

Executive Summary: Key Trends in the Use of Technology to Support Learning

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<http://www.imslobal.org/learningimpact2007/li2007report.cfm>

Defining Learning Impact: Access, Affordability, Quality

Regardless of whether you are an executive decision maker involved in higher education, K-12 schools, or corporate education, in the end analysis three things matter. The first is providing access to educational resources. The second is providing that access in an affordable way. The third is improving the quality of those educational resources. These are three elements that are at the heart of IMS Global Learning Consortium's view of learning impact.

Access to educational resources encompasses access to course materials, references, interactive applications, instructors, other learners or any other resource used to support learning. Much of access is about convenience for learners that makes it practical to engage in an educational experience when it otherwise would be impossible.

Affordability at its core in all segments is about the return on investment—the value add—of an educational experience. In some segments, affordability also encompasses a price tag for the educational experience that does not dissuade disadvantaged learners from engaging in an educational opportunity as a right of citizenship. In some segments affordability is measured by the organizational return on investment often heavily dependent on perceived cost savings in the creation and delivery of the educational experience. Education is expensive to produce and deliver. So lowering costs opens up new possibilities for access. Also, there is usually an affordability benefit associated with more convenient forms of access.

Quality of an educational experience is typically associated with outcomes as gauged by the ability to remember and engage learned information, the ability to perform in a similar or new context, or the ability to master one's own sense of what is known and unknown (often referred to as metacognition). Of course, access and affordability are greatly enhanced by quality. That is, access to quality educational experiences and affordable quality educational experiences is what is desired. However, quality may also have a higher cost and resultant price tag. This is a subject of considerable debate.

Access, Affordability, and Quality are at the heart of IMS Global Learning Consortium's view of learning impact.

There are also additional elements that play an important role in achieving learning

impact. In the view of IMS GLC these are adoption, accountability, organizational learning, interoperability, and innovation. **Adoption** indicates large-scale acceptance, typically meaning that a solution is highly useable. **Accountability** is the leadership imperative to determine the appropriate mix of access, affordability, and quality and to ensure its realization. **Organizational learning** is the scaffolding that supports the ability to provide high quality educational experiences. **Interoperability** enables choice and ease of implementation, a key element in enabling an efficient industry. **Innovation**, of course, represents the ability to solve problems in new ways or even envision completely new approaches. In the IMS GLC framework for learning impact, innovation replaces adoption as an evaluation element for research or new products.



The State of Learning Impact via Technology 2007

Access. Technology has had its greatest impact on access to educational resources. Many feel that today the tyranny of time and geography with respect to education is a long way toward being emancipated. The IMS GLC Executive Strategic Council (ESC) believes that access, choice, and opportunity are becoming more and more available to all. Evidence is apparent in the rapid growth of online and distance learning programs offered from a wide spectrum of universities and colleges, providing more flexible and convenient access to learning experiences. However, access is not equal or easy to all educational resources. In some respects it is a societal issue to address this challenge, but it is also a technological issue with

The primary impact of technology to quality of education today goes back to technology's ability to enable access.

respect to the cost of achieving the integration of various mixes of content and applications in the highly accessible online medium. For instance, it is a major challenge to convert course materials developed in one learning platform for use in another—not an uncommon scenario for educators to deal with today. It is also very challenging for an educator to incorporate a favorite learning tool, perhaps podcasting or wiki development, into an integrated set of learning activities.

Affordability. Impact on affordability of education by technology has been largely a matter of the “cost savings from greater convenience” enabled by Internet-accessible learning experiences. The economic value-add of higher education credentials has been strong and well-documented and has permitted tolerance of price increases in many countries. But the general feeling is that we have approached or are approaching the tolerance for price increases, even in countries such as the

U.S. which has been market-oriented in its approach. In the corporate education sector there have been well-demonstrated “savings” by reducing the cost of meetings through distributed learning or the costs of materials replaced via simulations. Therefore, return on investment is a matter of determining if the cost of implementation is less than the assumed cost savings. However, more examples of measuring return by achieving improved performance from investment in education, whether credentialed or not, are warranted.

