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EDITORIAL PREFACE



Changing the landscape of higher education: From standardized learning to customized learning

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ABSTRACT

Several universities worldwide have been offering their courses and programs through the e-learning mode, and this offering is changing the landscape of higher education. Disruptive information and communication technology and Internet technologies have been steadily impacting delivery of education. Social net worlds, wikis, blogs, YouTube, interactive websites, and integrated handheld communication technologies have taken over face-to-face meeting for learning. Virtual campuses with massive open online courses such as Coursera already deliver virtually every possible course through e-learning. Open online courses have already become the norm. Learners are utilizing formal and informal learning venues to create competence-based skill sets for higher employability. This article describes the evolution of the web, and consequently the evolution of e-learning, which is changing the landscape of higher education.

Introduction

In past two decades, information and communication technology (ICT) and Internet have been changing our lifestyles, enabling several social and economic developments, changing ways of buying and selling goods and services, and even affecting our social interactions. The biggest impact we are experiencing, however, is in the field of education as the learning landscape is changing and new learning spaces are emerging. The definitions of *classroom* and the *modes of delivery* are also changing. Higher education systems worldwide are changing and will continue to change. The contributors to this paradigm shift are the explosion of the Internet with decreasing computing and communication costs, ballooning tuition fees, increasing costs of academic resources, decreasing enrollments, changing demographics, and decreasing funding support from governments and other sources. As per Moody Investors Service, more than 100 four-year public institutions and more than 150 four-year private institutions in United States had a decline in net-tuition revenues in the 2013 and 2014 fiscal years (Carlson, 2013).

A typical student is no longer 18-years-old and fresh out of high school. More than 70% of higher education students are considered *non-traditional*, meaning they may work while attending school, study part-time or online, or support a family (Christensen, 2017a, 2017b). The expectations of non-traditional students are higher than ever before. Engaging students on a 24/7, on-demand basis cannot be accomplished without innovatively providing class and college experiences online. Affordable Internet access around the world is offering an opportunity to millions of students globally to take advantage of massive open online courses (MOOCs) and other online education alternatives. Free online courses offered by the MOOCs through platforms such as EdX, Coursera, and Udacity have been challenging universities in their ability to sustain themselves through traditional classroom and chalkboard education. Clayton Christensen (2017a, 2017b) predicts that half of U.S. traditional universities, community colleges, and for-profit schools (6,900 accredited postsecondary institutions in the United State) will close by 2028.

Social media platforms such as Facebook, Twitter, blogs, YouTube and others, which were initially known as mere info-entertainment spaces, have already become new learning spaces for interaction among students and professors, idea sharing, tutoring, and training just like traditional classroom learning spaces. With the introduction of three-dimensional (3D) virtual technologies in their curriculum, learners will be able to augment their skills by putting themselves in real-world situations, thus enhancing their academic skills in dealing with practical situations. Technologies like Google Glass and other wearable tech devices have already been used in limited ways in virtual reality e-learning experiments. For example, Google Glass provides a virtual tour of a museum or any other facility so students can experience facts and figures or landmarks without traveling to those locations. Google Glass also document and share lessons involving demonstrations and hands-on experiences, as well as providing accessibility to learning materials for students with visual, auditory, and/or physical disabilities. The learners of the future may use a variety of applications (apps) available on mobile platforms to enhance their learning skills and may simultaneously work in teams through chat boards on real-life applications. The e-learning of the future will incorporate interactive video games as part of the curriculum over and above asynchronous online learning through discussion or chat boards. Learners will better enhance their cognitive skills by playing these games based on real-life applications.

These changes in education delivery modes are significantly transforming the roles of professors, students, and administrators. The role of a professor is changing from “a sage on the stage” to a “guide on the side.” A professor is becoming more of a facilitator, enabler, motivator, and a resource provider rather than a traditional classroom face-to-face “teacher/preacher.” The definitions and roles of *classroom*, *student engagement*, *library*, *class interaction*, and *college campus* are changing. In an online classroom, students may enroll from anywhere in the world and break traditional classroom’s physical boundaries. The chalkboards are being replaced with chat or discussion boards.

In the context of these disruptive changes in delivery of education, this article highlights the changing landscape of higher education in the context of e-education (e-teaching as well as e-learning). The first section discusses the evolution of the world wide web (WWW). The second section describes how WWW evolution has had a direct impact on e-education. The third section discusses the evolving concept of personalized learning, which will necessitate that universities find ways to tailor and align curriculum and supporting learning infrastructures to match the personalized demands of students.

World wide web trajectory from web 1.0 to web 3.0

Before we discuss the evolution of e-learning, it is important to understand WWW trajectory from Web 1.0 to Web 3.0.

Web 1.0 (Circa 1992–2002)

The *Web 1.0* terminology refers to the beginning of the Internet when it was used mainly for displaying static information during early 1990s. According to Tim Berners-Lee, the first implementation of the web, representing the Web 1.0, could be considered as the “read-only web,” that made content available online for reading. Millions of web sites were created during this era. These web sites served well for sharing static information but could not do any interaction or facilitate any transaction with web surfers and customers (Rubens, Kaplan, & Okamoto, 2011).

