WHAT'S NEXT IN LEARNING TECHNOLOGY IN HIGHER EDUCATION?

A-HEC

Executive Briefing Paper

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INTRODUCTION

The purpose of this executive briefing paper is to outline some of the drivers behind the evolution of learning technology in order to understand what may be coming next. This paper is limited to the field of higher education applications. Originally published in October of 2005, it has been updated to reflect the potential impact of the Spellings commission report (A Test of Leadership: Charting the Future of U.S. Higher Education, 2006).

HISTORICAL PERSPECTIVE

In the last nine years or so, since the emergence of the Internet as a mainstream technology, there have been extreme views about the role of technology in learning. One extreme view is that technology can have absolutely nothing to do with learning – it is just a tool. The other end of the spectrum is that technology is a panacea that will enable creation of "learning objects" that will revolutionize how education is delivered and received. What has really happened and was it foreseeable?

There are three elements of learning technology that have become mainstream in this time frame:

- First, classrooms and campuses have continued to incorporate more and more technical infrastructure in terms of networks, Internet connections, smart boards, etc.
- Second, course management systems (CMSs) have been widely adopted at an institutional level providing, for the most part, an online communications hub for posting of class materials, syllabi, etc.
- Third, for those institutions, or operating divisions within institutions that have a mission of outreach, there has been a rapidly growing number of online courses and programs that are taking the place of, but better than, older alternatives for distance learning.

Of course, many ideas and predictions have not become mainstream realities. Among these are:

- Students did not rush to consume new forms of online digital content for studying.
- Institutions did not jump on the bandwagon to allow commercial benefits (either to themselves or third party vendors) from student portals.
- The very large majority of faculty have not opted to become "course developers" and develop online courses using the CMS.
- Use of digital content and third-party digital courses by faculty has remained in a small minority.
- Portals attempting to aggregate courses from multiple institutions have mostly failed with a few limited exceptions.
- High production value courses, sometimes featuring leading authorities or fancy problem-based, interactive learning approaches, have seen several dramatic flops with only a few limited successes in niche areas, such as remedial math.
- While use of PowerPoint, and in some cases the Internet, has become mainstream, in general faculty don't feel that all the technology in the smart classrooms has significantly improved the teaching or the learning experience.

It sure would have been nice to be able to accurately predict which of these things would become mainstream and which would not. Here are some important ideas, briefly summarized, that may have helped do this:

- Geoffrey Moore in his classic book, *Crossing the Chasm* (Moore, 1991, p. 3), indicates that new technologies achieve adoption by mainstream users and markets where there is the highest "compelling reason to buy." This phrase basically means that the value is so clear and the positioning against other alternatives is so favorable that it is a slam-dunk.
- Peter Drucker in his book, *Managing in the Next Society* (Drucker, 2002, pp. 10-11), points out that in technological revolutions most of the changes are changes in *how* we do things, not *what* we do. His examples are the industrial revolution and the information revolution. Most of the adopted

changes from both, with a few notable exceptions, have improved the productivity of things we already knew how to do. An example is that we use the Internet as a better way to buy books, but we don't use it (for the most part), to read digital books.

- Clayton Christensen in his book, *Seeing What's Next* (Christensen et al., 2004), provides theories for understanding when truly disruptive innovations (as opposed to sustaining innovations) take hold, pointing to the important opportunity provided by "nonconsumers." Nonconsumers are those that are the non-users of a product or product category. They are generally not using because the product is too complex or not offered in the right context. This book uses these theories to explain the rise of for-profit and other educational alternatives (Christensen et al., 2004, pp. 99-128).

While hindsight is always 20/20, it appears that the application of these three "forecasters" ten years ago would have produced pretty accurate results. The forecasting screen would specify that the most successful technologies will be ones in which all three conditions hold:

1. There is an extremely compelling reason to adopt, meaning it's almost hard to imagine life without it.
2. It enhances *how* the user does something they already do, but does not radically change *what* they do.
3. It is particularly appealing to the nonusers – providing them an appealing approach to accomplish something they feel they probably need to do yet haven't had an easy enough way to get it done.

