NMC Horizon Project Preview

2012 Higher Education Edition

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Time-to-Adoption: One Year or Less

Mobile Apps

Mobile phones — distinct from new sorts of larger format mobile devices such as tablets — have as a category proven more interesting and more capable with each passing year. According to a report from mobile manufacturer Ericsson, by 2015 80% of people accessing the Internet worldwide will be doing so from a mobile device. At the 2011 Mobile World Congress, Google CEO Eric Schmidt noted that for every baby born that year, 30 Android phones would be activated. Mobiles are becoming better understood in the academic world; there has been a significant amount of time spent finding creative ways to incorporate them both in the physical space and as a tool to help students learn from a distance. As educational institutions become more adept at developing and using mobile apps, their utility and pervasiveness is only due to increase. Current examples of mobile apps span functions from interpretation and education to campus service directories to specialized apps tied to specific courses.

Tablet Computing

In the past year, advances in tablet computers have captured the imagination of educators and museum professionals around the world. Led by the incredible success of the iPad, which in 2011 was selling at the rate of more than 3 million units a month, other similar devices such as the Samsung Galaxy and Sony's Tablet S, have also begun to enter this rapidly growing new market. In the process, tablets (a form that is distinct from tablet PCs) have come to be viewed as not just a new category of mobile devices, but indeed a new technology in its own right, one that blends features of laptops, smart phones, and earlier tablet computers with always-connected Internet, and thousands of apps with which to personalize the experience. As these new devices have become more used and understood, it is clear that they are independent and distinct from other mobile devices such as smart phones, eReaders, or tablet PCs. With significantly larger screens and richer gestured-based interfaces than their smartphone predecessors, they are ideal tools for sharing content, videos, images, and presentations because they are easy for anyone to use, visually compelling, and highly portable.

Time-to-Adoption: Two to Three Years

Game-Based Learning

Game-based learning has gained considerable traction since 2003, when James Gee began to describe the impact of game play on cognitive development. Since then, research — and interest in — the potential of gaming on learning has exploded, as has the diversity of games themselves, with the emergence of serious games as a genre, the proliferation of gaming platforms, and the evolution of games on mobile devices. Developers and researchers are working in every area of game-based learning, including games that are goal-oriented; social game environments; non-digital games that are easy to construct and play; games developed expressly for education; and commercial games that lend themselves to refining team and group skills. Role-playing, collaborative problem solving, and other forms of simulated experiences are recognized for having broad applicability across a wide range of disciplines.

Learning Analytics

Learning analytics refers to the interpretation of a wide range of data produced by and gathered on behalf of students in order to assess academic progress, predict future performance, and spot potential issues. Data are collected from explicit student actions, such as completing assignments and taking exams, and from tacit actions, including online social interactions, extracurricular activities, posts on discussion forums, and other activities that are not directly assessed as part of the student's educational progress. The goal of learning analytics is to enable teachers and schools to tailor educational opportunities to each student's level of need and ability. Learning analytics promises to harness the power of advances in data mining, interpretation, and modeling to improve understandings of teaching and learning, and to tailor education to individual students more effectively. Still in its early stages, learning analytics responds to calls for accountability on campuses and leverages the vast amount of data produced by students in academic activities.

Time-to-Adoption: Four to Five Years

Gesture-Based Computing

It is already common to interact with a new class of devices entirely by using natural gestures. The Microsoft Surface, iPad, iPhone and iPod Touch, the Nintendo Wii, and other gesture-based systems accept input in the form of taps, swipes, and other ways of touching, hand and arm motions, or body movement. These are the first in a growing array of alternative input devices that allow computers to recognize and interpret natural physical gestures as a means of control. We are seeing a gradual shift towards interfaces that adapt to — or are built for — humans and human movements. Gesture-based computing allows users to engage in virtual activities with motion and movement similar to what they would use in the real world, manipulating content intuitively. The idea that natural, comfortable motions can be used to control computers is opening the way to a host of input devices that look and feel very different from the keyboard and mouse — and that enable our devices to infer meaning from the movements and gestures we make.

Internet of Things

The "Internet of Things" has become a sort of shorthand for network-aware smart objects that connect the physical world with the world of information. A smart object has four key attributes: it is small, and thus easy to attach to almost anything; it has a unique identifier; it has a small store of data or information; and it has a way to communicate that information to an external device on demand. The Internet of Things extends that concept by using TCP/IP as the means to convey the information, thus making objects addressable (and findable) on the Internet. Objects that carry information with them have long been used for the monitoring of sensitive equipment or materials, point-of-sale purchases, passport tracking, inventory management, identification, and similar applications. Smart objects are the next generation of those technologies — they "know" about a certain kind of information, such as cost, age, temperature, color, pressure, or humidity — and can pass that information along easily and instantly. They can be used to digitally manage physical objects, monitor their status, track them throughout their lifespan, alert someone when they are in danger of being damaged or spoiled — or even to annotate them with descriptions, instructions, warranties, tutorials, photographs, connections to other objects, and any other kind of contextual information imaginable. The Internet of Things would allow easy access to these data.

Key Trends

The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators. Institutions must consider the unique value that each adds to a world in which information is everywhere. In such a world, sense-making and the ability to assess the credibility of information are paramount. Mentoring and preparing students for the world in which they will live, the central role of the university when it achieved its modern form in the 14th century, is again at the forefront. Universities have always been seen as the gold standard for educational credentialing, but emerging certification programs from other sources are eroding the value of that mission daily.