Web 2.0 (Circa 2002–2012)

The term *Web 2.0* was coined back in 2003 by Dale Dougherty, Vice President at O’Reilly Media, which became popular in 2004. Web 2.0 was the advancement of Web 1.0. The web sites in Web 2.0 could do “read-write” or two-way communication for any interaction or transaction (Richardson, 2006, Fuchs, et al., 2010). During this era, users started writing blogs and do e-commerce transactions. Social network platforms such as Wiki, blogs, Twitter, Facebook, Flickr, and YouTube are also examples of the Web 2.0

era. Web 2.0 provided a complete platform for interoperability, sharing information and collaboration among users and created an opportunity for virtual community (Dominic, Francis, & Pilomenraj, 2014; Singh & Gulati, 2011).

Web 3.0 (Circa 2012–Onwards)

Web 3.0 is also known as the “read-write-execute” Web (Maria & Negrila, 2012). Web 3.0 technologies include *artificial intelligence, automated reasoning, cognitive architecture, distributed computing, knowledge representation, ontology, recombinant text, Semantic Web, Semantic Wiki, and software agents*. These terms coined in literature represent the use of semantics and artificial intelligence to make for a “smarter web.” Web 3.0 is far from ubiquitous, and the technology is still evolving. Internet experts predict Web 3.0 will be a complete reinvention of the web, something Web 2.0 was not. Web 3.0 is an artificially intelligent web, which is likely to offer virtual assistants for surfing the net and making online lives easier and more intuitive with the use of smarter applications. It may offer social bookmarking as a search engine, which could provide more intelligent results than using Google. Artificial intelligence based assistants will support natural language, and users will be able to use smart devices such as phones, personal digital assistants, and other mobile devices to give commands to assistants to complete tasks (Rego, Moreira, Morales, & Garcia, 2010; Rubens et al., 2011; Singh & Gulati, 2011).

The impact of web evolution on e-learning trajectory

E-learning has been evolving alongside the WWW (Hussain, 2012; Hussein, 2014; Rubens et al., 2011) advancement. E-learning has also evolved in three phases as described in the following text, with a time lag of approximately 2–3 years.

E-Learning 1.0 (Circa 1995–2005)

E-learning 1.0 evolved along with Web 1.0. During this phase, various universities worldwide started adopting learning management systems (LMS) or learning content management systems (LCMS) to offer course content online. This adoption helped universities offer courses with online interactions with students for course content. This approach also allowed faculty members to use standard tools for student engagement, grading, and grade submission. Many universities in developing countries are still in the phase where they are using LMS for course or program delivery (Hussain, 2012; Hussein, 2014; Rubens et al., 2011).

E-Learning 2.0 (Circa 2005–2015)

E-learning 2.0 evolved with Web 2.0. As Web 2.0 made two-way communication, possible, e-learning 2.0 started incorporating student engagement online on an almost real-time basis. During this phase, traditional LMS 2.0 were augmented with social software tools such as discussion boards, blogs, wikis, podcasts, and other virtual world tools. These tools improved course related interaction, student engagement, and participation, which ultimately resulted in better learning outcomes. The systems in LMS 2.0 were improved in order to integrate with social interaction tools, which increased interaction and participation (Hussain, 2012; Hussein, 2014; Singh & Gulati, 2011).

E-Learning 3.0 (Circa 2015–Onwards)

With the evolution of Web 3.0, e-learning 3.0 has started evolving. In this phase, LMS 3.0 are further integrated with more collaborated and artificial intelligence based tools. In e-learning 3.0, the learning is based on a socially co-constructivist approach, and the main features of this phase are: *cloud-based distributed computing, extended smart mobile technology, collaborative intelligent filtering, 3D*

visualization, and *interaction* (Hussain, 2012; Hussein, 2014; Rubens et al., 2011). This stage is the most recent phase in which the e-learning 3.0 solutions offer personalization, intelligent agents, semantic annotations, computer-understandable data, and knowledge management for enhancing online delivery of programs (Dutta, 2006; Oakes, 2011; Shah, 2012). Many LMS vendors are struggling to incorporate Web 3.0 capabilities in their LMS products. E-learning 3.0 is likely to enhance the learning experience for students and will improve students' collaboration and interaction with their peers and with their teachers. The establishment of social media as a preferred vehicle for student interaction and knowledge sharing and its integration with LMS is the hallmark of e-learning 3.0.

What next → Beyond E-Learning 3.0

With new disruption technologies evolving, the web will evolve into a three-dimensional environment. Web 4.0 may combine a 3D environment (Web 3D) to create virtual worlds, such as those currently found in gaming. The 3D-based Web 4.0 will have a great impact on e-learning. Learners in augmented or virtual reality environments can be placed in a replica of their workspace, or a modeled 3D environment, with content pop-ups and features superimposed (Spencer, 2015). Video with audio and overlaid text can cater to many learning styles.