Quality. The impact on the quality of educational experiences by technology can be viewed from a couple of different perspectives. One perspective is technology-assisted instruction that results in improved learning outcomes or the academic return on technology. Another is the entire field of assessment in the critical role of helping to ascertain learning outcomes and enable improvement of educational processes in a scalable way. It is also important to note that improved learning outcomes could result from engagement or from more effective instructional activities. Technology is capable of playing a role in both. However, in the end analysis, we are still in an era where education is considered highest quality if it occurs via access to the best educational resources. Our current higher education era is influenced greatly by the push toward research as the pinnacle of prestige and knowledge in the 20th century. It is assumed today that physical presence at the centers of research result in the highest quality education. This means that overall the primary impact of technology to quality of education today goes back to technology's ability to enable access to “high quality” resources. The growth of online and distance offerings are as “high quality” as the institutions (or perhaps individuals in other settings) that create and deliver them.

The Road Ahead

In many respects, the distinctiveness of an educational experience is determined by how well thought out the mix of access, affordability, and quality is. In other words, is the educational experience distinctive by design and does the design permeate all aspects of the experience? As pointed out by the IMS GLC ESC, whiz bang products and technologies that don't fit what educators want to do are not embraced. But, the important question for education providers is how clear are you on what is distinctive in your approach? Going forward the value of technology in education will be about how well it can support this distinctiveness. How true this is not just among and between various organizations but also regions and countries. Distinctiveness is the key variable.

The important question for education providers is how clear are you on what is distinctive in your approach?

Access. While there has been great achievement in access and it can be argued that we primarily need access to greater affordability and greater quality educational experiences, we see several other key trends in access. The first is a better design for access to integrated learning resources. The second is access to content collections that are significantly more useable than those of today. The third is more integrated access to one of the greatest sources of learning resources: libraries.

Affordability. The road ahead for affordable education will continue to be dominated by return on investment. And we believe that return on investment will be strongly connected to distinctiveness. The other important aspect of affordability will be evidenced through adoption. There will

be several key trends. The first is the need for technological support for learning to become largely transparent to the users, reducing the need for costly training and development. The second is greater use of innovative products that enable self-directed learning with an instructor in-the-loop. The third is digital or hybrid alternatives to textbooks that reduce costs while maintaining profit incentives for creators and publishers.

Quality. Going forward, quality will be most linked to the aforementioned design of the distinctiveness of the experience and how well technology supports that distinctiveness. We see significantly more activity progressing in services that help achieve a technology design to support distinctiveness. This may encourage educational process redesign by leading institutions and organizations. Education providers will be looking for ways to capture their distinctive approaches with a reasonable investment. Several key trends supporting quality are apparent. The first is tools and techniques for designing and measuring accountability. The second are use of tools that can capture the distinctive curriculum and classroom-based instructional approach of an education provider and make that content available online. The third is use of this and other content alternatives to enhance study techniques. The fourth is greater integration of formative assessment into learning experiences. The fifth involves combinations of all of the above to improve the personalization of learning.



The State of Learning Technology 2007

The Context—10 Years of Learning Technology Industry Evolution

The Rise of the Learning Platform. Scenarios vary by region, but there are some clear results after ten years of global investment. The last ten years has seen the rise of the “centralized learning platform”, referred to by several names (including course management system, virtual learning environment, learning management system, and instructional management system), as an established category along side administrative systems, in both the education and training contexts. There have been significant variations in adoption and by sector globally. For instance, in the U.S., the higher education sector adoption of course management as a core element of the enterprise has been nearly ubiquitous, while the K-12 sector is just now beginning its adoption, led by the needs to support teachers in lesson planning (instructional management systems), state-run virtual schools, and computer-based intervention and tutoring systems. The K-12 schools sector in the UK, Korea, and other countries has moved forward more aggressively in adoption of learning platforms to address such areas as personalized learning and tutoring. The corporate training sector worldwide has seen the rise of the learning management system, primarily to support self-paced learning, with an evolving new emphasis on “talent management”. The corporate education and training sector has been dominated by the influence of the human resources department and other functional depart-

ments (such as sales) that have responsibility for substantial training goals.

