microsoft Research took a LIA Silver for its *ConferenceXP tool used by the Australian School of the Air and Classroom Presenter used at University of Washington*. Microsoft also received two Honorable Mentions, firstly for the *Microsoft Learning Gateway at Shireland Language College* and then for *Microsoft Partners in Learning, the Ministry of Education, Thailand*.

Ed Mansouri of Ucompass.com gave a demonstration of Enrich, a content enrichment tool that can be used potentially even with legacy content hosted within an LMS/CMS. The Enrich tool exploits tags used to embed javascript for adding enhanced features to the content. Content can be uploaded to an Enrich server so that the desired tags can be applied automatically. He then demonstrated an Enrich Common Cartridge Server, able to play a cartridge directly from the source zip at the server end via a flash client on the desktop.

Understanding End-Users. Andrew Shelffo of Jenzabar focused on the changing nature and attitudes of learners. Typifying the older generation as digital immigrants, then the younger generation are perhaps more digital natives, having grown up with the technology and for whom it is more intuitive. For the younger generation, their sense of community embraces much more online interactions and they happily consume online content but, they read fewer books. Andrew suggested that institutions need to rethink how they present to learners their learning community.

Alan Wolf of the University of Wisconsin gave some useful insight into how faculty search for and use digital resources. The conclusions drawn were based upon a survey of more than 4,500 academic staff across 250 institutions. Whether a general search engine or a collection was used depended upon the nature and intended use of the material sought:

- Gathering information for teaching (content)—search
- Pedagogical information—collection (except when seeking syllabi—search)
- Primary source material that can be integrated into a course—collection

Alan suggested that when the individual has an organizing schema, then they will search. When they do not, they seek a collection of materials, often offering peer review and additional information on use of the material. Interestingly, animations and simulations were the least used of the various digital resources available, even though they have great potential for communicating processes and concepts. Perhaps digital natives entering the teaching profession will be more at ease with the use and creation of these materials in education?

System Architectures. Peter Lamothe of HarvestRoad covered the evolution from the stand-alone LMS to its integration with a dedicated Learning Content Management System and the emergence of the institution-wide repository-enabled model. Moving to the present day, Peter advocated the adoption of a Service Oriented Architecture (SOA) to construct an enterprise service bus, capable of achieving the integration of learning systems into the wider institution and its existing services. Peter further proposed adopting federated search as the means of facilitating cross-repository access. HarvestRoad were awarded a LIA Gold for their *Hive & the Resource List Management System at the University of Western Australia*.

George Ward of California State University also proposed an SOA approach for the institutions Academic Technology eFramework, the first instantiation of which will be the CSU Digital Marketplace.

He predicted the need for a new generation of applications for use by faculty (e.g., syllabus builders, portfolio managers, ...) which will need to plug into the institutional infrastructure. However, here a layered SOA model is proposed, comprised of desk-top clients calling educational applications, which sit over com-

mon services, which in turn sit over back-office systems and federated repositories.

With respect to students, there is a perceived need for new collaborative applications, along with automated system remediation and a general move toward self-paced learning.

The Challenges & Opportunities

Whilst the main focus of the session was digital content, the discussion was allowed to roam when it came to identifying the challenges and opportunities now before the learning community. Recognizing that learning systems have evolved from being stand-alone, discrete applications, to themselves being increasingly composed of multiple software components, and which also have to interwork with the wider institutional infrastructure, there was a keen interest in SOA and the Enterprise Bus to help educational institutions manage this complexity. But equally, it was stressed that this complexity needed to be transparent to the user and single sign-on authentication should now be the norm, not the aspiration. There was also felt to be a need for a greater emphasis on identity management to protect students.

Expectations for content advances were centered around the need to be able to personalize learning and provide timely adaptive assessment for remediation. There was expectation that greater use could be made of animations and simulations in online learning, but also recognition that these are currently very expensive to implement. The solution proposed was the development of suitable authoring tools for the next generation of teachers to speed up creation of animations/simulations.

But, learning is not just about more or better content. Many felt a need for richer collaborative tools, able to offer greater support to the virtual learning community and there was a call for the whole community to embrace virtualization as a vehicle for online social networking.

