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Structured Collaboration

Gertrude (Trudy) Abramson

During my community college teaching years (1997-1985), I learned something important about course development. The curriculum and instruction for the first iteration of a course was my best guess using design and development skills and the best textbook I could find. Syllabi were much shorter then and classes were all campus-based. It was acceptable to modify the syllabus during the term; requirements could be made lighter but not heavier. Preparation for the second term was much easier, just modification based upon first experience. The third term had all the bugs addressed and by the fourth, tedium was beginning to set in and it was time to pass the course along to someone else.

Life in today's online teaching is very different. Instructional designers head up teams to develop courses, working with the content expert; instructors, largely adjunct faculty, deliver the courses. Happily for me, and hopefully happy for my students, I have the freedom to design and develop my own courses. Unlike the community college where I taught the same courses each term and often more than one section per term, I now teach a course no more than once a year. What remains the same is the need to modify the course based upon what students do with it. It is important to have good and committed students in order to gather data for modification that is useful. Teaching is a communication experience and the actions of the sender should reflect the needs of the receiver.

Collaboration goes hand-in-hand with online learning. Every learning management system (LMS) comes equipped with a discussion board. The governing theory is that students learn through discussion and/or collaboration. Three quick Google searches resulted in 281 million hits for collaboration, 245 million for online learning, and just under 15 million for collaborative learning.

All four 2012 editorials discussed different aspects of collaboration. The winter issue looked at collaboration in a course from the perspective of engagement. The spring editorial looked at society – collaboration in business and organizations. Fall was about collaborative teamwork and winter about collaborative analysis in course development. Winter 2015 reported on an experimental course in which students involved in the dissertation writing process collaborated in support of one another. Hard as I try to put the term to rest, things keep cropping up that should be useful to our readers.

My class for the winter 2015 term was small but participatory. The plan was to have peer evaluations in place of pilot tryouts of a unit of study because the term was not long enough for authentic evaluation. I urged students to make useful observations because, in the past, they tended to post admiration rather than constructive analysis of one another's lesson plans. Although I provide ongoing messages about the course, I try not to interfere with student/student communication. At the end of the term, when I reviewed the final papers, I looked to see what modifications had been made based upon peer input. Sadly, little valuable input had been made. This was a good class; the fault, I decided, was mine.

To that end, the next iteration will contain guided or structured collaboration. That is, I will restructure the assignment so that comment weeks contain answers upon which the recipient can build/modify restructure.

The syllabus states: Week 12: Read all peer instruments (lesson plans and assessments) and select one upon which you are commenting. In the subject area, write your name. In the message area, post a comment that you feel will be helpful to a peer. Do not include a reference or a link.

The modified syllabus will elaborate upon comment by structuring the response. For example:

These questions are intended to guide your evaluation comments. It is not necessary to address them all. It is acceptable to add others.

- Has the instructional problem been identified so that learners know what is expected of them? Can you state the problem after reading what has been written?
- What is the aim or goal? What observable objectives will need to be met?
- The students will carry out what tasks and in what order? For blended learning: What will be done online and what on-campus?
- What strategies will be used in implementation?
- What formative and summative instruments will be used to assess mastery?

Remember, if the unit and the assessment are described carefully, a substitute teacher or an adjunct instructor should be able to facilitate the unit as intended.

As an aside, when we started creating syllabi for online learning, we were warned against shovel-ware or merely transferring on-campus experience to online without major changes. We were, in fact, entering a whole new world. Twenty years later, I realize the advice was too global. There were many excellent aspects to on-campus instructional design that transfer well. As someone for whom structure is satisfying and gratifying, I pledge to introduce structure wherever possible in collaborative online assignments.

Snapshots

Cordelia R. Twomey

The process of assembling a project is often as interesting as the end product itself. The articles in this issue were the work of five teams of doctoral students, with each team consisting of three people. They were asked to research technology use in the region to which they were assigned, as if they were preparing a documentary for a television show. Each person was assigned to one of five bureaus—Africa, Asia, Europe, Latin America, and the Middle East—and asked to report on K-12, higher education, and corporate use of technology. How they organized their report was determined by the members of that bureau.

The authors are doctoral students in the Educational Technology Leadership program at New Jersey City University and come from many countries, such as Egypt, Cuba, China, and the Bahamas and work in varied occupations in the K-16 spectrum. Although they all had to address the same areas (K-12, higher education, and corporate) they all took widely divergent tracks.

As I assembled these five articles, the word *snapshot* kept running through my mind. A snapshot is something that allows us to freeze a special moment in time. The first interpretation of *snapshot* is that, with the ever-changing nature of technology, if we were to go back and re-read these articles in five years, so much would have changed—much like our family albums. Economics, politics, and advances in technology will all change the facts of these regions in the next five years, rendering us with entirely different snapshots. Another perspective of *snapshot* is that these are short vignettes, designed to highlight unique occurrences. They were not designed to be two-hour movies; they are montages. A third perspective of *snapshot* is that photos do not always have to show beautiful things. The students were told to be honest—to look for the negatives as well as the positives—what is being done well in the region and what is not, from the group's perspective.

The entire activity had benefits from the beginning to the end of the project and beyond. The first guiding objective of the doctoral program is to develop educational technology leaders, and one of the cornerstones of our program is the following: "One of the most important attributes that distinguishes leaders from managers is 'vision': the ability to communicate desirable, achievable futures quite different from where the present is drifting. Leaders redefine people's paradigms about what is possible," (Change Leadership Group at the Harvard Graduate School of Education, 2009).

So this group, who had only just recently met in a seven-week summer course, had to think like leaders, work together, and organize a major project. We can see from the articles that they understood that it was not just about technology. They saw the bigger picture, which was that external factors impact technology availability and delivery. Look at the different approaches that they took—geographical, political, and economic. Then they had to generate a document that would be informative and interesting. As important as the learning that took place on the individual group level was the benefit of sharing the projects with the entire class. There was a peer review period when the projects were posted on the discussion board and everyone was responsible for reading all of the other bureaus' reports and providing feedback. They were amazed at the many different approaches that could be taken to one project.

For those of us who have been in the field for years, it is fascinating to look back at the evolution of technology over the last four or five decades and realize that some of the old adages are still true. For example, the transfer of knowledge between technologies can be accomplished without formal training anymore. Think about how you migrated from Lotus to Peachtree to Excel; or think about when you purchased your latest smartphone. Also, from the dot.com bubble experience we learned that what's hot today is tomorrow's dinosaur. These changes have happened over years. However, the factors that surround technology integration in a country—political, economic, and religious, for example—can have a direct and immediate impact on the relationship of people and technology.

Even though we may be interested in what is going on all around the world, with our busy schedules none of us has time to study all parts of the world from many different perspectives. The point is to show you snapshots from around the world and to possibly encourage you to investigate further.

About the Guest Editor

Cordelia Twomey. Ph.D. is a Professor in both the Ed.D. in Educational Technology Leadership and the M.A. in Educational Technology programs at New Jersey City University. She is the co-author of *TechPro: The Information Processing Simulation* (1993) with Executive Editor, Gertrude (Trudy) Abramson. Ed.D. Dr. Twomey was part of an educational exchange with the People's Republic of China and was the recipient of an International Studies Grant, researching technology education in London, Birmingham, and Cork. ctwomey@njcu.edu

In This Issue

This special issue is the product of a new doctoral program in educational technology leadership at New Jersey City University. Guest editor, **Cordelia Ryan Twomey,** is the visionary behind the creation of the program. She guided the initial class through the first year. We are pleased to present the articles produced by each of the teams in the inaugural program. In keeping with the theme of the volume, the work presented is largely a result of online collaboration.

Executive Editor, **Gertrude (Trudy) Abramson,** extends the discussion on collaboration by describing a possible solution for upgrading the value of peer-to-peer discussion.

Guest Editor, **Cordelia Ryan Twomey,** offers a description of the process that resulted in the production of the five collaborative articles. She edited each of the papers just enough to make them fit the message of our journal.

Katy Blatnick-Gagne, Gregg Caverly, and **Rebecca Kreider** present an overview of educational technology in sub-Saharan Africa, the area that comprises all countries located below the Sahara Desert. Specific attention is focused upon South Africa, Ghana, Uganda, and Kenya.

Min Chou, Ericka Collado, and **Deborah Kantor Nagler** examine the growth of China's knowledge economy through the lens of educational technology. Three areas of engagement with educational technology are presented: K-12 education, higher education, and corporate training.

Antoinette Darling, Martha Osei-Yaw, and **Leonard Sheehy** provide a brief analysis of the major challenges to enhance teaching and learning with technology in European schools, institutions of higher education, and corporate institutions.

Dudrick Edwards, Mary Healy, and **Angelica Jimenez Safanova** present economic snapshots of developments across Latin America and show how they are impacting the nature of K-12, college, and corporate environments.

Lori A Dini, James Markey, and **Gigi Mohamad** focus on problems and unique initiatives of Israel, Jordan, Egypt, and Saudi Arabia and provide an overview of the current status of education and technology in the fields of K-12, higher education, and corporate training.

The issue ends with guidelines for submissions. Comments and short reports may be sent to the Executive Editor at abramson@nova.edu as e-mail or e-mail attachments. We make it as easy as possible for all readers to participate.

An Overview of Educational Technology in Sub-Saharan Africa

Katy Blatnick-Gagne
Gregg Caverly
Rebecca Kreider

ABSTRACT – As part of the second largest continent, many African countries have seen their economy improve in the past decade. Access and use of technology, especially in the field of education, have also seen upticks. The changes that are being influenced by educational technology can be seen in the shifts that are occurring in K-12, higher education, and corporations. The region of Sub-Saharan Africa that one resides defines how much technology is accessible and how reliable that technology will be. With the increased availability of cellular and satellite technology, some of the more rural areas are starting to have increased exposure to technology and are weaving it into the culture.