The Context of the Evolution of the Learning Technology Industry

- Rise of the Learning Platform
- Continued Dominance of Instructor Led and Credentialed Learning
- Custom and Supplementary Content is King
- Consolidation Leads to Stability with Open Source Emergence

Six Strategic Trends to Watch

1. Increasing Emphasis on Integrated Access to Teaching and Learning Resources
2. Content Collections Resulting in More Usable, Efficient, and Effective Digital/Print Options
3. Self-Directed Learning Programs with Instructor in the Loop for Entry-Level Education or Domain-Specific Learning
4. Evolving Forms of Collaborative Learning
5. Capturing the Classroom for Transparent “Authoring” Techniques, Rich Media, and Mobile Learning
6. Defining and Implementing Accountability and Dashboard Metrics

Continued Dominance of Instructor Led and Credentialed Learning. Despite the many overlaps among the sectors, there has been somewhat of a divergence between the educational scenario, which is dominated by instructor-in-the-loop, with centralized ICT support and decision-making and the training scenario, dominated by self-paced learning with departmental objectives and support. Interestingly, over the last ten years the

higher education and further education sectors have dominated the lifelong learning sector. Despite high hopes for various new and unconventional approaches, there has been a clear preference among adult learners to engage in degree-credit programs.

Custom and Supplementary Content is King. The use and evolution of digital content for learning has varied across the sectors as well. In the corporate education and training sector, digital content ten years ago was focused on one of two areas: computer-based training in non-custom, longer shelf-life titles (such as IT training or leadership) or custom-developed content. Much of the custom developed content was in support of enterprise implementations of ERP (Enterprise Resource Planning), compliance or departmental training objectives. While web technology dominates today, the split is largely the same with custom-developed content continuing to dwarf a relatively small market for web-based, pre-packaged content. In the higher education sector it has become commonplace for textbooks to be supplemented by a variety of digital learning materials that can be accessed through the learning platform or otherwise. While a small minority of faculty have become developers of online courses, a majority feel comfortable using the learning platform to post course information, distribute various documents, and conduct online discussion forums. In the K-12 schools sector, use of digital content has varied regionally in relation to the use of learning platforms, typically associated with overall student access to the Internet.

The value proposition of content in conjunction with the learning platforms has

largely been one of ease of distribution and access (resulting in productivity gains), as opposed to fundamentally changing the nature of instruction or learning. While gurus and pundits promoted the concept of just-in-time performance support and learning objects ten years ago as the coming trend in the corporate learning sector, this has, so far, come down to the use of web technologies to make access to relevant and up-to-date information easier, as opposed to a revolution in learning.

Consolidation Leads to Stability with Open Source Emergence. While the learning platform and supplementary digital content have gained acceptance in



the last ten years, there has been a very significant level of consolidation in terms of the number of providers. This has both caused some churn in the marketplace as well as provided a more stable and viable base of core competitors. There have been very few examples of providers that have been able to cut across sectors. However, the learning platform providers have had some success across geographies. There has also been the emergence in the last four to five years of new open source learning platforms and open learning content providers in the educa-

tion sectors. Open source is evolving as a way to pool investment through participation in a community effort, while enabling customization.

Six Strategic Trends to Watch

The Learning Impact (LI) conference and showcase features the complete spectrum of learning technology innovation from participants around the globe. The LI venue explicitly brings together perspectives on executive level issues, architecture issues, and technology-supported learning for the purpose of determining the “state of” and future directions. There are as many opinions and conclusions formed as attendees at the conference. However, the unique blend of perspectives and participants enables a gauging of “how real” are new developments and “how compelling” is the need they are addressing. Each of the four program track summaries contains a view on a particular area of learning systems, digital content, academic enterprise/assessment, and open technologies. What follows here are the top six strategic trends to watch - those that look “real” and have very compelling drivers. By “strategic” we mean worthy of consideration of being in your planning, purchase, and integration cycle during the next 36 months. Note that products may address one or more of these trends.