From standardized learning to customized learning

As we are progressing along the e-learning trajectory, we will see the emergence of personalized and lifelong learning as a new expectation of learners from the traditional university. E-learning will evolve around student-driven personalized or customized life-long learning. In such an environment, learners will be able to control their learning and contribute to their learning through discussions and collaboration using online platforms. The closed learning environment of traditional campus is going to be increasingly challenged, and universities have to prepare themselves to offer personal learning environments. The personalized learning will put pressure on universities to create newer curriculum and adopt different pedagogical approaches. Preparing learners and instructors for this new phenomenon is going to be a challenge for universities. Learners and instructors will need to utilize a variety of skills in technology, social networks, and other virtual engagement tools, and newer pedagogical methods, as well as high-tech supporting infrastructures. Universities will be forced to find ways to tailor and align curriculum and supporting learning infrastructures to match the personalized demands of students (Gallagher & Garrett, 2013; Kirkwood & Price, 2014; Petegem, 2008).

Conclusions

The higher education landscape is undergoing significant change as a result of technological innovations. Students have an option to learn through self-paced or real-time online courses offered by the MOOCs and Coursera platform. Education already has moved from the mode of chalk boards to chat boards. Most learning management systems have already switched over to cloud-based systems. Worldwide, most faculty members have adopted e-learning platforms and have incorporated chat boards, social media, wikis, blogs, and other digital tools for their class delivery, student engagement, and class participation. MOOCs, Coursera degrees, and similar programs will become more common as part of degree completion. Virtual technologies and social media sites, such as Facebook, Twitter, and others, could become the primary forum for “instantaneous idea sharing, tutoring, learning and training.” E-learning will incorporate more interactive video or game-based platforms for learners to participate in and experience than listening to traditional lectures.

Classes may have students across the world, so the boundaries of a typical, traditional class will be changed to more of an open class structure. The role of instructors will be as facilitators, motivators, enablers, and coordinators for providing pointers to academic audio, text, and video resources, rather than a mere transmitter of knowledge. Instructors will still be responsible for designing the course

outline, setting up real-life application-based assignments, tutorials, and examinations, for example, as well as giving examinations and monitoring the performance of the learners. Students will be able to share their knowledge and experience with different students in online learning communities from all over the world. Students will also be of various kinds, such as self-paced, cohort, and personalized- or individualized-learning based. The instructors will also have to design classes based on different learning styles. Instructors will be overwhelmed with class sizes and continuous student engagement to accommodate different learning styles. These factors will have an impact on faculty tenure, promotion, and retention policies. Additionally, as universities continue both campus and online programs, the demand for more virtual courses and programs will grow in the next decade. Higher education stakeholders would expect virtual programs to grow in order to serve a more diverse set of students from all over the world. The decline in enrollments and shrinking state and federal funding in United States are raising very real questions about the sustainability of the current higher education business model. It seems the current university model is antiquated (Mehaffy, 2012). We surmise that just like e-commerce, e-education will become a worldwide playing field.

Notes on contributors

Dr. Sushil K. Sharma is the Associate Dean and a professor of computer information systems (CIS) in the Miller College of Business at Ball State University. Dr. Sharma has co-authored/edited/co-edited 12 books, published over 90 refereed research papers, and published 45 refereed chapters in various books. He has presented and published over 135 papers in various national and international conferences. Dr. Sharma's research has appeared in several highly ranked journals in the MIS field, including *Decision Support Systems*, *Communications of the Association for Information Systems*, *European Journal of Information Systems*, *Information Systems Frontiers*, *Journal of Information Privacy & Security (JIPS)*, *Electronic Commerce Research Journal*, and *Information Management and Computer Security*. He received Ball State University's Outstanding Research Award for academic year 2006–2007 and the Outstanding Faculty Award for academic year 2008–2009. At the college level, Dr. Sharma received the Miller College of Business Extraordinary Year Award for three consecutive years (2003, 2004, 2005). He also received the college's Outstanding Researcher of the Year Award in 2008. Internationally, Dr. Sharma has been a featured speaker at several professional forums, executive development seminars, and academic conferences covering topics such as e-learning, e-government, computer and network security, ERP implementations, community and social informatics, human-computer interaction (HCI), and knowledge management.

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Dr. Kuldeep Kumar is a professor of economics at Bond University in Gold Coast, Australia. He obtained his PhD in Statistics from the University of Kent, Canterbury. He has also taught at the Indian Institute of Management and the National University of Singapore. He is a Fellow of the Royal Statistical Society and has the title of Chartered Scientist from the Science Council. He has several awards: Commonwealth Scholarship, CEC Post-Doctoral Fellowship, Young Statistician Award (International Statistical Institute), Bond-Oxford Fellowship (1997), Australia-Taiwan Exchange Program Fellowship (1998 and 2007), Vice Chancellor Quality Award for Research Supervision (2006), Teaching Excellence Award (2005), Quality Award for Post-Graduate Supervision, and Excellence in Research Award of Faculty of Business in 2006. Recipient of several grants, Dr. Kumar has published more than 100 research papers, 10 chapters in various books, 24 book reviews, and edited four conference proceedings and one book. He has also edited a special issue of *Managerial Finance*. He is on the editorial board of six international referred journals and has been an invited speaker and chaired sessions at several international conferences.

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