Keywords: Sub-Saharan Africa, African Virtual University, educational technology, South Africa, Ghana, Kenya, women in technology, educational technology

Introduction

Africa, the second largest continent, is located between the Atlantic Ocean to the west and the Indian Ocean to the east. According to the United Nations Economic Development in Africa 2014 report, the annual growth rates in Africa have been higher than the world economy since 2000. Although Africa's economy is on the rise, there are still areas that struggle with disease, availability of food, unemployment, environmental issues, low educational attainment and inequities, and reliable access to technology. This report will focus specifically on the access to technology in educational environments across the continent and how this access impacts various regions of Africa.

Sub-Saharan Africa

Sub-Saharan Africa refers to all countries located below the Sahara Desert (see Figure 1). It is comprised of 50 countries with a total population of 925 million and includes 33 of the most underdeveloped and poorest countries in the world (Simmons, Mbarika, Mbarika, Thomas, Tsuma, Wade, & Wilkerson, 2011).

This area has been the most politically volatile region on the continent, with major democratic breakthroughs in some countries, and coups, insurgencies, and authoritarian crackdowns in others (Freedom in the World, 2014). Although each of these issues has an impact on the access to educational technology, many countries in this region are finding that more individuals are seeking better educational opportunities than ever before. One may ask, however, how learners will access quality education in Africa, especially when the majority of the population lives in rural settings.

Figure 1 – Sub-Sahara Africa

K-12 Education Overview

K-12 education in Africa can be vastly different based upon which part of the continent is studied, and the economy of a specific region will have a major impact upon education. There has been a shift in education throughout Africa in the past 50 years—in the past, many countries focused on Africanization, but recently the focus is more on domestic needs to help align that particular country with current international trends (Kuyini, 2013). Kuyini talks about how the World Bank's Education for the Knowledge Economy initiatives have been a part of the reform goals of some countries. Two countries that will be explored further are South Africa and Ghana, to see their similarities in educating children.

K-12 Education in South Africa

In South Africa prior to 1994 education followed the policy of apartheid, which benefited the white South African population as opposed to the black population. With this type of government policy in place, the schools for the white children received much of the funding while the black students did not have the proper facilities and supplies and quality teachers. With apartheid now in the past, South Africa still is experiencing a new type of digital divide—the digital divide when it comes to accessing technology (Cantrell & Visser, 2011). South Africa is divided into ten provinces. The provinces of Western Cape, Gauteng, and Northern Cape have the highest percentage of schools with computers—97.0, 94.5, and 91 respectively. For the next group of three provinces (Free State, North West, and Mpumulanga), their percentage of schools with computers are 77.3, 67.6, and 52.9, respectively. The tenth-ranked province is Eastern Cape with 23.0% (Cantrell & Visser, 2011). Reasons for the divide can still be attributed to the history of apartheid in South Africa.

The digital divide is not the only disparity in South Africa. In the 2006 International Literacy Study, South Africa had the lowest score of 40 countries (Nassimbeni & Desmond, 2011). Looking more closely at the schools, it was found that those that had books and libraries available to the students outperformed those that did not have the same resources. Biblionef, a book donation organization, is helping provide books for those in need (Nassimbeni & Desmond, 2011). The books are being sent in a student's local language with the hope that by having books available, students will develop a love of reading.

In the school setting, teaching technology is something that should be a priority and schools are encouraged to introduce students to information and communication technologies. Having these topics covered in the curriculum will help prepare students for a career in the workforce. According to Cantrell and Visser, in order for technology to be fully integrated into the courses there needs to be a shift from a traditional model to more of a constructivist approach to learning.

South Africa is perceived as having one of the most modern telephone systems in Africa (Cantrell & Visser, 2011). From a digital divide perspective, in some areas mobile phone technology is being used in the educational system; in others it is not used at all. But not everyone in South Africa feels that the country has an excellent phone system. Students find it a struggle at times to locate electricity and may not have the funds needed to pay for airtime for their cellular phones (Walton & Pallitt, 2012). The students do use their phones for communication; however, for much of the time the phone is used to play games, mainly the free games that came installed on the phone. Cantrell and Visser state that approximately 6% of the homes in South Africa have computers in them; again, this is related to the economic level of the household.

K-12 Education in Ghana

Over 3,000 miles northwest of South Africa is the country of Ghana. In 1957, when Ghana became the first country in the Sub-Saharan region of Africa to gain independence, it saw education as a vehicle for crystallizing new national goals and visions (Kuyini, 2013). Over the next several decades the focus on education shifted to employability and self-reliance. This led to yet another shift to the privatization of education. The latest set of education reforms, which came about in 2007, shifted away from privatization and created new procedures and content for each school level. Additionally, teacher training was addressed, along with a greater emphasis on information and communication technology (Kuyini, 2013).

Kuyini talks about the inadequate access that students have to education, along with poor quality teachers. The World Bank states that the poorest children are ten times more likely never to attend school than their richest peers (Kuyini, 2013). The PaabinaaMeriga Peace Initiative, a non-governmental and non-profit organization, launched a "School for All" project in October 2009 in Ghana. The founder of the initiative describes the distinction between urban and rural schools in the sense that rural schools do not have computers because the government lacks the resources to provide them, even though their own timetable states they should have been provided. The urban schools can be divided into two groups, privileged and less privileged. Most of the privileged schools do have access to computers; the privileged students also have access to computers in their homes.

The founder goes on to further explain that the government owns the majority of the schools, but there are some that are operated by private individuals. The government-owned schools in urban areas are considered privileged because the students have access to computers that are either funded through non-governmental organizations or parent-teacher associations. In private schools their proprietor funds computers.

Currently, Ghana relies heavily on donors to help supply schools with technology until a time when the country's economic growth allows for governmental assistance (Kuyini, 2013).

Post-Secondary Education Overview

At one time, a college education was accessed by few individuals across the continent; however, educational technology is allowing more individuals to realize their academic goals. This section will focus on educational technology access at the post-secondary level in the Sub-Sahara region.

Universities across the Sub-Sahara region are impacted differently, based on their location and availability of technology. For example, institutions in Uganda and Kenya appeared to be less equipped technologically than those in South Africa. As stated by Farrell and Shafika in Ngimaw & Wilson (2012) this is not a surprise given that South Africa is more technologically advanced compared to other African regions. Through their research, Ngimaw and Wilson (2012) discovered that the main obstacle influencing adoption of open education resources (OERs) is related to sociocultural issues (i.e. a lack of awareness, negative attitudes, limited capacity, academic pride, and loss of income), as well as policy-related factors at the institutional and the national levels. Many individuals are paying attention to these issues and are working to bring education to individuals across Sub-Sahara Africa.

A Successful Post-Secondary Option

Nairobi, Kenya, is home to the headquarters for the African Virtual University (AVU). AVU is a Pan-African Intergovernmental Organization established by charter with the mandate to significantly increase access to quality higher education and training through the innovative use of information communication technologies. Eight African governments signed a charter establishing the AVU as an intergovernmental organization. These governments were: Kenya, Senegal, Mauritania, Mali, Cote d'Ivoire, Tanzania, Mozambique, and the Democratic Republic of Congo (African Virtual University, 2012). Through this partnership, these countries have been working to fight against the brain drain which took place throughout Sub-Saharan Africa during the 1980s (Simmons et al., 2011). The brain drain, caused by many students learning and working abroad, was causing socio-economic and political issues. In addition to the brain drain, the AIDS/HIV epidemic took a heavy toll on teachers and educators, further limiting the access to higher education (Simmons et al., 2011).

Since 1997, AVU has delivered degree programs, certificates, and diploma programs through online technologies. AVU manages a digital library, develops and implements OERs, and provides state-of-the-art e-learning centers across 18 different government systems in Sub-Sahara Africa. As a university, it has undergone many changes, however, its key objectives have remained the same:

- To use modern telecommunication technology (especially satellite TV technology) in diverse countries in Africa to demonstrate that it can be used effectively as a teaching medium.
- To prove that such a project can be successfully implemented in various African countries, each having its own government and culture.
- To prove that such a project can generate enough revenue to sustain itself after the discontinuation of donor funding.
- To upgrade the quality of teaching in African countries in mathematics and science, subjects that are very much needed to get the economies going.
- To prove that diverse communities can easily adapt to modern technology.
- To increase the participation of women in science and engineering.

Less than 20 years ago the African Virtual University was a dream. It has since reached a maturity status that will allow it to develop programs to reach into more countries in Africa (Simmons et al., 2011). To find out more about AVU's mission to provide e-learning and OER, view the presentation by the Manager, Education Technology and Learning Resources of AVU, by going to http://youtube/9RRk6wGMsxI.

While a large portion of Sub-Saharan Africa is dealing with poverty, governmental restrictions, and cultural issues, a watchful eye should be kept on the nations that make up this region. Universities such as African Virtual University will continue to open doors for the citizens of this region, helping them increase their education level and leave their economic footprint on the world.

Corporate Overview

The Newest Trend in African Corporate Technology—Women

One growing group of technology professionals in African corporations is women. Ethel Cofie, a Ghanaian technology entrepreneur, started a

movement called "Women in Tech" which was formed to bring together women technologists in Africa. The goal of the organization is to encourage more women to enroll in computer science classes, be successful in the technology industry, and build a network across corporations. The Google Developer Group for Women in Ghana was recently created to fill the void of technology professionals in Africa. Both of these organizations came under attack from people trying to keep women out of the workforce, a problem not unlike other areas of the world. In addition to the mounted opposition to their entrance into the workplace, these women face the same day-to-day technology challenges as men in Africa, such as power shortages and broadband inaccessibility (Cofie, 2014).