Increasing Emphasis on Integrated Access to Teaching and Learning Resources. This trend is being driven by three very compelling needs: convenience, productivity, and strategic inclusion of new learning tools. While it has often been noted that digital natives have no problem switching between different interfaces and applications, the reality of education today is that convenience and productivity, that is, time savings, is one of the most important potential added

values from technology. In addition, faculty and teachers are not technologists and do not have the time to become familiar, let alone expert with new technologies. Therefore, an education provider’s value can be greatly enhanced by providing integrated access to a variety of resources that fit seamlessly into the teaching and learning process.

There are many exciting new educational products emerging. There is also a desire to encompass similar functionality of popular social networking sites into a collaborative learning environment. Such products and functionality are made that much more impactful if they are made available at a single access point and in the appropriate context. This is also true of digital content integration and access. LIA Gold winner *HarvestRoad Hive & the Resource List Management System at the University of Western Australia* represents a breakthrough in an easy to use product that allows integration of library and other digital resources into a familiar “reading list” construct while handling all the underlying technical complexity.

There is a very interesting competitive dynamic as to what should be the central access point for the very large volume of learners and instructors in the educational enterprise. There are at least three options in terms of product categories: learning or course management systems, portals, or administrative systems that provide portals, all of which are vying to be the key point of entry that adds the most value to the educational process. It will be interesting to see if the predominant approach becomes solution/product-, administrator-, student-, or faculty-centric. In addition, the assessment and usage data from new and existing learning tools needs to be used strategically by the education provider in order to improve how education is deliv-

ered. There are at least three options in terms of product categories: learning or course management systems, portals, or administrative systems that provide portals, all of whom are vying to be the key point of entry that adds the most value to the educational process.

Content Collections Resulting in More Usable, Efficient, and Effective Digital/Print Options.

The future of educational publishing may be online environments that are most effective for specific educational purposes. There is compelling pressure to address the cost of textbooks while providing alternative approaches that fit how departments, programs, and individual instructors create and deliver courses. Books and print will not be replaced completely, but the production will become optimized to help reduce costs to learners. Publishers are exploring, and some are already offering, digital content options that are much more usable by faculty, teachers, and instructors than currently available products. This includes customizable courses, supplementary reference web sites, and domain specific adaptive learning environments.

Environments such as LIA Platinum winner *Cyber Home Learning System of Korea* show that even at large scale, effective support for studying supported by technology is viable. Several states in the U.S. are in the process of piloting

new initiatives that are testing various new approaches to supplementary use of digital content that will inform this trend. LIA Platinum winner *OpenLearn at the Open University, United Kingdom (supported by Moodle)* represents another innovative approach to open access to online courses. This continues a several year trend of making various forms of content openly available in order to encourage dissemination of educational practices. We feel that projects

such as this will inform the future direction of digital content for education. Another aspect of this trend will be access to best practice communities for making use of online course materials or other instructional content and support, exemplified by LIA Gold

winner *European eTwinning Action by European Schoolnet*.

Self-Directed Learning Programs with Instructor in the Loop for Entry-Level Education or Domain-Specific Learning.

It is very clear that educational leaders now “get it” when it comes to redesigning high enrollment courses to make better use of technology in order to personalize the experience. Much of this is due to the great work by the National Center for Academic Transformation. However, this trend is also exemplified by LIA Platinum winner *ETS Criterion Online Writing Evaluation service at Farragut High School, Knox County Public Schools*, and LIA Gold winner *California State Uni-*



versity (CSU) *Math and English Success Websites and the CSU Fresno Fast Forward Program*. Both of these winners help learners gauge their own progress, but in different ways. Development of effective and sophisticated applications to support self-directed learning will typically be focused on high enrollment, entry-level subjects. A critical need is to support efficient ways for instructors to be able to monitor and aid self-directed learning. ETS Criterion Online allows and enables this. LIA Silver winner *Using Giunti Labs learn eXact LCMS at the UK NHS and Royal College of Radiologists R-ITI Project* applied many of these same principles in supporting a domain-specific curriculum that enabled greater access, scale, and quality.