Interestingly, it was suggested that perhaps the most effective way to improve learning provision generally, would be a greater exchange of knowledge and experience amongst practitioners. Publication of case studies of experiences working with the technology and best practices on sourcing, implementing and operation of technology would enable the inexperienced to learn from the experts and generally foster good practice.

Influence on IMS GLC Initiatives

- IMS GLC has embraced SOA in its web services approach, but this work will need to be periodically revisited to keep it abreast of new developments in the field.
- Content Packaging and Common Cartridge should be examined for enhancements that will enable personalized learning to be more readily constructed from available content.
- Adaptive assessment suggests the need for a harmonized sequencing mechanism across content and assessments (i.e., QTI).
- The newly formed Learning Technology Advisory Council (LTAC) within IMS GLC is in an excellent position to publish case studies of experiences with the technology and define best practice on sourcing, implementing and operation of technology.
- Single access integration across a myriad of emerging tools.



The Academic Enterprise: Assessment, Analytics, and Student/Institutional Performance

Introduction

Challenge Question: What are the most important metrics by which to measure quality and success of courses or programs? What will be the role of formative and summative assessments and analytical tools?

Participants in the assessment, analytics, and student/institutional performance program track at the LI 2007 event were tasked at defining the current state-of-the-art and establishing a way forward for the next 24 months. A series of perspectives from Blackboard, Respondus, Desire2Learn, Oracle, SunGuard Higher Education and Pearson Education were used to prompt the discussions. A further perspective was presented as part of the Summit on Global Learning Industry Challenges in which a panel of experts discussed the work of the Spellings Commission and its implications for access, affordability and accountability in U.S. Higher Education. The early nature of this work was also reflected in the Learning Impact Awards (LIAs).

The Context

During the Summit on Global Learning Industry Challenges, Nicholas Allen of the University of Maryland University College, provided an overview of the Spellings Report. In September 2005, Margaret Spellings (U.S. Secretary of Education) convened a Commission charged to examine vital issues central to quality Higher Education, namely: accessibility, affordability, accountability and quality. The Commission's report was released in October 2006 with its focus as compli-

ance, conformability and comparability within Higher Education (HE).

Amid a variety of findings the most pertinent to our discussion is "Because data systems are so limited and inadequate, it is hard for policymakers to obtain reliable information on students' progress through the educational pipeline. This lack of useful data and accountability hinders policymakers and the public from making informed decisions and prevents higher education from demonstrating its contribution to the public good." As a consequence of identifying the lack of suitable metrics the corresponding recommendation by the Commission is that "To meet the challenges of the 21st century, higher education must change from a system primarily based on reputation to one based on performance".

While the Spellings Commission is solely concerned with the U.S. similar exercises have been undertaken around the World. In June 1999 the European Union announced the Bologna Declaration, to put in motion a series of reforms needed to make European Higher Education more compatible and comparable, more competitive and more attractive for European citizens and for citizens and scholars from other continents. In Australia, the Commonwealth Government introduced the Institution Assessment Framework (IAF) in 2004. The IAF produces an across-the-board assessment of institutional achievements based on quantitative and qualitative data from universities and external sources and includes quality outcomes for systems and processes in teaching and learning.

Therefore, it is clear that compliance, conformability and comparability within HE are worldwide issues. The problem is compounded when we need interoperable technology solutions that cross national boundaries to reflect the growing multinational reach of HE Institutions.

The State-of-the-Art

Neil Allison from Blackboard identified, with the other speakers confirming, the starting point when considering assessment as a problem with three levels: the Course which reflects a topic of study; the Program in which courses are combined; and the Institution where the teaching aspirations are reflected in the nature of the Institution. These levels are tied together using target outcomes which drive the creation of the programs and courses and against which performance is measured through achievement or otherwise.

If Learning Outcomes combine to thread the three levels together then appropriate measurement is essential. We can use direct measures, such as tests or indirect measures such as course evaluations. But as David Smetters of Respondus stressed, the issue becomes one of 'quality of data'. By quality we mean is the data valid and reliable; are consistent measures being used; do we have sufficient data to be statistically meaningful; are enough courses, programs and institutions providing data; and are enough fac-

ulty participating at the course level? Smetters also reported that over 90% of U.S. HE Institutions have course management systems but less than 10% of all HE courses deliver assessment using these systems.