A Snapshot of Ghana

Corporate information technology infrastructures are suffering inside the boundaries of most Sub-Saharan countries on the African continent because of major systems issues. Ghana, for example, does not have a continuous, stable supply of electrical power. It is substandard compared to other parts of the world because it is government run with no private-sector competition. Ghana's electrical plants and the attached grids are inefficiently managed and cost companies millions of dollars in revenue.

In addition to the unsteady and unstable supply of electric power, the telecommunications systems in Sub-Saharan Ghana also create information technology roadblocks. Data cannot be sent across a dispersed area without reliable links between servers and mainframes. Slow or interrupted response times add countless seconds and minutes to common transactions. The ratio of telephone lines to people in sub-Saharan Africa is 1 to every 235 people, compared to a ratio of 1 to every 2–3 people in industrialized countries (Mbarika, Okoli, Byrd, & Datta, 2005). Costs for these phone lines are also prohibitive. Sub-Saharan countries pay more for their access than the countries that have a higher density of access.

Most importantly, Ghana and the surrounding countries suffer from an anemic supply of computing resources, people certified and trained in the field, and money to invest. Because few people and corporations have adequate phone lines, they do not have quality computing systems. To highlight the digital divide, while the United States and the United Kingdom have been enjoying internet connectivity for decades, Eritrea had its first internet connection in 2000 (Mbarika et al., 2005). Trained information technology professionals face challenges in Ghana. For example, after an infrastructure project is implemented, the maintenance and upkeep often fall short when the tech professionals are moved on to another project. Also, the rapid rate of change makes keeping the existing professionals up to date impossible.

Technology in Kenya

The founder of Blair in Kenya, an organization formed to aid students and their families in rural parts of Kenya, recently built two local schools. In a phone interview he provided the authors with the following information regarding technology in sub-Saharan Africa:

"In Kenya, there is great cell phone service and cell phones are ubiquitous. I've been on rickety buses, with goats and chickens and not a house in sight, and people are on their cell phones. Kenya completely skipped the land-line phase and even those who live without running water or electricity have a phone. Getting the cellular phones charged can be tricky, yet it is hard to function without one. And, this is amazing, they can "text" money to each other using a system called "Mpesa". Mpesa can be used between two friends/family, but is also accepted at most stores. In fact, I have a friend who uses this technology to run small scale power plants—he installs solar panels or windmills in a village, hooks up the houses around the "power station" and then sells them electricity by taking money via text (i.e. you text $2 and you get $2 worth of power). In general, however, the rural poor still lack electricity, computers, and many of the other things that we all take for granted."

When asked about corporate funding or support from local companies for technology implementation and integration for the two schools built by Blair in Kenya, he said:

"No corporations helped us at all. We raised money to install a solar array on the roof of the school—in America solar can be linked into the electric grid, but in Africa, you need batteries; otherwise—no lights at night. We went through a local company to install the power. Once we had power, we connected to 10 computers that I had brought over. We worked with the local cell company to provide a wireless signal for Internet." (Co-founder of the Blair in Kenya project, personal communication, 2014).

Conclusion

Sub-Saharan Africa's lack of a solid technological infrastructure throughout the continent hinders its move to be an educational technology leader. Poor power reliability, an anemic supply of money, and lack of capital resources and trained professionals place it precariously at the bottom of the list of technologically advanced regions. Various sectors in Africa, such as women in technology, have united across Africa to bring together their knowledge and promote future growth of the industry, but to date they have not made much progress. Sub-Saharan Africa's diversification and focus on technology integration into the K-12 school system and post-secondary education community will help it to grow quickly in the educational arena and the world should look forward to this.

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Educational Technology at the Intersection of East Meets West: China's Globalization in the Digital Age

Min Chou
Ericka Collado
Deborah Kantor Nagler

ABSTRACT - China has discovered that emerging educational technologies are a critical tool in educating and training its workforce. This article examines the growth of China's knowledge economy through the agency of educational technology. Three areas of engagement with educational technology are presented: K-12 education, higher education, and corporate training. The Science, Technology, Engineering, and Mathematics (STEM) advancement in K-12 curricula, new models of e-learning such as Massive Open Online Courses (MOOCs) and other technological innovations in higher education, as well as high-tech corporate training academies are among the many examples highlighted throughout the article. Keeping in mind China's size, political diversity, and history, the authors focused their research on Shanghai, Hong Kong, and Taipei as representative areas for urban development in the 21st Century.

Keywords: instructional innovations; corporate training; knowledge economy; e-learning; technology integration; China

Introduction: Building a Knowledge Economy

China, with a current population of 1.3 billion (UNDP, 2014), has the world's second largest economy (Henderson & Nadvi, 2011). Fifty-seven percent of China's population now lives in urban areas (UNDP, 2014). Once suffering from extreme poverty, China has made such progress that it "is now classified as an upper middle income nation with an economy gradually transitioning away from an export-led model toward a consumption-based one" (UNDP, 2014, para. 1). Some important reasons for this growth have been foreign investment and the establishment of foreign enterprises in China. China aspires to compete with Western nations, and to do so it must develop a knowledge economy, which has been described as "every aspect of contemporary society where knowledge is at the heart of value added - from high-tech manufacturing and ICTs (Information and Communication Technology) through knowledge-intensive services to the overtly creative industries such as media and architecture" (Kok, 2004, p. 19). For example, ten years ago, China's employee pool included 3.1 million college graduates; however, fewer than 10% of these graduates were skilled enough to work for foreign companies (Ausburn, 2007).

China is making an effort to close the gaps in its knowledge economy and to produce the kind of skilled workers, managers, and leaders that are needed to support continued growth.

These efforts have generated an increase in the use of educational technology along the continuum of education from early childhood through professional and on-the-job training. From strengthening STEM in K-12 curricula to bringing new models of e-learning such as MOOCs and other technological innovations to higher education, to establishing corporate training academies that employ sophisticated e-learning systems, China has discovered that emerging educational technologies are critical tools in educating and training its workforce.

The goal of this article is to examine the growth of China's knowledge economy through the agency of educational technology. While "educational technology" can be viewed through many prisms, the three areas of focus in this article are: K-12 education, higher education, and corporate training. Because China is a large and diverse country, three cities have been selected as the focus for investigation: Shanghai, Hong Kong, and Taipei. Each of these cities represents variant histories, political/governmental systems, and approaches to education. At the same time, they share important commonalities. All three have inherited the same culture that places a high val-

ue on education; they are experiencing a climate of economic growth and technological advancement; and all three mirror China's efforts to establish itself as an important global leader.

K-12 Education: Government-Directed Integration

In March 2012, the Chinese Ministry of Education released the Education Information Technology Development Ten-Year Plan. The goal of the plan is to make an IT study environment available for all students by the year 2020, to form a learning-based social system supported by information technology (IT) platforms, and to implement broadband coverage for all districts and schools (Deloitte, 2013).

The guiding principles of the China National Educational Information Plan focus on the following premises:

- An IT environment in which all learners have access to high-quality education resources to support their lifelong learning should be built.
- Digital education resources must be developed based on the demands of an education reform.
- Action plans should be diversified according to the demands of different regions.
- Educational technology should play an instrumental role in educational reform by exploring the integration of technology and education.

The plan refers to elementary educational technology as the cornerstone of national information literacy. The specific goals to be met at this level are: narrowing the digital divide by perfecting the technology infrastructure, promoting the integration of education and technology through digital education tools and new teaching models, and training students learning in a technological environment. The plan also includes fostering a reform of education management and public service by using technology to enable a shift to a new model of connected teaching and updating the public service model of education management.

Hong Kong: Engaging Parents and Teachers

As described by The Government of the Hong Kong Special Administrative Region, an educational technology program was first launched in 1998, followed by the second one in 2004. The focus was on an enhancement of IT infrastructure as well as learning and teaching with IT. Then, in 2008, a third technology education strategy was implemented entitled "Right Technology at the Right Time for the Right Task" that aimed at assisting teachers in integrating technology, honing their IT pedagogical skills, producing an effective IT environment at the school level and providing parents with the skills necessary to assist their children to use technology to learn at home (Education Bureau: The Government of the Hong Kong Special Administrative Region, n.d.).

The Education Bureau in Hong Kong has also developed a set of guidelines for technology education. These principles describe the role of both teachers and students in the process of achieving mastery of technological applications. These behavioral objectives reflect the content, skills, and attitudes that China's 21st Century workforce will need in order to achieve globalization and to compete with the knowledge economies of western nations (Education Bureau: The Government of the Hong Kong Special Administrative Region, 2009).

Shanghai: Competing with Other Competencies

Based on documentation supplied by the Organization for Economic Cooperation and Development, as cited by Singmaster, the city of Shanghai has being known to have the best school system in the world. As part of the school reform in China, Shanghai has been given the autonomy to experiment with educational reform before the rest of the country. The status of Shanghai's educational system resides in the fact that it was the first city to "achieve one hundred percent primary junior high school enrollment" as well as "achieve almost universal secondary school attendance" (The OECD, 1996, para. 2).

Despite this privileged rank, Shanghai's school system is not free from challenges in the educational technology arena. Education is driven by standardized tests like the high school examination, a three-day paper-and-pencil examination that cannot be retaken and which is crucial for students' acceptance into prestigious universities. Therefore, education is mainly focused on getting the students prepared for examinations that do not involve the use of technology. The exploration of technological tools, therefore, is seen as an impediment to progress because it seemingly distracts students from a primary objective of learning in order to perform successfully on a test.

Taipei: Opportunities for ICT Progress

A report by the Ministry of Education: Republic of China (2011), points to Taiwan's efforts in improving educational technology adoption and implementation, which the city of Taipei abides by. Several of the initiatives are described below:

- The development of Digital Opportunity Centers (DOCs) in remote villages to provide equal access to information opportunities and competency in information application. There

are10,902 courses provided by the DOCs, and 168,620 learners attended DOC courses as of 2011.