In addition, this trend area portends the growing importance of being able to easily integrate assessment into the web support for courses. LIA Silver winner *Respondus 3.5 and University of Alberta* represents the growing value of assessment creation that can pull together pre-developed test items from publishers, as well as institution-created items. It is very possible that the market will see more preformed collections of assessment items to supplement topical areas to make it easier for education providers to incorporate customized formative assessment into web-based course support.

Evolving Forms of Collaborative Learning. Online discussion forums have become a mainstay of instructor-led online courses or seminars. This is because there is ample evidence that they can be utilized in pedagogically successful ways that enhance the level of interactivity beyond what is achievable in many classroom settings. The “Web 2.0” phenomena of social networking, blogging, video sites, wikis, with texting and

instant messaging replacing email, are causing educators to take note and see if this energy and collaboration can be harnessed towards instructional goals. For instance, it is clear that in the appropriate instructional scenario the peer creation and review of a wiki can represent a very realistic and effective learning scenario that builds critical thinking and metacognitive skills. A new wave of innovative companies and products are beginning to address this need in a way that is more straightforward for faculty and students to integrate into the educational online experience. LIA Bronze winner *Wimba (Wimba’s Course Genie: An Authoring Tool for Common Cartridge at Langside College)* is a leader in this emerging area. There are more exotic approaches being experimented with, such as Second Life communities for various aspects of teaching and learning. LIA Silver winner *Microsoft Research ConferenceXP at Australian School of the Air and Classroom Presenter at University of Washington* represents another approach—use of a flexible platform for designing innovative approaches to collaborative learning that are institution or domain specific.

Capturing the Classroom for Transparent “Authoring” Techniques, Rich Media, and Mobile Learning. IMS GLC research into learning technology trends and satisfaction indicates that authoring of content for online environments and the tools to do so remain a challenge and high priority. The reality is that the overwhelming majority of instructors have absolutely no desire to be web developers, instructional designers, or the like. The answer that is emerging after ten years of development, deployment, and testing are the use of low cost, easy to use digital media capture with seamless publishing through a learning or course management system. LIA Bronze winner

Tegrity Campus 2.0 at Saint Mary's University exemplifies this emerging category. The compelling need is to give students options for reinforcing their study by being able to revisit the classroom experience in an efficient way, while adding little to no extra burden on the instructor to make this possible. The applications to distance learning are obvious, but we see this development as probably the most realistic and useful classroom support for learning in the market today, with a high probability of becoming mainstream. Two LIA Bronze winners, *Articulate at Jefferson County Public Schools*, and *Wimba's Course Genie: An Authoring Tool for Common Cartridge* at Langside College both addressed a slightly different solution to this same issue by enabling very easy and intuitive use of familiar desktop applications to develop course materials.

Solutions such as Tegrity's also address the potential for mobile learning with download and replay through iPods or other devices. In fact, whereas the use of rich media for learning has been long-touted, classroom capture, high-speed connections, and ubiquitous playback platforms are making it a reality in some segments. This is especially the case in serving tra-

ditional students in the U.S. higher education segment.

Defining and Implementing Accountability and Dashboard Metrics. Accountability is perhaps the single most important issue for any provider of education whether K-12 schools, further education, higher education, or corporate education and training. However, in all segments defining appropriate accountability metrics and measures beyond completion and retention rates and satisfaction surveys has proven elusive or controversial, or both. The challenge of thoughtful and useful accountability is as much a call to leadership as it is to the technological support for that leadership. This seems to be one of the most important and promising areas for breakthroughs for the student system vendors, learning management platforms, and service providers alike. Activities in IMS GLC indicate that we expect to see implementations and exemplars emerging to provide additional leadership in this important area. LIA Honorable Mention *eCollege Program Intelligence Manager at Iowa Community College Online Consortium* focused most explicitly on this topic out of all of this year's entries.