So what do we conclude? We understand the problem and we have technology that can help us but we have not yet enabled faculty to use it. The Spellings Commission identified that there is resistance to a culture of inquiry and this theme was further developed during Kenneth Chapman's presentation of Desire2Learn. He identified some of the key concerns from faculty including heavy workloads and insufficient time to re-design courses to take advantage of the available technology; the limitations of the current one-size-fits-all approach from technology;

and, most significantly, lack of tools to track and organize learning outcomes across an Institution. Eric Bassett of SunGard Higher Education provided an alternative perspective that balanced the tension between the expense of accountability

and the affordability of access. Technology is essential to establish that balance but it is not sufficient. A culture of performance must be established and it is within such a culture that technology can enable change.

Our speakers showed how technology currently available could be used to support various assessment activities and how these can be used together to start



to realize some of the Spellings Commission's recommendations, including:

- The Blackboard Outcomes System enables an institution to coordinate manage the assessment process within the classroom, at the program level and for the institution as a whole. The focus is on usability by faculty to enable them to embrace a culture of inquiry.
- Respondus showed how their assessment tools can be used to author and manage formative and summative assessments. These assessments can be integrated with a wide range of content and leading management systems and other third party tools and so use the Respondus tools as an interoperability bridge. The application of *Respondus 3.5 at the University of Alberta* was a LIA Silver winner.
- Oracle described how their Campus Solutions Warehouse is used to provide an 'Admissions and Recruiting Mart', a 'Students Records Mart' and a 'Students Financials Mart'. Together these can be used as a database of various metrics of direct and indirect measurement for course, programs and the institution.
- Desire2Learn presented their popular 'Design Process' add-on that supports the definition of outcomes in terms of competencies, learning objectives and activities. This is closely linked to assessment and enables data to be aggregated and made available to other applications. This approach for the *Office of Open Learning at the University of Guelph* received a LIA Honorable Mention.

The significance of 'quality of data' and the difficulty in obtaining and analyzing such information was reflected in the LIA

Platinum winners *ETS Criterion Online Writing Evaluation service at Farragut High School, Knox County Public Schools* and *Cyber Home Learning System of Korea* both exemplify improved study tools with formative assessment. In both cases, the collection and depth of analysis of the assessment data was exemplary which reflected the capability of the systems to supply the raw data.

The Challenges & Opportunities

So, we've established that the problem is not just one of technology. However, the limitations of a technology always mask the people issues. So, what are the technology-based pain-points that we need to address as soon as possible? A starting list includes:

- Tools, applications, and systems that enable the definition of outcomes in terms of competencies, learning objectives and activities and where all of these can be defined at any level and shared within parts of an organization. Different tools need to be able to process and manage the same information.
- Tools, applications, and systems that enable the collection and analysis of quality data that can be used to evaluate assessment at the course, program and institutional levels. These tools need to be able to manage the relationship of the outcomes and these different levels and to create the appropriate reports.
- Tools, applications, and systems that support direct and indirect measurement of assessment for courses, programs and institutions. Both formative and summative direct measurements required. More importantly, indirect measurement of the usage and suitability of learning con-

tent is essential including student/student, student/instructor and instructor/class interactions.

- Tools, applications, and systems that support the lifecycle for performance improvement. This includes the ability to discover, prioritize, re-design, pilot, assess, adjust, scale, portalize and monitor all aspects of the assessment process for courses, programs and the institution.

Influence on IMS GLC Initiatives

From the perspective of IMS GLC the corresponding activities to support market development are to:

- Improve and refine the Question & Test Interoperability (QTI) specification—the QTI specification has wide adoption, particularly for formative assessment. The latest version, QTI v2.1 (available to IMS Members now but publicly in late 2007), addresses the issues of the design and delivery of summative assessment, and incorporates the IMS Content Packaging to support a wide range of meta-data associated with the items and assessments for outcomes, learning objectives and activities.