- An online tutoring for after-school students to improve ICT abilities through web services that enrich learning resources is another initiative. Twenty-eight universities and 1,344 volunteers participate in the project and 1,030 elementary and junior high school students are served. The government also subsidizes ICT-professional volunteers to provide remote schools and DOCs with necessary assistance since 2001. Results of the census indicate that there are 946 youth teams joining the program and about 14,000 youth served as ICT volunteers. In addition, 1,487 remote schools and 392 DOCs were served.
- One Laptop Per Child Program that benefits over 13,000 families by subsidizing one computer and a three year online fee per family.

The implementation of China's Ten-Year Information Technology Plan is visible in the cities of Hong Kong, Shanghai, and Taipei, yet the approach has been different in each one of them. Hong Kong has developed clear objectives for teachers and students, provides support to teachers in integrating technology, and had been successful in improving the IT environments in schools and home. Likewise, as mandated by the Ministry of Education in Taiwan, Taipei has focused on strengthening the availability of technological resources for students and their parents at home through outreach programs. Through another prism, the Education Commission in Shanghai does not provide clear evidence about the steps taken to reinforce the implementation and use of technology in schools. Despite the differences, the three cities are considered innovators in educational reform.

Higher Education: Facing Disruptions in a Technological Age

The advancement of Internet technology has facilitated global outreach in higher education and has expanded higher education student populations beyond the limit of geographical, social, economic, and political boundaries. The disruption of the MOOC is one recent example of the role that Internet technology plays in the development and transformation of higher education in a technological age. This article explores the impact of technology on higher education in China, and the implications for college teaching and learning.

MOOC: Shaking up Higher Education in China

The New York Times declared 2012 the Year of the MOOC in the United States (Pappano, 2012). Soon after that, China became a sizable market for MOOCs. Thousands of Chinese students have now joined the MOOC community, taking courses offered by Yale, Massachusetts Institute of Technology, and Stanford (Xia, 2013). In 2013, higher education institutions in Hong Kong, Shanghai, and Taipei were among the first to announce Mandarin-based MOOC courses through a partnership with the U.S. platforms Coursera, edX, Udacity, or the U.K. platform FutureLearn (Forestier, 2014; Najarro, 2013, Liberty Times, 2013).

In April 2014, Hong Kong University of Science and Technology announced the first credit-bearing MOOC in Hong Kong. This was a move to "bring overseas learners to campus and create further diversity at HKUST," said Professor Pong, Senior Advisor to the Executive Vice-President and Provost ("Hong Kong University," 2014). Nineteen universities in Shanghai also announced in April 2014 to give reciprocal MOOC credits.

The MOOC development extends opportunities to students all over the world, strengthens open resources for education (Forestier, 2014, Liu, 2014), and expands the influence of China in the global information society so that high-quality digital content can be effectively used in various e-learning contexts (Tsai, Chen, & Chen, 2010). MOOCs, a key component of the technology revolution in China, have played a critical role in pushing the boundaries of traditional teaching methods in China and expanding online learning spaces to include anyone from everywhere.

An Overview of Online Learning in Higher Education in China

Online education in China has gone through three stages--from distance education in TV or video recording forms and formats, to hybrid models combining face-to-face and web-based course management systems, to fully web-based models (Zhou, 2014; Zhao & Jiang, 2010). Early forms of distance education started with television universities, with the name being changed to open universities later on, and they have been in existence for more than two decades. The Open University of China (http://en.crtvu.edu.cn), the National Open University in Taiwan (http://www.nou.edu.tw), and the Open University of Hong Kong (http://ouhk.edu.hk) were established in 1979, 1986, and 1989 respectively. The primary purpose of open universities is to provide a supplementary channel to traditional forms of higher education. Like traditional education, open universities also support vocational education and lifelong learning. The application of innovative technology and the further development of online education will benefit both traditional and non-traditional forms of higher education in China.

In a report produced by the Economist Intelligence Unit in 2010, Hong Kong, Taiwan, and Mainland China garnered high ratings in technological infrastructure and e-learning readiness for higher education (as cited in Szeto, 2014). Please note that this paper uses e-learning, web-based learning and online learning interchangeably in the context of online education. With the advent of information and communication technology (ICT), the integration of e-learning into traditional face-to-face classroom settings has gained popularity in higher education in China. Blended learning, where 30%-79% of the instruction is delivered online while the rest is face-to-face (as cited in Imbriale, 2013), has been a popular model in Hong Kong, Taiwan, and Mainland China.

Blended Learning—The Best of Two Worlds?

Many say that two of the disadvantages of online learning are the lack of interaction and the sense of belonging. It makes some students feel isolated. To address this challenge, there are those students who form study teams or clubs as a support group to share problems and solutions (Liu, 2014). The use of educational technology in designing courses completely online will fundamentally alter the traditional Chinese educational structure. Therefore, China has proceeded to adopt the MOOC online setting with mixed feelings and reactions. According to Vice President Zhen Huang of Shanghai Jiao Tong University, "Shanghai Jiao Tong University is working to combine them [MOOCs] with its traditional teaching methods to create a mixed mode of online and offline teaching" (as cited in FutureLearn, 2014).

Most higher education institutions in Mainland China have not yet moved to delivering courses completely online. Blended-online models that use face-to face meetings in conjunction with online lessons are gaining increasing acceptance in China over a completely asynchronous web-based mode (Zhao & Jiang, 2010). Studies conducted in China, Hong Kong, and Taiwan suggest that students are more satisfied with assistance of synchronous technology through web-conferencing tools such as Adobe Connect, Blackboard Collaborate, or Big Blue Button to make their online learning more engaging, enriching, and effective (Wang, Jaeger, Liu, Guo, &Xie, 2013; Kuo, Walker, Belland, Schroder, &Kuo, 2014; Kan, 2011; & Fox, 2013).

Interviews with Higher Education Leaders

During the course of writing this article, the authors interviewed senior administrators in Hong Kong Baptist University (HKBU) and a Vice President of Tongji University in Shanghai to gain more up-to-date knowledge on e-learning in their institutions and their insight about the impact of technology on higher education in China. HKBU responded that the University currently offers hybrid/blended courses using Moodle and Blackboard. Some academic departments of HKBU have collaborative arrangements with higher education institutions in North America and Europe using e-learning tools to offer courses jointly to students in different locations (personal communication, October 30, 2014). In Hong Kong, MOOC initiatives are supported by the University Grants Committee (UGC), an advisory body to the Government of Hong Kong that determines the funding of government-subsidized institutions in higher education. Although HKBU has not offered a MOOC course by itself, faculty members have submitted proposals for the Teaching and Learning Fund through UGC to participate in MOOC projects led by Chinese University of Hong Kong and Hong Kong University of Science and Technology (personal communication, October 30, 2014).

According to the Vice President of Tongji University, online education, including MOOC platforms, is still an addition to formal education in the traditional teaching method in China. "Face-to-face interaction between faculty and students should be maintained. Online education platforms should be used to enhance such personalized interaction. Compared to other developed countries, face-to-face interaction between students and their professors is insufficient rather than sufficient in China," said the Vice President (personal communication, November 5, 2014).

Corporate Training: Supporting a Learning Economy

Language is only one of the barriers in China's globalization efforts. Its unique cultural and political profile creates challenges for the integration of technology and use of the Internet. China's *shanzhai*or "copycat culture" encourages the illegal acquisition of technology through backward design and is supported by lax intellectual property laws (Zhu & Shi, 2010). Internet use is restricted at the discretion of the government. All in all, corporate culture and Chinese culture negotiate a delicate pas de deux in the name of global development.

In a learning economy workers need to acquire a range of skills and to continuously adapt these skills (OECD, 1996). Corporate training in particular is an excellent indicator of economic activity (Ausburn, 2007). When business is slow, training, which is usually discretionary spending, is cut back. In a thriving economy, the need for additional personnel, sales staff, and leaders opens the door for training programs (Ausburn, 2007).

China's booming economy has spawned many different kinds of professional development and work-based learning programs that employ technology.

The goals of corporate training include efficiency, higher profits, and lower employee turn-over (Lee, Hsieh, & Chen, 2013). Many companies in China's growth areas are now using e-learning systems for corporate training. In particular, e-learning courseware allows the corporation to reach employees without the considerations of cost or distance. Microsoft, for instance, enjoys a large market share in China. Their employees in China are encouraged to use online certification programs in their native language, as well as in English (https://www.microsoft.com/learning/en-us/international-training-certification.aspx).

At the same time, research by Wang, Ran, Liao, and Yang (2010) found that the use of e-learning alone in corporate training fell short in "motivating employees to learn" if it did not "align individual and organizational learning needs." This study suggests that training must be concretized for the learner as being performance related and must include opportunities for social interaction with other workers. Therefore, e-learning is more effective in a hybrid format, which combines self-paced online learning with opportunities for face-to-face and hands-on learning.

An example of corporate use of e-learning courseware can be found in Bee-net.com. This Hong Kong-based company provides learning and training solutions for companies throughout Asia. Moodle®, Blackboard®, and NBC Learn® are featured among the many platforms Bee-net uses to create e-learning programs for clients that include corporations, universities, and schools. Bee-net's Assistant Director of Product and Services (private correspondence, October 24, 2014) shared that while Bee-net.com does not have a training department, it does use self-paced, e-learning courseware to train its sales staff. For this company, e-learning is combined with face-to-face training in an overall hybrid format.