Education paradigms are shifting to include online learning, hybrid learning and collaborative models. Budget cuts have forced institutions to re-evaluate their education platforms and find alternatives to the exclusive face-to-face learning models. As such, what may have began as a challenge has now become an increasingly interesting trend. Students already spend much of their free time on the Internet, learning and exchanging new information through various resources, including social networks. Institutions that embrace face-to-face/online hybrid learning models have the potential to leverage the online skills learners have already developed independent of academia. We are beginning to see developments in online learning that offer similar — if not better — environments than physical campuses, including opportunities for increased collaboration while equipping students with stronger digital skills. Hybrid models, when designed and implemented successfully, enable students to learn at their own pace and style, whenever they want from wherever they are.

People expect to be able to work, learn, and study whenever and wherever they want to. Life in an increasingly busy world where learners must balance demands from home, work, school, and family poses a host of logistical challenges with which today's ever more mobile students must cope. A faster approach is often perceived as a better approach, and as such people want easy and timely access not only to the information on the network, but to their social networks that can help them to interpret it and maximize its value. The implications for informal learning are profound, as are the notions of "just-in-time" learning and "found" learning, both ways of maximizing the impact of learning by ensuring it is timely and efficient.

The technologies we use are increasingly cloud-based, and our notions of IT support are decentralized. The continuing acceptance and adoption of cloud-based applications and services is changing not only the ways we configure and use software and file storage, but even how we conceptualize those functions. It does not matter where our work is stored; what matters is that our information is accessible no matter where we are or what device we choose to use. Globally, in huge numbers, we are growing accustomed to a model of browser-based software that is device-independent. While some challenges still remain, specifically with notions of privacy and control, the promise of significant cost savings is an important driver in the search for solutions.

There is a new emphasis in the classroom on more challenge-based and active learning. Challenge-based learning and similar methods foster more active learning experiences, both inside and outside the classroom. As technologies such as tablets and smartphones now have proven applications in higher education institutions, educators are leveraging these tools, which students already use, to connect the curriculum with real life issues. The active learning approaches are decidedly more student-centered, allowing them to take control of how they engage with a subject and to brainstorm and implement solutions to pressing local and global problems. The hope is that if learners can connect the course material with their own lives and their surrounding communities, then they will become more excited to learn and immerse themselves in the subject matter. Studies of challenge-based learning in practice, including two

authored by the NMC, depict an increase in the uptake of 21st Century Skills among learners, including leadership and creativity.

The world of work is increasingly collaborative, driving changes in the way student projects are structured. As more and more employers are valuing collaboration as a critical skill, silos both in the workplace and at school are being abandoned in favor of collective intelligence. To facilitate more teamwork and group communication, projects rely on tools like wikis, Google Docs, Skype, and online forums. Projects are increasingly evaluated by educators not just on the overall outcome, but also on the success of the group dynamic. In many cases, the online collaboration tool itself is an equally important outcome as it stores — and even immortalizes— the process and multiple perspectives that led to the end results.

Significant Challenges

Appropriate metrics of evaluation lag the emergence of new scholarly forms of authoring, publishing, and researching. Traditional approaches to scholarly evaluation such as citation-based metrics, for example, are often hard to apply to research that is disseminated or conducted via social media. New forms of peer review and approval, such as reader ratings, inclusion in and mention by influential blogs, tagging, incoming links, and re-tweeting, are arising from the natural actions of the global community of educators, with increasingly relevant and interesting results. These forms of scholarly corroboration are not yet well understood by mainstream faculty and academic decision makers, creating a gap between what is possible and what is acceptable.

Digital media literacy continues its rise in importance as a key skill in every discipline and profession. This challenge, driven by a related trend, appears here because despite the widespread agreement on the importance of digital media literacy, training in the supporting skills and techniques is rare in teacher education and non-existent in the preparation of faculty. As lecturers and professors begin to realize that they are limiting their students by not helping them to develop and use digital media literacy skills across the curriculum, the lack of formal training is being offset through professional development or informal learning, but we are far from seeing digital media literacy as a norm. This challenge is exacerbated by the fact that digital literacy is less about tools and more about thinking, and thus skills and standards based on tools and platforms have proven to be somewhat ephemeral.

Economic pressures and new models of education are bringing unprecedented competition to the traditional models of tertiary education. Across the board, institutions are looking for ways to control costs while still providing a high quality of service. Institutions are challenged by the need to support a steady — or growing — number of students with fewer resources and staff than before. As a result, creative institutions are developing new models to serve students, such as streaming introductory courses over the network. As these pressures continue, other models may emerge that diverge from traditional ones. Simply capitalizing on new technology, however, is not enough; the new models must use these tools and services to engage students on a deeper level.

Institutional barriers present formidable challenges to moving forward in a constructive way with emerging technologies. Too often it is education's own processes and practices that limit broader uptake of new technologies. Much resistance to change is simply comfort with the status quo, but in other cases, such as in promotion and tenure reviews, experimentation or innovative applications of technologies is often seen as outside the role of researcher or scientist.

New modes of scholarship are presenting significant challenges for libraries and university collections, how scholarship is documented, and the business models to support these activities. While the university library has traditionally housed collections of scholarly resources, social networks and new publishing paradigms such as open content are challenging the library's role as curator. Students and educators are increasingly able to access important, historic research in web browsers on devices of their choosing. As such, libraries are under tremendous pressure to evolve new ways of supporting and curating scholarship.