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Status of Products and Services that Enable Enterprise Learning

How are the strategic trends going to be actualized in the average educational enterprise? Only time will tell. A picture we use to lay out the components needed is shown here as the IMS GLC Learning Enterprise. While there will be some variation by segment and need, we believe that all educational institutions and systems should be aware of developments in the functional areas depicted in the picture by each box. Whether each of those boxes represents a product or a functional service will depend on the strategies of product providers as they vie for a share of the learning enterprise. Interoperability standards enable interoperability of services regardless of which product they reside in. Also note that the term "enterprise" is not meant to imply a physical location. It is assumed that the functionality may exist anywhere that is reachable via the Internet.

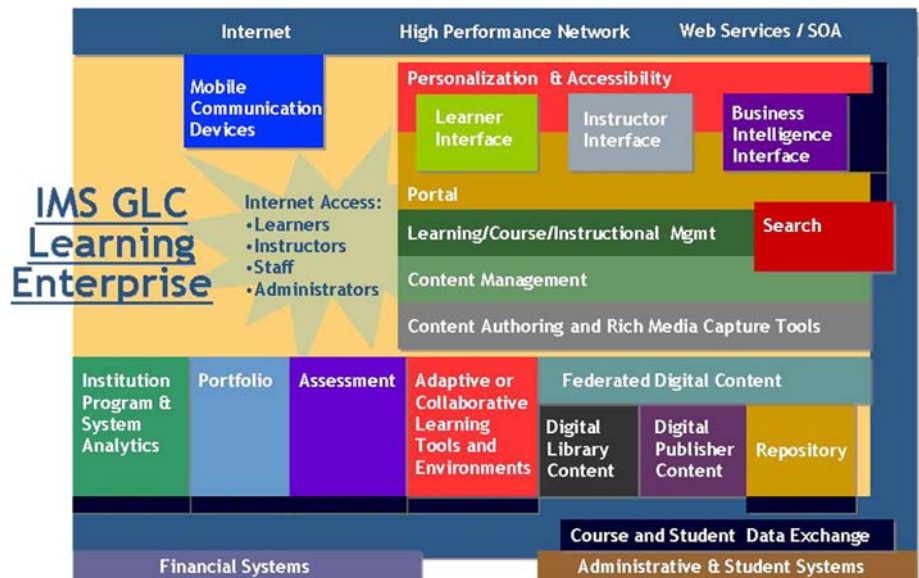
publisher content, digital library content, assessment, and collaborative learning functionality. We also consider the use of web services for learning as emerging.

Niche or R&D

We define the niche functionality of the learning enterprise as that which appears to be finding niche application in some segments of the learning industry. We define the R&D functionality of the learning enterprise as that which needs further development or compelling need to achieve more robust adoption. This does not mean that these functions will remain as niches or R&D. It is solely a reflection on our perception of the current status of these functions. In our opinion these include portfolio, repository, analytics, adaptive learning, mobile communication devices (used

Core

We define the core functionality of the learning enterprise as that which is well established today. This consists of portal, learning management (also referred to as course management, instructional management, or virtual learning environment), content management, and student system functionality.



Emerging

We define the emerging functionality of the learning enterprise as that which is showing potential for becoming mainstream, but has not yet crossed the chasm to mainstream usage. In our opinion, this consists of content authoring, rich media capture tools, digital

explicitly for learning), federated digital content, search (for educational and learning purposes), personalization, and accessibility. We also consider the use of service-oriented architecture (SOA) approaches in this category.