E-Learning and Hybrid Training

Another respondent to the authors' inquiry regarding the use e-learning courseware was a technology company with its headquarters in Beijing, with offices in Shanghai. The Founder Technology Group is engaged in the research and manufacture of computer hardware and accessories ("Founder Technology Group," November 7, 2014). The size and financial success of this company are reflected in the fact that its stock is traded on the Shanghai Stock Exchange. The president of the company (private correspondence, October 30, 2014) explained that the HR Department is responsible for training executives, middle-level management, and general staff. As in the previous example, this company uses a hybrid learning model in its training. This training targets areas such as job performance, problem-solving skills, information sharing, and innovative thinking. He added that improving the professional ability of his employees was closely aligned with the corporation's goal of "enhanced core-competitiveness."

Since the 1980s, Taiwan has developed a worldwide reputation for performance in high tech manufacturing (Shie, Meer, & Shin, 2012). In addition to ICT, Taiwan is using e-learning systems for training in manufacturing, marketing, and government services. Courses are designed for every level of the employee hierarchy from frontline staff to top managers.

Taiwan has even tried to use e-learning programs to reach out to its key audience in rural communities, farmers. However, the results of a study of this program (Yueh, Chen, Chiu, & Lin, 2013) showed that the farmers did not perceive this type of training to be useful. Their wives also took part in training and assessment. They, on the other hand, found these courses to be extremely beneficial. Yueh, Chen, Chiu, and Lin (2013) explain this discrepancy simply: The wives take care of (the) bookkeeping, accounting, and routine business functions of farm management and this kind of knowledge can effectively be conveyed online.

Another example of online corporate training is Coca Cola China, which has developed an Online Vocational Training Platform called "Koolearn." This learning management system "allow(s) Coca-Cola management and human resources professionals to evaluate employees' knowledge in a specific subject area and assess their progress throughout the course" (Zhao, 2014). Upon completion of the online training, employees are also required to participate in a site-based course.

Corporate Training Academies

A growing number of foreign corporations are addressing the need for trained personnel by creating corporate academies. The following are two examples of industries that have made a major investment in China and are supporting their financial commitment by creating corporate institutions for professional development and training.

Since 1972, Boeing has been supplying airplanes and parts to China's aviation industry and Boeing has a number of subsidiary companies in China, including the Boeing Shanghai Aviation Flight Training, which provides training for pilots, crews, and mechanics. Other training initiatives include the Boeing Academy-China, "launched in 2012, (it has) created an integrated platform to

further enhance training initiatives" in all areas related to aviation (Wang, 2014, p. 2). Boeing also takes an active role in K-12 and higher education in China by sponsoring programs and scholarships that bolster STEM skills.

Novartis, the international pharmaceutical company, has established The China Leadership Development Centre. Two kinds of programs are offered through this entity: regional and global leadership development (Ausburn, 2007). Novartis also created a private Business MBA program that is only open to its employees. Both distance and site-based learning are used in the Novartis programs.

Collaborations between Universities and Private Companies

The need for trained workers in China is so great that many universities are partnering with local corporations to meet training needs. Shanghai Jiao Tong University is one example of the adaptation of Business School programs to the private market for Corporate Leadership Development. Along with the expected courses in business strategy and finance as well as Business Chinese, the University offers a course called "How to Do Business in China" (http://www.educationshanghai.com/ct.html). This type of course and another called "How to Negotiate in China" are the types of course offerings found in most China business preparation courses, either site-based or online.

Conclusion

China's educational core, the continuum from early childhood education through higher education and work-based training, has been engaged in the battle to prepare a workforce that will meet China's needs in the coming decades. Educational technology is in active use in all levels of education in Shanghai, Hong Kong, and Taipei. All three locales, despite their differing political structures, are employing 21st Century technologies for learning at every level of education. Further, the same spirit of innovation and drive to succeed that infuses the Chinese marketplace also infuses its educational and corporate training programs and institutions.

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Challenges in Technology and Its Influences on Education and Training

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ABSTRACT – This article, devoted to the examination of education technology trends in Europe, explores the relationship between access gaps and integrative technology offered in K-12, higher education, and corporate settings. Using rich data from reports, experts in the field, and surveys, the researchers estimated that education technology leaders must be at the forefront of promoting creativity and innovation in the field of technology and education. If educators in those three environments expect their students to be trailblazers, then they should be on the cutting edge themselves. Technology education has evolved in past decades and is still experiencing exponential change. The new ways in which people work, communicate, and learn has caused this evolution, and the speed with which new technologies enter the marketplace challenges traditional methods. On a parallel course, institutions with access to highly equipped digital resources are at a greater advantage than those that are less equipped with internet communication and technology access. The implications for technology and education management in Europe are challenging and exciting.

Keywords: educational technology, Europe, EU28, future trends, access gaps, STEM education

Introduction

Europe is currently experiencing a digital divide because of large access gaps across vast geographic regions. Technological resources and the effects of Internet and communication technology are just two of the factors that are impeding the progress of decreasing these access gaps. One of the biggest challenges may well be the cost factors associated with integrating technology into primary and secondary settings as well as university and corporate classrooms. This was a concern for almost 70% of university students across European campuses in the late 1990s (Marchessou, 1999). Other factors are the legal and ethical issues associated with distance learning. It is essential to engage and motivate learners in order to maximize the use of technology throughout all types of learning environments. Faculty, teachers, and administrators have to recognize that if learners are going to use technology in the classroom, educators must find ways to keep the content meaningful and current. As governments and corporations expand and adapt to the ever-changing needs of the society and the economy, they must think globally and act locally.

Figure 1: The European Union (EU28)

Austria	Estonia	Italy	Portugal
Belgium	Finland	Latvia	Romania
Bulgaria	France	Lithuania	Slovakia
Croatia	Germany	Luxembourg	Slovenia
Cyprus	Greece	Malta	Spain
Czech Republic	Hungary	Netherlands	Sweden
Denmark	Ireland	Poland	United Kingdom

Source: European Union, 2014

The Digital Divide in K-12 Education

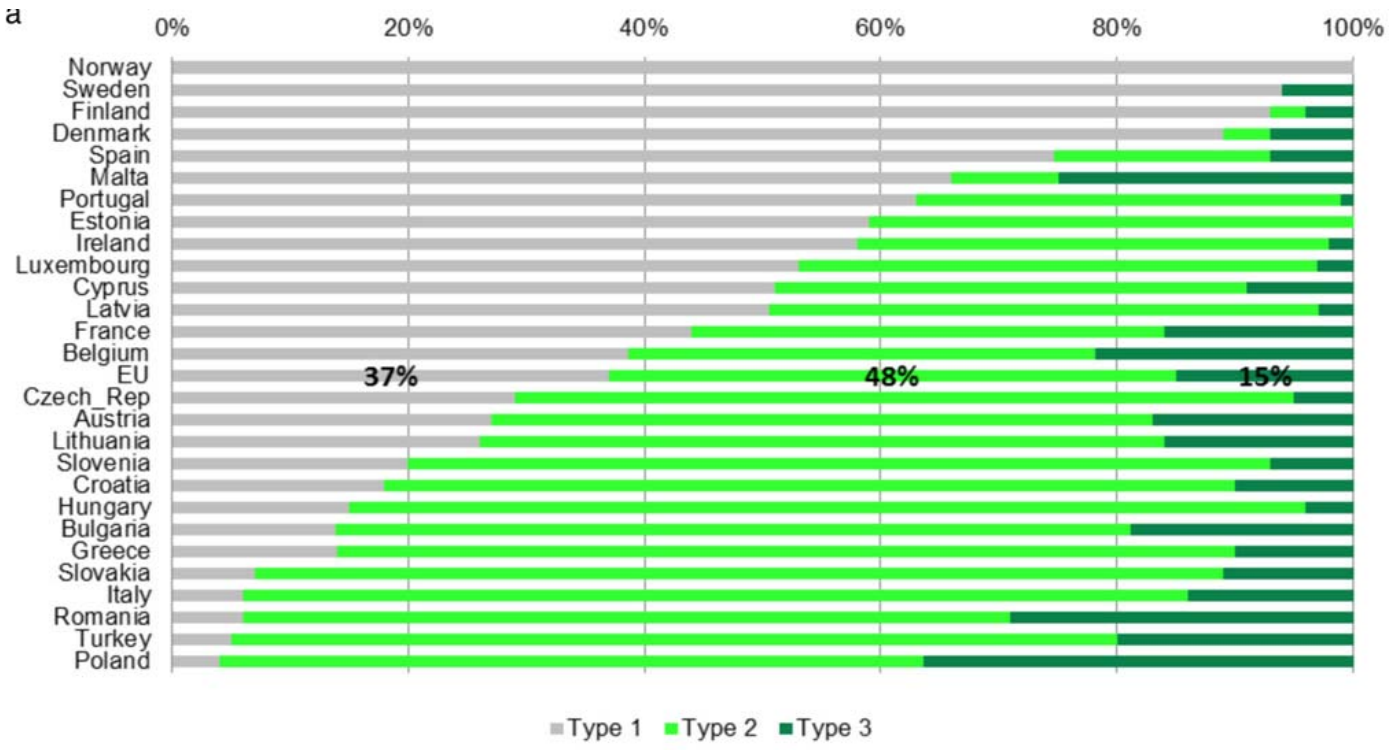
The digital divide can be viewed as one of the main barriers to the growth of Internet and Communication Technology in academic institutions throughout both developed and developing countries. From a national perspective, the digital divide can be defined as the gap that exists between those countries that have access to advanced technologies and those that do not (Gasco, 2005, as cited in Afacan et al.). In a synthesis report based on data collected for over two decades, the Study of the Impact of Technology in Primary Schools (STEPS) reported that computers in classrooms are a reality in some European schools while other educational settings rely heavily on computer labs. These findings are based on data gathered from 30 countries and over 270,000 schools which were involved in this study (Balanskat, 2007).