Let's look at this briefly. When it became obvious that the Internet was moving into the mainstream, it would have been pretty difficult to imagine a world ten years hence in which the three items that did come to pass did not. In other words, given the ubiquitous adoption of the Internet it would have been difficult to imagine a world in which more technology related to the Internet was not added to classrooms and campuses, that institutions would not want to have something like a

CMS to utilize the Internet for simple but better communication in support of instruction, or for providers of distance learning to create an incrementally better product with a ubiquitous distribution technology that eliminates distance. All three largely were clear productivity improvements on things that were happening already in higher education. They all expanded the availability of something valuable to nonusers. Smart classrooms have made it much easier for the growing number of faculty who use computers, publishing tools, or the Internet to expand that aspect into the classroom. CMSs have enabled a standard and relatively easy way for institutions to simplify distribution of electronic materials without having to build custom web sites for all courses using a variety of tools. Distance learning platforms have greatly improved access for learners – many of whom were nonconsumers of higher education previously.

To consider one counter-example, the idea that students would rush on mass to use new digital content products to study does not pass any of the three screens. The vast majority of students, excepting those involved in research, know what content they are expected to master and it is already fully specified and highly accessible and convenient in traditional forms. While not cheap (textbooks are expensive) there were no online alternatives offered that radically changed the economic equation (or productivity) for the student.

THE COMPETITIVENESS DRIVERS

While U.S. higher education has often been seen as slow moving and traditional, there has in fact been great change in the U.S. higher education landscape since the founding of the first colonial colleges. A couple of observations that have been made numerous times by numerous authors is that the diversity of the U.S. system is its unique strength and that the integrity and tradition of certain core values is the reason why paradoxically our institutions are both trusted as well as misunderstood.

Sometimes with all the news sound bites and other noise we all encounter it is difficult to tell what has really changed recently and whether we should be concerned. Despite all the greatness of our system, there is real evidence that we could be doing better. The challenges are not in research or producing Nobel Prize winners (Bowen et al., 2005, pp. 56-60) – as exciting as that aspect of higher education is. The challenge has to do with being the most educated nation on earth and in essence continuing to be the leader in the model of a highly educated citizenry.

Here are five key competitiveness challenges. First, in the last 20 years the U.S. has dropped from first to seventh in the percentage of young adults attaining college degrees (OECD, 2005, p. 5). Second, despite better preparedness for college we are seeing no rise in the last 10 years in the percentage of high school graduates attending college (Measuring up 2004, 2004, p. 11) - an area in which there were previously dramatic gains (Bowen et al., 2005, pp. 69-72). Third, although gains have been made, we continue to see significant stratification of which college a student attends based on family income (Collins & Veskel, 2004, p. 132) (Bowen et al., 2005, p. 84-87). Fourth, while enrollments are projected to grow at a relatively modest 1.4% per year overall during the next 5-10 years (Gerald & Hussar, 2002), 20 states will see dramatic rises in enrollment that will pose significant capacity challenges (Martinez, 2004). And fifth, and probably most importantly, we continue to struggle with attainment or graduation rates at about 60% within 6 years (Choy, 2002a) with one study indicating that the time to achieving a BA

degree has increased substantially since 1970 (Turner, 2004).

While some of these challenges have been ongoing, it is natural to ask what are the most significant drivers in higher education change? It turns out that some things have changed pretty radically in the last 35 years. Probably the most significant is a rise in the cost to attend college that has been twice the rate of inflation (Vedder, 2004, p. 3). A close second in significance is the dramatic shift in financing for higher education from grants to loans over the last 15 years (Losing ground: A national status report on the affordability of American higher education, 2002, p. 7). Taken in

total the economic realities and financing trends make it not at all unusual for today's student to graduate with $15,000 to $25,000 or more of debt (Federal student loan debt: 1993 to 2004, 2005). Over the last 35 years, especially from 1970 to 1995, there has been a dramatic rise in non-traditional students (Vedder, 2004, p. 96-99) - those that need to work or have other serious distractions from the degree goal.

Today, the percentage of students that are traditional is only 27% (Choy, 2002b, p. 1). While the percentage of non-traditional learners is expected to level off (Gerald & Hussar, 2002, p. 31) over the next ten years, there are no signs that we are going back to the traditional past. The biggest challenge and potential opportunity is that data indicates that the non-traditional student is much less likely to complete courses or programs due to other priorities in life. In fact, the graduation rate in

six years for the non-traditional student drops to as low as 32% for some non-traditional factors ([Student success: Understanding graduation and persistence rates 2003](), p. 7).