- Create a service to support the exchange of enterprise-wide outcomes information—the new Enterprise Services v2.0 specification (available to IMS Members in late 2007 and publicly available in mid 2008) has a new Outcomes Service that supports the management of results. These results can be managed in terms of the relevant courses and programs as well as the grouping of respective student groups.
- Create the next version of the Tools Interoperability Guidelines—the new version 2, called the Learning Tools Interoperability (LTI) specification (available to IMS Members in early 2008 and publicly available in late 2008) will support a broader set of tool interactions including outcomes reporting and will be integrated with the IMS Common Cartridge v1.0 specification.
- Establish a competencies framework to serve as the backbone for assessment offering—the various building blocks have been established, including the IMS Reusable Definitions for Competencies and Educational Objectives (RDCEO), and the next stage is to establish the best practices that show how the various IMS GLC specifications can be used to create such a framework.



Progress in Open Source, Open Content, and Open Services

Introduction

Challenge Questions: What are the successes of open initiatives in education so far and what is coming next? What business models are working and why? What is the practical role that Service Oriented Architectures will play, if any?

Participants in the open source, open content, and open services program track were tasked with assessing the state of progress of various active open initiatives. A series of perspectives were presented by the Joint Information Systems Committee (JISC) United Kingdom, the Department of Education Science and Training (DEST) Australia, Microsoft, Sakai, Open University UK, and the Center for Open Sustainable Learning at Utah State University. Additional perspectives and discussion were brought forward during the Summit on Global Learning Industry Challenges by a distinguished panel of experts.

The Context

It is clear that open initiatives in education and educational technology have been largely successful to this point. The learning community has witnessed the birth and substantial growth of open content and sharing of learning resources made possible through the advancement of technology and infrastructure. Open source software for managing and supporting online learning environments has matured and been widely received. More and more services are being built up around enhancing learning systems and improving the learner experience.

The panel of experts that discussed the successes and future directions of open initiatives during the Summit on Global Learning Industry Challenges included higher education technology leaders from universities in the UK, Canada, and the U.S. Comments were focused on current projects and prevailing concerns at their institutions. Joel Greenberg, of the Open University UK, emphasized the important role that open source plays by giving institutions a common core to start with that can be built upon, improved, customized, and then shared back again with the community.

On a similar thread, John Norman, University of Cambridge and Sakai Board Chair, identified innovation as an important factor in considering the adoption of open initiatives. It is not just about cost and quality—products and models that institutions adopt should allow for greater innovation that truly impacts learning. Focusing further on the student, Ted Dodds, of the University of British Columbia, described their vision for the future of student systems as being student-centric. This emphasis allows the system to function around what each student needs in order to receive his/her desired education, rather than the old paradigm of back office systems most common today. Speaking to the need to improve the development of learning materials, Joel Thierstein, of Rice University and Connexions, identified shifts of thinking required at the provost level down to instructors and researchers in the way academic research is valued by creating new processes for properly vet-

ting and dispersing materials back to the community.

In summary, the overall feeling within open educational initiatives is positive. Progress is being made and open initiatives are working well in learning contexts, yet specific challenges and opportunities lie ahead as we continue forward.

The State-of-the-Art

In recent years, open courseware and open educational resources initiatives have garnered worldwide attention and inspired many institutions to make their course materials and instructional content open and freely available online. Despite initial resistance from educators and instructional designers, there is now a growing acceptance of the idea of open content and reusable, community learning resources. The Open University's OpenLearn program, as presented by Stephen J. Bradley, is pushing this concept to a higher level of innovation by offering free access to online learning materials within an advanced learning management environment that also offers added support and encourages the establishment of collaborative learning communities amongst this new category of learners. Brandon Muramatsu described several projects sponsored by the Center for Open Sustainable Learning at Utah State University. These initiatives contribute to the advancement of open content in this space by encouraging the development of tools that make it easier for learners and instructors to reuse and share online learning materials.

Considering which business models work best for educational open source, content, or service initiatives, the educational technology community has largely followed the lead of the open source soft-

ware industry. In many ways, open initiatives in education find themselves in a similar state—at times struggling to subsist—as those facing the open source software community of the late 1990s. We can learn from these earlier open source software projects that went on to enjoy stunning success by building sustainable communities and/or supportive foundational organizations that have proven critical in establishing open initiatives and engaging willing participants. Sakai has done just that, following a model similar to Apache's in the open source software world, Sakai's open community model, as presented by Charles Severance, has seen marked success in a short period of time. This can be attributed, in large part, to operating under the umbrella of a foundational organization consisting of corporate sponsors and member/user institutions that share developer resources to help sustain the community.