Internet and Communication Technology Structures in Schools

Numerous state-of-the-art tools are being incorporated throughout the European nations. Interactive whiteboards are one of the primary devices being utilized in many schools across Europe, most notably in the United Kingdom, the Netherlands, and Denmark. According to the STEPS report, in some countries such as Finland, the cost factors associated with interactive whiteboards have resulted in limited access to the devices. Research studies from the United Kingdom indicate that interactive whiteboards engage and motivate students while facilitating cross-school use of ICT (Wastiau et al., 2013). However, interactive whiteboards are not the only tools being offered in K-12 academic settings. "There is a clear trend towards laptop purchases in primary schools, probably because of their greater versatility and smaller footprint" (Balanskat, p. 14).

Denmark, Estonia, and Norway have been known for having the highest levels of platform use. Tablets with a wireless network and a wireless data projector that are enabled to move around among the students are found to be the most functional devices for classroom use in schools across the EU28, Iceland, Norway, and Turkey (Wastiau, 2010 as cited in Wastiau et al.). Furthermore, there are nearly twice as many laptop computers per 100 students in secondary schools in the European Union as compared to the data from 2006. Broadband usage is currently at 95%, indicating significant increases compared to 65-75% in 2006 (Wastiau, p. 14). These findings may very well indicate that the EU is continuing to work towards meeting the needs of 21st Century learners.

Figure 2. INTERNET COMMUNICATION AND TECHNOLOGY ACCESS



Source: The Use of Internet and Communication Technology (ICT) in education: A Survey of Schools in Europe, 2013

Type 1: Highly digitally equipped school, i.e. high equipment level, fast broadband, high connectedness (school website, virtual learning environment, teacher/student email accounts, etc.)
Type 2: Partially digitally equipped school (slow or no broadband access)
Type 3: Low digitally equipped school (no connectedness)

In a survey of schools in 2011, ICT in Education was commissioned by the European Commission Directorate General Communications Networks, Content and Technology, to assess and establish a benchmark for the use and attitudes of ICT in educational institutions across the EU28, Iceland, Norway, and Turkey. Data from the 31 countries was collected from primary level education, lower secondary level education, and upper secondary level education. The results demonstrate that in countries such as Denmark, Finland, Norway, and Sweden students have access to highly digitally equipped schools as compared to students in Portugal, Ireland, and Luxembourg. Some of the causes that can be attributed to this disparity include lack of financial resources and limited accessibility to technological infrastructures (see Figure 2).

Current Challenges

One of the top priorities in Europe is to transform current technological infrastructures in order to compete globally with other countries outside of the European Union. Even though the day-to-day penetration of ICT continues to gain momentum, there is still a disparity between countries within the EU. Even though technology usage has increased globally, the findings have concluded that there is a considerable discrepancy with Internet usage between developed and developing countries. While in developed countries 71.6% of inhabitants are Internet users, in developing countries only 21.1% of the population is using the Internet (ITU, 2010 as cited in Afacan et al., 2013). These findings are significant because Internet usage not only affects such industries as businesses and health, but it also greatly impacts the educational systems that make up the European nations.

The Future of European Higher Education: A Technological Impact

The technological focus in training varies between business and higher education—and this

is significant in a country's development (Birnbaum, 2001). Higher education's distinctive combination of goals, tasks, employees, governance structures, values, technologies, and history makes it distinctly stand out from the corporate world (Altbach, Gumport, & Johnstone, 2001; Thelin, 2004). Higher education in Europe differs from the United States. In Europe the educational mission focuses on political, administrative, and economic unification. For example, a country such as Russia faces leadership challenges as it shifts to adjust to changing cultural values of students and the community. In Germany, there are economic and infrastructure differences as the country seeks to balance technology availability and use in what was formerly West Germany and the former communist Eastern federal states (Nistor, Gogus, & Lerche, 2013). It is important to keep in mind that among European countries there are differences in terms of technological and educational infrastructure. In Western Europe, television and technological advancements are molding undergraduate minds, values, and essentially their way of life, which is growing at a startling rate (Nachimuthu, 2012). These undergraduates are changing--from the radical center of education to the mindset that their core values have them taking charge of how they should use technology. The focus is no longer how technology policy-making and planning by governments should influence their lives. An example of this is how undergraduates are using technology in the form of social media to look for truth and value and not rely solely on what their government reports.

Distance Education

Online learning is gaining a firm foothold within universities around the world—and at a rapid pace within Europe. In this regard, higher education in Europe is leveraging global innovations to put education within the reach of more and more individuals around the world (Bolman & Gallos, 2011).

Thanks in part to the success of the British Open University, distance education has found acceptance and success. Well-known European distance education programs are found in Belgium, France, Germany, Italy, the Netherlands, Portugal, and the United Kingdom (Albrechtsen, Mariger & Parker, 2001). Ireland is also making its mark as a leader in the research and development of new and emerging technologies and their incorporation into education (Marchessou, 1999).

In addition, the dissolution of the former Soviet bloc and the development of the European Commission have opened new avenues for expanding knowledge and collaboration among the European countries. This availability of computers and the Internet and the technological savvy of many Europeans are continuing to provide the necessary conditions for a strong distance learning society. In addition, technology may be disruptive in ways not intended, as it results in higher incidences of plagiarism, cheating, and blatant distraction as European students become more mesmerized with easy and ready access to mobile technologies. The higher education environment is both influencing and being influenced by the type of technologies needed to advance educational goals.

Technology on College Campuses and in Society

Technology is having a strong impact on campuses. Just like students, faculty have to adjust to the use of new digital technologies in the university environment. As technology is constantly changing, teaching faculty need regular support to keep up to date. Therefore, greater effort is needed in the area of professional development training for faculty so that they can continue to keep university students engaged. Denmark shares an active tradition of adult education and lifelong training which is naturally technology oriented (Marchessou, 1999). The Norwegian education scene is quite similar. With strong public support, they have had an IT plan established for the same length of time and with the same objectives as Denmark has had while offering interesting initiatives in distance education. In Sweden, the long tradition of public commitment to educational technology remains, but recent purse-tightening as a result of the recession has led to a shift. Moving further south, Italy and Spain present similarities and differences: in both cases, domestic

development of educational multimedia has been ahead of many other countries.

Distance education has bridged geographical boundaries and has leapt across the continent. It remains a key player in alleviating imbalances when it comes to the integration of educational technologies in the college/university environment. Things are quite different in the United Kingdom with its strong, well-established tradition of online and distance learning and public initiatives. To this end, several pan-European societies have been created over the decades. While some of these academic institutions originally focused on the traditional book-and-paper media, the development and use of modern technologies has become a major part of these societies' networking (Albrechtsen, Mariger & Parker, 2001).

Regarding technology and its educational use, Germany displays high technology diffusion, while Turkey and Romania make efforts to intensify their use of educational technology. While distance education is a necessity for Turkey, it comprises a relatively small part of higher education in Germany—and it is still operating as an experiment in Romania (Nistor, Gogus, & Lerche, 2013). It is well-known that the technology gap is widening between developed and developing countries.

If distance education is to spread across campuses and through Europe, then consideration must be given to the particular needs of European countries with lesser means. This may mean that the very technology that is part of widening the gap can also be used to close it. Over the next decade, advanced technologies will put education within the reach of many more students; therefore, teaching methodology will have to be restructured as well, to support the growth of technology on college campuses.

Implications for STEM Educators

It seems to be an accepted idea that college programs in the domains of STEM promptly adopt top technologies and their related educational applications, promoting them in creative new ways (Wang, 2010). Presumably, the fast technology diffusion within universities is because STEM professionals possess more related knowledge and skills which, in turn, can affect change in higher education throughout European classrooms, communities, and the corporate world. The goal for university educators should be to provide meaningful opportunities for their undergraduate students to engage in cultural discussions and realize that culture will always surround their lives: personal, educational, technological, and professional.

There are at least three innovations that come to mind in the higher education environments which have achieved so much momentum through wide implementation in the university culture at large and which cannot be ignored by educators in Europe. These are social networking, mobile and handheld computing devices, and gaming. These are almost guaranteed to have permanent roles in higher education. Social networking and Web 2.0 applications have been spectacularly successful in Europe on a large scale (Maddux & Johnson, 2011). However, true integration of technology will require solving the problem of differential access to technology-related, effective learning experiences.

Whether it is a business, a public entity, or a non-profit association, it is now impossible for an organization to function without using digital technology in its external and internal communications. The digital organization needs to coordinate communications and instruction with its key groups—its staff and administrators—and the best avenue for this to happen will have to be through corporate training efforts.

Technology and Corporate Training

The manner in which workers learn requires that companies become more flexible and responsive in their training. The current workforce has more information available to them at faster speeds and the nature of their jobs requires that they collaborate and share information. Employees learn best by doing their jobs. Studies have shown that skills in the workplace are gained from trying new solutions, making mistakes, and asking questions of colleagues and friends (Simmons, 2014). Employees now gain knowledge by participating in personal and professional networks and communities. Informal conservations and group meetings are more likely to supply knowledge than traditional training sessions. Google, external blogs, and news feeds are resources for employees today. Managers need to recognize this and use technology as a training tool, allowing their employees to learn from networking, not top-down structured instruction (Hart, 2012).

Developing a culture of collaboration is the foundation of propagating knowledge today. The keystone to creating this philosophy is trust. European corporations are slower to grant trust; however, once it is bestowed, the relationship lasts longer than in the United States (Fitzpatrick, 2014).

This collaborative culture is less of a geographical issue than a generational one. Younger workers are more likely to share and build social networks than older ones because they have been exposed to this environment most of their lives. All members of the workforce, however, can develop confidence in this system if management provides a motivating atmosphere by creating a collaborative infrastructure (Cross, 2013).