The future challenge for U.S. higher education can be summarized in one simple phrase, "How can we educate more people?" This means a higher percentage of successful students entering, persisting and completing. This means that our system must make room for more students and must do a better job of providing quality education that fits their life circumstances. The challenge is in helping all students, a majority of whom are more distracted and economically challenged, complete programs that not only help them get jobs but help them move ahead significantly in terms of liberty and economic status. Since the amount of knowledge is said to be doubling every seven years, this is not a trivial task – and may in fact be the most important challenge of our future. And, as a global leader the U.S. has a role in this equation for the entire world.

FROM ACCESS TO STUDENT ACHIEVEMENT

In light of the 35-year trends of improved access with continued low completion rates and increasing completion times, several experts have weighed in that the next big challenge in U.S. higher education is degree attainment. The recent book, *The Future of Higher Education*, emphasizes the critical need to move the focus beyond access to attainment ([Newman et al., 2004](), pp. 56-58) as one of a handful of key areas where there is

a growing gap between public needs and the reality of U.S. higher education. In another recent book, *Equity and Excellence in Higher Education*, the case is made for focusing on completion versus enrollment ([Bowen et al., 2005](), pp. 91-94).

"Finally it seems clear that enrollment maximization is not the best policy to pursue; college completion (in a timely fashion) is a more important goal." ([Bowen et al., 2005](), *p. 94*)

Why is student achievement becoming a catalyst for action at many institutions? How important is it? We note the following three factors:

- There are few mission objectives that have as positive economic return for society, students, and the institution than increasing the retention and completion rates. For many higher education leaders it is crucial to their mission and ultimately a key measure of their success.
- For-profit institutions have jumped in with fast growing offerings that are especially oriented to the non-traditional student, and now a subset of the nonprofit institutions, serving the same student body, are motivated and mounting substantial online and hybrid initiatives where timely completion is probably the number one selection criteria for prospective students.
- While the outcry to improve higher education is not nearly as strong as that to improve K-12, it is only a matter of time that the diminishing position of the U.S. in terms of world leadership gets additional attention. In terms of an economic driver, the 4-year degree appears to now be essential for dramatic lifetime earnings differentials ([Kelly, 2005]()) and the associated GDP growth.

THE ROLE OF LEARNING AND LEARNING TECHNOLOGY

In many respects, learning technology has already provided the means for additional access and capacity. It has been and is up to the most motivated institutions to take advantage of this development.

Retention, persistence, and graduation rates have been under study for several decades. Perhaps the most notable scholar in this area is Vincent Tinto of Syracuse University. Tinto identifies five factors that impact persistence: expectation, advice, support, involvement, and learning (Tinto, 2002, pp. 27-28). It is interesting to note that these factors essentially define an institutional system for success. It is also interesting to note that certainly the challenges in these areas grow as more non-traditional students are served.

While some institutions that specialize in distance programs have adopted new ways to set expectations, provide advice, and provide support, most students are looking to the heart of their learning experience, the interaction with faculty, to judge whether the educational endeavor is worth the time and effort. This is where involvement and learning takes place for the non-traditional student and probably most traditional students as well.

Tinto reinforces this idea with his finding that the last factor, learning, is the key ingredient:

> *"Students are more likely to persist and graduate in settings that foster learning. Learning has always been the key to student persistence. Students who learn are students who stay."* (Tinto, 2002, p. 28)

> *"The center of the policy I have in mind . . . must be located at the center, not the periphery, of institutional life and must commit the institution to place the assessment and promotion of student learning and persistence at the top of their priority list."* (Tinto, 2002, p. 29)

If the research from these decades of study is correct, it means that in fact the most impactful and compelling need in solving retention, persistence, and graduation is better learning. Again, the challenge in achieving better learning should not be underestimated given that there is more to know while at the same time most students have substantial non-traditional concerns.

PREDICTIONS FOR LEARNING TECHNOLOGY

The concluding section of this paper will put some stakes in the ground for what mainstream developments we will see in the next seven to eight years with respect to learning technology. The approach is to apply the prediction screen covered above along with what has been argued as the most compelling need of student achievement.

Expect to see more of the three now accepted innovations outlined above, CMSs, distance learning platforms, and more Internet technology on campus and in classrooms. This is because these innovations are in relatively early phases of their adoption and there is plenty of room for additional sustainable innovations in these product categories.

The question is what are some other product categories that would seem to fit the model discussed above? Since there are infinite ideas, presented here are only a few that seem to have the most merit.

First, there appears to be a compelling need for tools that help students do more productively what they already do so they can learn more efficiently and effectively. What are examples of this?