Service Oriented Architectures are being carefully scrutinized by the learning community for the potential benefits of services-based infrastructures, such as extensibility, integration, and interoperability. Sheila MacNeill and Dr. Lyle Winton discussed the initiative, called the e-Framework, sponsored by their respective organizations, JISC and DEST. This open community initiative is focused on identifying processes and models that higher education and research institu-

tions can use to establish a framework for better integrated educational systems and streamlined processes. Commercial vendors are also keying in on this space, such as the Microsoft Learning Gateway. The objective of the Learning Gateway, as described by Cliff Lloyd of Microsoft, is to provide a standards-based platform that allows broad application support, data portability, and system interoperability from multiple vendors, including open and community source solutions.

A primary driver behind the quest for more services focused frameworks is the desire for local, institutional configuration and customization. This allows institutions or organizations to implement only those specific elements that fit their unique needs, which helps clear the path toward future technical trends that see institutions moving away from big, monolithic systems to disaggregated, interdependent components.

The Challenges & Opportunities

The growth and reach of these and future open educational initiatives depend upon what steps are taken to address some of these important requirements identified by those who presented and participated in the open initiatives discussions. These challenges and opportunities include:

- **Building Strong Communities around Open Initiatives.** It is impossible for one organization to support and drive all activities of an open initiative. A thriving community of willing volunteers will do more to guarantee the success of an open initiative than anything else.
- **Making Activities Relevant and Compelling.** In order for open initiatives to attract willing volunteers, there must be compelling drivers. If the

project offers impactful solutions or capabilities, the community will build and maintain itself; however, this cannot be artificially manufactured.

- **Evaluating the Impact.** Measuring the success of the learner experience is crucial to furthering open content initiatives. The emphasis needs to be on the learner and evaluating his/her needs and learning experiences.
- **Allowing Time to Succeed.** In particular with open content, funding is not the most important factor of success. What's needed is time and dedicated, contributing effort.
- **Keeping it Easy.** When discussing the development of or planning for system architectures, the focus needs to be on keeping implementation paths unencumbered by overly complex requirements.

In recognition of the impact that the Open University's OpenLearn program has had on learning, the OU was awarded the LIA Platinum 2007. OpenLearn educational resources, made freely available for download and reuse within a Creative Commons framework, attracted over 370,000 learners from 159 countries in the first six months of the project. Materials are structured in an open source virtual learning environment that includes learning support and collaboration tools. Learners and educators are connected in self-sustaining communities through forums, learning journals, video conferences, and instant messaging.

Influence on IMS GLC Initiatives

The following activities within IMS GLC correspond to supporting and improving initiatives in the open source, open content, and open services communities:

- IMS Common Cartridge (CC) is a standard for delivering content to compliant systems or learning environments. During Learning Impact 2007, several IMS contributing members, including Open University UK, demonstrated content prepared in the Common Cartridge format. This specification is currently being adopted by many IMS contributing members and will be available to the public in late 2007.
- IMS Learning Tools Interoperability (LTI) specification is being developed to provide more advanced interactions and integration of third-party learning applications with student learning systems. Sakai demonstrated portlet integration during Learning Impact 2007 using this specification.
- IMS Service Oriented Architecture project group-under-formation is exploring what activities it can engage in the developing standards or best practices around services based systems. IMS contributing member representatives from JISC and DEST are helping align these efforts within their e-Framework initiative as well.



Summary of Influence on IMS GLC Initiatives

What's Next in Learning Systems

- Content management, document management, resource lists, repositories based on standards; including clarifying best practice for effective adoption. This is a potential topic for the IMS GLC Learning Object Discovery and Exchange workgroup currently under formation.
- Incorporating interoperability of a broad set of collaborative learning tools into the newly chartered LTI workgroup.
- The importance of defining quality of the overall educational experience and how technology can support and enable higher quality. This is a potential topic for the Technology-Enabled Flexible Learning workgroup currently under formation.
- The importance of tying assessment into the learning interactions continues to grow and it is clear from this track and the academic enterprise that there needs to be greater integration between gradable events and other evidence of learning from learning platforms and tools and the enterprise administrative systems. Therefore, taking the next steps to integrate QTI with the latest Academic Enterprise work in IMS GLC is key.