This collaborative infrastructure is based on the theory that learning depends on the different perspectives among co-participants (Lave & Wenger, 1991). Learning, understanding, and meaning are not self-contained structures, but depend on a team of individual contributions. The final outcome should not be focused on the knowledge level of one person but the aggregate value of participation of the entire group (Lave & Wenger, 1991). Collaborative infrastructure is the network that links workers with workplace learning activities: information, customers, news, models, plans, directives, gossip, and other colleagues (Cross, 2013). Corporate training officers need to develop a culture that takes advantage of all these areas. Expertise locators, content management systems, blogs, feeds, search tags, and indexes are some of the tools in which workers require training in today's world. These provide employees with the ability to share solutions to problems and come up with new ideas.

Leaders need to recognize that learning now takes place every day at the workplace. Organizations need to create cultures that foster this environment by removing obstacles, developing communities, encouraging networking, and stimulating conservation. Learning must take place at work because the pace of progress is faster than ever before and organizations that fail to recognize this will die (Simmons, 2014).

The CEO and Chief Learning Officer of Internet Time Alliance suggests implementation of the following steps to create a collaborative culture:

1. Focus on all workers, not just those that are new or need the most help.
2. Don't punish failed experiments; if you never fail, you are not innovating.
3. Create a directory that enables people to locate information from the correct individual.
4. Encourage people to present their work to others.
5. Root out information hoarding; make sharing the norm.
6. Reduce cycle time with instant messaging, Twitter, and podcasts; the world is not going any slower.
7. When feasible, substitute self-service and peer learning for workshops (Cross, 2013)

At the same time corporations and countries must find a way to narrow the digital divide. The new collaborative culture cited above would impact individuals who do not have access to the current knowledge base and will not have the same opportunities for collaboration as employed people. Second, smaller companies with fewer employees will have less of a community of information from which to draw information.

Recommendations

- Develop the infrastructure for the network of public Internet access points (PIAPs) throughout Europe.
- Create a plan to narrow the gaps in performance between the countries within the European Union.
- Create common policies for ICT development and teacher professional training across the European Union.
- Create programs to address inter-European synergies so that student mobility and community learning can be achieved.
- Invest funding and offer teacher training so that language barriers can be addressed through linguistic instruction either through international conferences and workshops or through video and multimedia avenues.

Conclusion

The relationship between technology and learning is one of the most important topics in higher education in Europe—and increasing in importance. While there are many areas of concern related to this topic, Van Dusen (2000) has alluded to three primary areas that should be addressed: issues of access and equity, issues of cost and affordability, and issues of quality and effectiveness. Not surprisingly, these represent the same three areas of critical challenge to the success of colleges and universities in other regions, as the struggle to make higher education more accessible, more affordable, and more effective is examined in European academic institutions.

This article provides a brief analysis of the major challenges to enhance teaching and learning with technology in European schools, institutions of higher education, and corporate institutions.

It also highlights those areas that can be further improved or developed especially in cases where technology carries a significant amount of risk and when its implementation does not meet specified goals or outcomes. The basic issues that can cripple technology usage in K-12 settings are also the items that are needed to support technological functions in higher education. This is not to say that technology cannot serve as a fertile source of management ideas and innovations—but not at the expense of the cultural values of the human capital and the need to bring about progress within academic institutions and the corporate world.

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Educational and Technological Highlights of Latin America through the Prism of Economics

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Mary Healy
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ABSTRACT – Economics, politics, and education are closely interwoven elements in any country, and Latin America is no different. Like many areas, Latin America has suffered since the economic crisis of 2008, yet external factors are all impacting the area. What at first may appear to be diverse elements such as eco-tourism, a new canal, legal changes in England, cheaper Internet costs, and the dropping of travel restrictions all will play key roles in the development of Latin American countries. This article will present economic snapshots of developments across Latin America and show how they are impacting the nature of K-12, college, and corporate environments.
Key words: global issues, economics, Latin America, educational technology, eco-tourism, Panama Canal, Caribbean, Central America

Primary and Secondary Education in Latin America

Although there are many definitions of "Latin America," the authors used the definition found in the *Encyclopedia Britannica* (2014), "Latin America is generally understood to consist of the entire continent of South America in addition to Mexico, Central America, and the islands of the Caribbean whose inhabitants speak a Romance language." The authors took a little license by including English-speaking countries in the region because of the strategic role those nations play in the economics of the region.

Central America

Of all the countries in Central America, the biggest number of immigrants entering the United States is from Mexico. Compulsory education in Mexico is nine years. Rowing (2006) cites that Mexico has seen an increase in school enrollment rates at every level. From 1950 to 2000 alone, Mexico's school enrollment rate increased eight fold. The steady increase in school enrollment has put a burden on the Mexican educational system to provide quality education and improve facilities to meet the demand. In spite of all of Mexico's efforts, a high secondary drop-out rate still exsists. Of the students who graduate from high school, only 46% enroll in college, which is far less than most other countries in the region.

To the south, Costa Rica is considered by many economists to be the most developed country in Central America, having the most advanced and highest quality of education in the region. It boasts a literacy rate of 96% and its educational system is ranked 37 out of 134 in primary education around the world (Porter & Schwab, (2008-2009). The government encourages schools to add programs in computer sciences and English as a Second Language (ESL) into the curriculum to ensure students are able to compete internationally upon graduation.

South America

Brazil has many characteristics of a third-world country but is considered by many economists to be a developing country. According to Stanford.edu, Sao Paulo is seeing a technology boom, boasting the fifth largest amount of mobile and Internet users in the world, despite the fact that the price of a computer in Brazil is approximately twice that of a computer in the United States (World Economic Outlook, 2011). Although education is mandatory for all Brazilian citizens, it is not enforced and many children who live in impoverished areas do not attend school. It is estimated that one-fifth of all Brazilian children ages 12-16 are working (Marteleto & Souza, 2013). To counter this trend, elected officials are encouraging the development of technology centers throughout the country and are focusing on the educational infrastructure of post-secondary schools. Utilizing a top-down approach, Brazil has launched an initiative to send thousands of post-

secondary students abroad to study. Belta, an international student exchange agency, reports that in 2011 the number of Brazilian students who were sent to study abroad was 215,000, and that figure grows by 20% every year.

The Caribbean. The island nation of Cuba boasts a 97% literacy rate. In the last decade the government has made it a priority to build schools in rural areas in order that education can be accessed by everyone. In February 2011 the installation of a 994-mile underwater fiber-optic cable stretching from Venezuela was completed (Phys.org, 2013). While the Internet is now available and legal in Cuba, there are still many restrictions. The infrastructure in Cuba does not support a fast Internet connection and the Internet is so expensive that the majority of the people cannot afford it. Online education in Cuba is impossible because of the infrastructure and expense; therefore, people download courses and information retrieved from other countries to educate themselves on a particular topic.

To the southeast is Dominican Republic. Until recently the attitude of many in the Dominican Republic toward education was vastly different from those of the Cubans. In an interview with a Dominican mother of three school-aged children, the researchers were told that the Dominican Republic has seen a shift in cultural values toward education with the beginning of the 2014 school year. School, which formerly consisted of a four-hour shift with a one-hour lunch and recess, has moved to a full eight-hour day. Unfortunately, the country was not prepared for such a transition and schools, which once accommodated two, four-hour shifts, are finding it challenging to handle these large numbers of students all at once. Inevitably, this has lead to overcrowding. Yet many parents believe that the country is headed in the right direction, that there is still much work ahead, and that growing pains are inevitable.

Institutions of Higher Learning

Central America

Panama is opening a second canal and the southern coast of the United States is bracing for the increased commerce that will be coming from Panama—and the reverse is also true. With the success of the second canal, Panama could see itself as a major hub of the region in terms of the shipping industry which, in turn, will increase the need for expanded higher educational programs related to industrial sectors that support maritime-related careers.

South America

Guyana has positioned itself as a source of teachers for the English-speaking Caribbean. Although it has one university, it has an established reputation of producing scholars in education and law and the institution ensures that the Internet is available for all college students (Personal communication with a College of the Bahamas Professor, Oct 17, 2014).

Working our way south, Brazil is recognized as having some of the best universities in the region. The University de Sao Paulo is a prime example and is ranked highly (27th) in the world, (www.topuniversities.com/where-to-study/region/latin-america/). Brazil is a major industrial center, having courted technology giants to stimulate its economy. On the opposite coast, Chile boasts of a sophisticated educational system and a high ratio of higher educational institutes to students compared to its population (Personal communication with a College of Bahamas Professor, October 2, 2014).

The authors believe that by embracing innovations in educational technology in their industrial sectors and with stabilized governmental policies, these countries can continue to attract external investment, thus becoming more prosperous and raising the standard of living of their citizens. The region has a large labor pool at the right price, natural resources, built-in internal markets, and the advantage of proximity to a large number of neighbors who need their services.

The Caribbean

The countries of the Caribbean are taking a new approach to higher education. Their college graduates are being asked to attend specific training venues after graduation, especially to obtain certifications supporting the financial industry. The new institutions into which graduates are entering are called Centers of Excellence and are specialized apprenticeship programs managed by institutions of higher learning under the control of the University of The West Indies (UWI). Although agreed to in theory by many of the governments of the Caribbean Community and Common Market (CARICOM), all of the centers are not in place yet. They will be distributed in different countries of the region (Proceeding of the 3rd Caribbean Conference on the Financial Services Sector, April 2, 2014). For example, in order to meet the demands of emerging industries, the Republic of Trinidad and Tobago has now introduced its first university, the University of Trinidad and Tobago. Many of the technocrats working in the region are sent by their banks to Trinidad for training in specialized areas of information technology in the finance sector.

Oftentimes, events in other locales have far-reaching effects. For example, in the area of law in the Bahamas there is a movement to replace the Privy Council in England with the Caribbean

Court of Appeal. This significant event means that the region must produce graduates of law schools and Master's Degree programs, complete with national and international certifications, to meet this growing market. Hence, the College of the Bahamas (COB) has moved to establish its own Law School, which is now independent of the University of the West Indies' support.