- Systems that help students take notes and study from notes more effectively.
- Systems that help students organize their course materials and improve the efficiency and effectiveness for review in preparation for tests.
- Tools that help students interact with faculty more effectively, especially with regards to helping faculty understand the degree of student learning.
- ePortfolio tools to do a better job at capturing student accomplishments – if they can improve productivity – providing a platform for students to interact better with faculty and improve the learning experience.
- Online search engines for academic content – as a more productive way of finding the right materials as opposed to being a substitute for the materials.

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Second, there is a compelling need for pedagogical tools for faculty that can be used by the majority who do not wish to be "course developers." Today most faculty, while not being entirely comfortable with technology, understand the potential of the Internet. Yet, becoming an Internet "course developer" makes absolutely no sense for them given tight time constraints, their interests, or expertise.

key factor of learning, the core of which still centers around the classroom experience. It is important to note that some appear to be searching for approaches that radically transform the classroom experience. While certainly interesting, these approaches violate the second screen and are unlikely to be adopted except in niche markets.

Lastly, online tools that link students, faculty, and the administration can be used for assessment to improve the quality of the student-faculty interaction. This is the third compelling need area. This is becoming a very active area that is being approached on several fronts:

- Tools that allow faculty to monitor student study interactions to determine which materials are most difficult and why.
- Tools that allow faculty to self-assess their teaching, in essence a better approach to course evaluations.
- Tools that allow administrators to determine which courses, under what conditions, are having retention or other problems.
- Tools that allow the obtainment of learning objectives to be better tracked within the context of a course or a curriculum – with a caution that this may gravitate only to niches that have well-defined learning outcomes and where it is a standard practice already to lay them out.

Figure 1
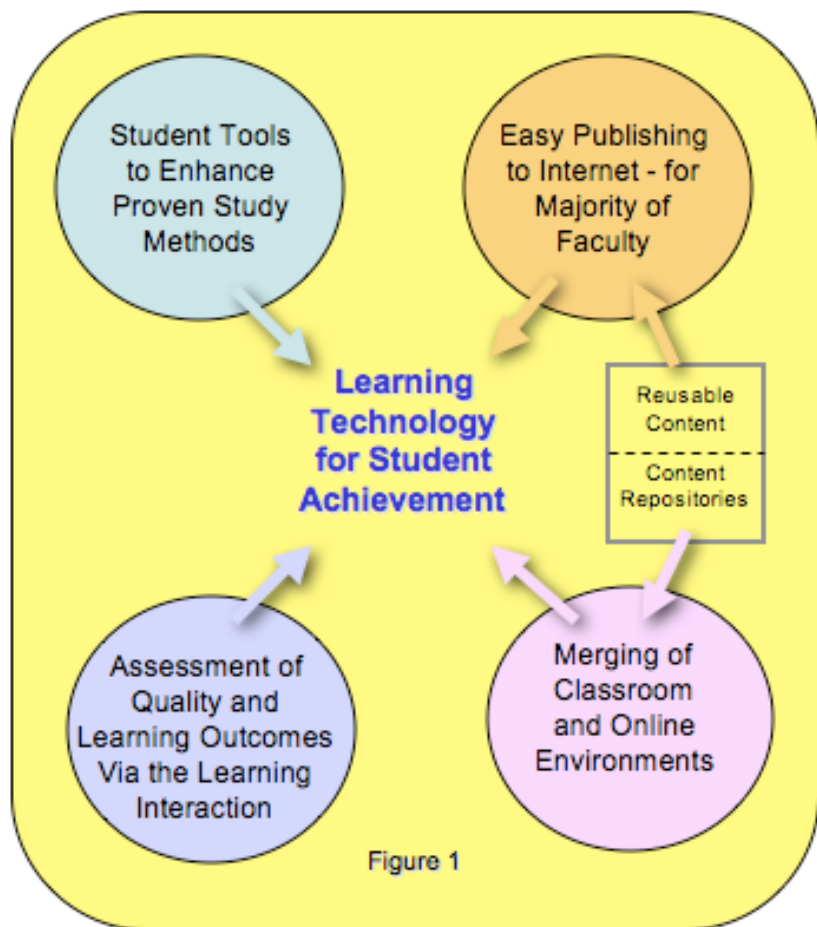
Third the concept of classroom at the center of the learning interaction and engagement is not going away anytime soon. In fact, we are seeing a trend in marrying the online and classroom experiences – doing what we always have done, but better. This trend has been verified in the A-HEC (Alliance for Higher Education Competitiveness) performed study on Internet-Supported Learning in which leaders in fully online programs continue to express a priority in developing hybrid programs (Abel, 2005, p. 41). This trend verifies the inherent realization of the importance of Tinto's