What's Next for Digital Learning Content

- IMS GLC has embraced SOA in its web services approach, but this work will need to be periodically revisited to keep it abreast of new developments in the field.
- Content Packaging and Common Cartridge should be examined for enhancements that will enable personalized learning to be more readily constructed from available content.
- Adaptive assessment suggests the need for a harmonized sequencing mechanism across content and assessments (i.e., QTI).
- The newly formed LTAC (Learning Technology Advisory Council) within IMS GLC is in an excellent position to publish case studies of experiences with the technology and define best practice on sourcing, implementing and operation of technology.
- Single access integration across a myriad of emerging tools.

The Academic Enterprise: Assessment, Analytics and Student/Institutional Performance

- Improve and refine the QTI specification—the QTI specification has wide adoption, particularly for formative assessment. The latest version, QTI v2.1 (available to IMS Members now but publicly in late 2007), addresses the issues of the design and delivery of summative assessment, and incorporates the IMS Content Packaging to support a wide range of metadata that be associated with the items and assessments for outcomes, learning objectives and activities.
- Create a service to support the exchange of enterprise-wide outcomes information—the new Enterprise Services v2.0 specification (available to IMS Members in late 2007 and publicly available in mid 2008) has a new Outcomes Service that supports the management of results. These results can be managed in terms of the relevant courses and programs as well as the grouping of the students.
- Create the next version of the Tools Interoperability Guidelines—the new version 2, called the LTI specification (available to IMS Members in early 2008 and publicly available in late 2008) will support a broader set of tool interactions including outcomes reporting and will be integrated with the IMS Common Cartridge v1.0 specification.

- Establish a competencies framework to serve as the backbone for assessment offering—the various building blocks have been established, including the IMS Reusable Definitions for Competencies and Educational Objectives (RDCEO), and the next stage is to establish the best practices that show how the various IMS GLC specifications can be used to create such a framework.

Progress in Open Source, Open Content, and Open Services

- IMS CC is a standard for delivering content to compliant systems or learning environments. During Learning Impact 2007, several IMS contributing members, including Open University UK, demonstrated content prepared in the Common Cartridge format. This specification is currently being adopted by many IMS contributing members and will be available to the public in late 2007.
- IMS LTI specification is being developed to provide more advanced interactions and integration of third-party learning applications with student learning systems. Sakai demonstrated portlet integration during Learning Impact 2007 using this specification.
- IMS Service Oriented Architecture project group-under-formation is exploring what activities it can engage in the developing standards or best practices around services based systems. IMS contributing member representatives from JISC and DEST are helping align these efforts within their e-Framework initiative as well.



Join the IMS Global Learning Consortium Community



Presentations and Awards from Annual Learning Impact Conference

Leadership Interviews & Articles

Presentations from Quarterly Summit Meetings

Learning Tech Trends & Satisfaction and Best Practice Research

Member Directory

Calls for Participation

The IMS Global Learning Consortium Community is open and free to everyone interested in learning technology. The Community offers:

- Articles – Discussions and interviews with learning technology industry leaders that showcase important developments of products, services, and trends within the learning community inside IMS GLC and beyond.
- Best Practices – Reports and research conducted to help inform readers about the use of technology to support teaching and learning. These reports look at trends in how technology is being used and supported, as well as the technologies themselves.
- Calls for Participation – Notifications to the worldwide IMS GLC community informing them of new initiatives beginning within IMS and inviting all to contribute and participate.

The Community portion of the IMS GLC website also provides access to the Specification Maintenance Database, Use Case Repository, Profile Registry, and Presentations from various events. You'll also be sent notification of IMS GLC News and Press Releases, the Dispatch, our monthly newsletter, a copy of this annual report, and other tremendous resources!

Become part of the Community here: <http://www.imsglobal.org/register/welcome.cfm>



Join us for Learning Impact 2008

Austin, Texas, USA

12-15 May 2008

<http://www.imslobal.org/learningimpact2008/>

Register now!