LIA 2007 Awards Summary

Platinum Winners:

- * ETS Criterion Online Writing Evaluation service at Farragut High School, Knox County Public Schools
- * Cyber Home Learning System of Korea
- * OpenLearn at the Open University, United Kingdom (supported by Moodle)

Gold Winners:

- * HarvestRoad Hive & the Resource List Management System at the University of Western Australia
- * The California State University (CSU) Math and English Success Websites and the CSU Fresno Fast Forward Program
- * European eTwinning Action by European Schoolnet

Silver Winners:

- * Using Giunti Labs learn eXact LCMS at the UK NHS and Royal College of Radiologists R-ITI Project
- * Microsoft Research ConferenceXP at Australian School of the Air and Classroom Presenter at University of Washington
- * Respondus 3.5 and University of Alberta

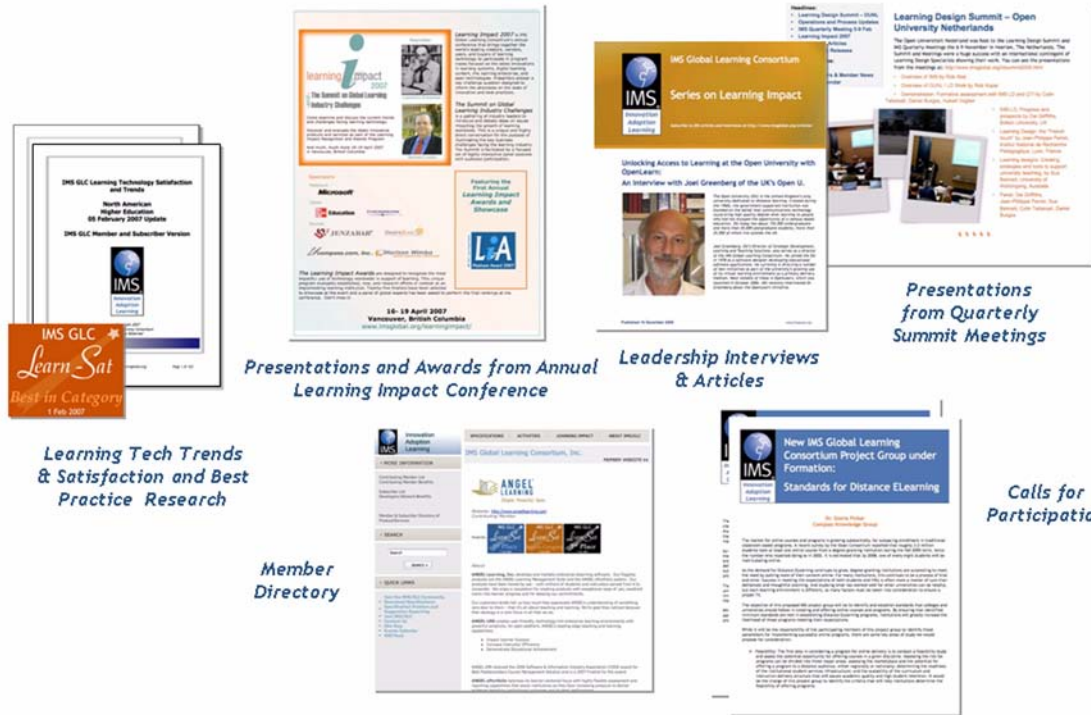
Bronze Winners:

- * Tegrity Campus 2.0 at Saint Mary's University
- * Articulate at Jefferson County Public Schools
- * Wimba's Course Genie: An Authoring Tool for Common Cartridge at Langside College

Honorable Mentions:

- * eCollege Program Intelligence Manager at Iowa Community College Online Consortium
- * Desire2Learn at Office of Open Learning, University of Guelph
- * Microsoft Learning Gateway at Shireland Language College
- * BlueStream Digital Asset Management System At The University Of Michigan (supported by Ancept and IBM)
- * ANGEL at Penn State
- * UGO Online Academic Resource Management system at the University of Montreal (supported by Logiweb)
- * A study on how to enhance support for the Cyber Home Learning System by Korea Education & Research Information Service
- * Meeting the Needs of a Global Student Body with Jenzabar at Park University
- * Microsoft Partners in Learning at Ministry of Education, Thailand

Join the IMS Global Learning Consortium Community



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>



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