Figure 1 summarizes these conclusions in graphical form. An interesting question concerns the role of new technologies for production of online content, namely content repositories and the reusable content itself. Both of these have strong compelling needs in the market for purely online courses in which content quality and productivity improvements are high priority concerns. Whether these can cross over to the mainstream depends on how well they can be used to aid the majority of faculty as well as how well they can apply to the classroom context (in addition to online).

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ACCOUNTABILITY AND LEARNING TECHNOLOGY

Some believe that the recent report from the Spellings commission (A Test of Leadership: Charting the Future of U.S. Higher Education, 2006) portends an increasing role for the federal government in ensuring higher education accountability (Eaton, 2007). Indeed, a least two national coalitions of colleges have responded with new initiatives to aid in achieving transparency to the public (see the web sites for College Portrait and Transparency by Design).

In education, accountability is typically associated with two things: some type of reporting on student success and some type of comparative testing. The evolution in recent years of some new instruments, such as the National Survey of Student Engagement and the Collegiate Learning Assessment, have provided more information to college administrators and are now being considered for public consumption by the initiative mentioned above. From these developments one can postulate that perhaps the Spellings commission or other competitive pressures have encouraged some institutions to submit to comparisons. This would be a major cultural shift. However, how far it will go is still unclear. There are warnings that comparison of test data can be faulty, for instance, comparing means of scores when it would be the variance that is most revealing (Kuh, 2007).

Technology will clearly continue to have a role in summative assessments of various types. However. in light of the prior discussion of this paper, the principle that technology must make the job of accountability easier is key. Yet, verifying the efficacy of any educational experience, especially higher education, may be an impossible task.

As such, I see two additional potential impact areas for technology that help to address the overlay of accountability upon the prior predictions in this paper. The first is tools to aid in the cataloging and measuring of learning outcomes. This is based on the belief that accountability will give many institutions greater incentives, both external and internal, to be explicit about learning outcomes at the academic program and course levels. In the context of the prior discussion, such tools could not only help educators be more efficient in the design of learning experiences, but could also help students self-assess.

The second impact area is greater integration across various learning and adminstrative applications. Such integration will make possible the linkage between learning outcomes constructed in one system and assessment that occurs via many systems, such as course delivery platforms, assessment tools, and so forth.

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About Rob Abel

Rob Abel is an education industry researcher, consultant, author, and analyst focused on transformation, innovation, and effectiveness in higher education. He founded the Alliance for Higher Education Competitiveness (A-HEC) in May 2004 for the purpose of performing research to uncover and disseminate best practices that enable transformation. In order to fulfill this mission in a scalable fashion, Rob has lead the development a new action research methodology of participatory evaluation that facilitates institutional collaboration. A-HEC's mission is to help the United States and the world meet the challenge of providing postsecondary education to more people. A-HEC corporate and institutional sponsors are "***Working Together to Educate More People***."

Prior to founding A-HEC Rob was the Senior Vice President of Client Services for Collegis (now SunGard Collegis) where he was responsible for services delivered to more than 60 higher education institutions. Rob also served as General Manager of Collegis' Online and Academic Services business unit (formerly known as Eduprise), Chief Marketing Officer, and Senior Vice President of Business Development.

Rob has over 25 years experience in high tech general management, business development, marketing, and product development. At Oracle Corporation has was the Senior Director for the Oracle Learning Architecture, a pioneering and award-winning learning management system and worldwide application service provider initiative. At National Semiconductor Rob was a Senior Market Development Manager focused on Internet products during the emergence of the Internet.

At TRW Rob was the Managing Director of the Accuscan Environmental Monitoring business unit and the Director of TRW's Advanced Computer Laboratory, an applied research and development group focused on high performance network operating systems, distributed systems, adaptive signal processing, artificial intelligence, expert systems, and human-machine interface.

Rob has earned an undergraduate degree in Computational Physics from Carnegie Mellon University, a graduate degree in Computer Engineering from USC, and a graduate degree in Engineering Management from Stanford.

Rob has been recognized as a National Merit Scholar, a Hughes Master Fellow, and the recipient of the TRW Chairman's Award for Innovation.