The COB remains as the premier tertiary institute in the Bahamas and, after years of planning, it will become a University in 2015, and the COB's new President is interested in bringing students and faculty from as many international destinations as possible. In addition, the Bahamas Marine and Science Institute (BAMSI) opened its doors on Andros in 2014. It is a technical/research-based program formed in conjunction with the University of Miami and the COB.

Cuba provides scholarships to its sister countries like the Bahamas, Jamaica, Trinidad, and Barbados in the area of higher education. Internally, education is free, up to and inclusive of higher education—and there are over 60 universities in Cuba. With the possible lifting of travel restrictions by the United States and many other countries looming on the horizon, there may well be a strong opportunity for growth in the tourism industry in the future. Therefore, higher education will see an increased demand for personnel to support this industry in terms of specialized schools

It is being predicted that all sectors of the Cuban economy could see an injection of investment—both in human as well as infrastructural and financial capital—as it adapts to its "new" political climate.

Technology and the Latin American Business World

Companies worldwide face the problem of retaining skilled employees, and Latin American companies are no exception. To remedy this problem, human capital development executives in Latin America recommend that companies "blend tech with touch" (Sanchez-Arias, et al., 2013) by finding the appropriate mix of virtual learning with face-to-face learning to meet an organization's unique cultural and strategic demands.

Businesses in developed countries know that technology can play a significant role in recruiting, training, and retaining employees so that they can succeed in the global marketplace. Social media are being used to target potential employees, and chief learning officers are revamping how training at all levels is delivered. Brick-and-mortar classrooms are no longer the only means to "push" training to employees. Through the use of blended-learning and e-learning environments, technology is used by employees to "pull" training when and where it is convenient. Corporations are using cost-effective, flexible, and engaging technology systems to invest in one of their most valuable assets—their employees.

Cultural issues, infrastructure, and governmental barriers have inhibited the use of technology in some corporate environments in Latin America. In general, Latin American societies "rely on social relationships for almost all aspects of daily life" (Olivas-Lujan & Ramirez, 2007, p. 420). In the corporate environment, the use of technology to recruit candidates, train employees, or network with colleagues runs counter to the cultural mores of Latin American society. Olivas-Lujan and Ramirez found that after implementing an electronic human resources management system (e-HRM), four Mexican-owned companies saved money and improved efficiency by using e-compensation, e-training, e-recruitment, and e-staffing technologies. However, the companies had to work toward altering the employees' mindset regarding their cultural values in order to successfully implement an e-HRM system. Employees had to change their interactions from face-to-face environments to virtual environments when they conducted human resource activities.

A second issue is infrastructure, which can be a barrier to integrating digital solutions in the corporate setting, especially in Mexico. Nationally, there are areas where telephone lines are not available, and locally there are some small communities that lack electricity, telephone lines, Internet connections, and other services (Olivas-Lujan & Ramirez, 2007). Access to technology is not a priority in areas where even basic necessities such as electricity and clean water are not available. There are, however, hopeful signs that Latin America can overcome obstacles to ensure that underdeveloped regions can participate in 21st Century activities that most developed countries take for granted.

Central America

According to the former president of Costa Rica, the country "is striving to be a mecca for eco-tourism as well as high-technology business" (Chandler, 2011) and plans to upgrade utilities, roads, and ports, as well as install the cabling systems required to double Internet access from 7% to 15%. Similar to the new opportunities poised for Panama with expanded marine-based jobs and Cuba and the tourism industry, Costa Rica has new opportunities for its citizens—and challenges for educators.

South America

Large corporations in Brazil have begun to use distance learning via Web-based e-learning and virtual environments (Porto & Berge, 2008) and have found gains in employee productivity and

overall performance. The Inter-American Development Bank has begun to use MOOCs to train project designers and program managers. According to one of their corporate executives, "MOOCs make training more accessible to government agencies with budget restrictions and allow us to reach the most sensitive parts of the chain of implementation of development projects" (Bonnefoy, 2014). Brazil is "characterized by wide gaps in wealth distribution, with 20 percent of its population functionally illiterate and living below the poverty line" (Porto & Berge, 2008, p. 1). Even with a growing middle class and millions of people being lifted out of poverty, "heavy government intervention in the economy continues to cause the misallocation of capital, limit mobility, and fuel a sense of injustice" (2014 Index of Economic Freedom, 2014). Despite wide divisions between the rich and poor, "Brazilians are culturally open to technology and the change it brings with it" (Porto & Berge, 2008, p. 3). Geromel (2012) states that technology companies dominate the country's top ten startups.

The Caribbean

Although citizens of Cuba want access to technology, "Cuba remains one of the world's most repressive environments for the internet and other information and communication technologies" (Swinhoe, 2013). Because the government only granted permission for private mobile phone ownership in 2008, Cuba has the lowest rate of mobile phone ownership in Latin America. When computer ownership was banned, ownership averaged 3.3 per 100 people; now it is up to 834 per 1,000. However, Internet use is negligible because of poor connection speeds, high costs, and government monitoring (Swinhoe, 2013).

Conclusion

Across Latin America, 2.5G and 3G infrastructure is being upgraded to 4G infrastructures as 150,000,000 smart phones are predicted to be sold in the next few years. Yet the challenges are more profound than that. On the positive side, Latin America has a large labor pool at the right price, natural resources, built-in internal markets, and the advantage of proximity to a large number of neighbors who need their services. In addition, countries around the world recognize the key role that Latin America plays, and they want to be partners, for the mutual benefit of both. This article cited many initiatives being undertaken by countries in Latin America—from all-day schools in Dominican Republic, expanded maritime careers in Panama, eco-tourism in Costa Rica, corporate Web-based e-learning, and Centers of Excellence across the Caribbean, to name a few. At first glance they may seem disparate; however, upon further investigation they all tie together with a common thread. Challenges and opportunities abound—and Latin America is preparing to leap into the global marketplace, and education and technology will be the catalysts to help all countries in the region move forward.

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Education, Technology, and the Middle East

Lori A. Dini
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ABSTRACT –The Middle East is diverse from many perspectives—economically, culturally, religiously, and politically. In response to the need to combine education, technology, and tomorrow's careers, countries, educational institutions, and corporations have taken different approaches. With so many diverse countries encompassing "the Middle East," this article will focus on problems and unique initiatives of a few countries in the region and will provide an overview of the current status of education and technology in these countries relative to the fields of K-12, higher education, and corporate training. The common thread is how countries in the area seek to improve educational systems from the primary level through to universities and beyond and how they view educational technology as a viable option to increase opportunities for the region and its people.

Keywords: educational technology, Middle East, MENA, K-12 education, higher education, corporate training, educational technology

Introduction

The Middle East, the lands around the southern and eastern shores of the Mediterranean Sea, extends from Morocco to the Arabian Peninsula and Iran. By the mid-20th Century a common definition of the Middle East encompassed the states or territories of Turkey, Cyprus, Syria, Lebanon, Iraq, Iran, Israel, the West Bank, the Gaza Strip, Jordan, Egypt, Sudan, Libya, and the various states and territories of Arabia proper (Saudi Arabia, Kuwait, Yemen, Oman, Bahrain, Qatar, and the Trucial States, or Trucial Oman [now United Arab Emirates]). (Encyclopedia Britannica, 2014). This article will focus on the problems facing and the unique initiatives of a few countries in the region and will provide an overview of the current status of education and technology in these countries relative to the fields of K-12, higher education, and corporate training.

The countries of the Middle East are undergoing rapid change in many areas, and the field of education is no exception. The demands for greater accountability and more responsive delivery of public services echo across the region, with many of the demands directly focused on education—and educational technology can play a key role in the upgrading of national educational systems in the Middle East.

Educational Technology in K-12

Technology in the Classroom

In a report in the *Jerusalem Post*, the authors found "a significant increase in the use of technology among elementary-school pupils and middle-school pupils for learning purposes. In 2013/14, 49% of elementary-school pupils and 35% of middle-school pupils reported using the Internet for learning purposes, compared to 28% and 21%, respectively, in 2007/08" (Kids Are Happy at School, 2013). In the same article it was interesting to note that teachers in Israel face some of the same standardized test issues that American teachers face. Regarding the national Meitzav examinations, in August 2013 the Education Minister announced the cancellation of the external Meitzav achievement exams for the 2013/14 year, though schools continued to administer the examinations internally. The exam, used to assess and compare the performances of schools across the country, tested language, math, and science skills. Then the Education Minister announced that beginning in the 2014/15 school year the Meitzav exams would be reinstated every three years. According to his plan, fifth graders will be tested in three disciplines – mother-tongue language (either Hebrew or Arabic), mathematics, and English.

In Jordan, *The Jordan Times* (2012) published the results of a study it conducted about computers in schools and the findings included:

- About 99% of the country's schools have at least one computer and 86% of them are connected to the Internet.
- 85% of the Kingdom's schools have at least one computer lab and on average there is one computer per 14 students in the country schools.
- 58% of students have computers at home and 28% of them have Internet services.
- 77% of teachers have computers at their homes, 41% are connected to the Internet, and 57% have personal e-mail accounts.

In an interview with an Egyptian parent whose daughter is an eighth grader attending a private school in Egypt, he mentioned receiving an official notice from the school at the beginning of the school year (2014-2015) outlining an eLearning policy that would make textbooks available online. According to the parent, the notice did not specify a certain release time or a web link to check availability (E. Hafez, Personal communication, October 15, 2014). One of the authors visited the Egyptian Ministry of Education's website and found no mention of such a policy. On the other hand, the Ministry's official page on Facebook provided various posts that directed visitors to eBook links of selected content areas such as World Languages, Chemistry, and Mathematics, most of which were published in foreign languages (English, French, and German), in addition to some religious studies texts of various levels. The page looked like a work in progress and was created March 1, 2013 (Arab Republic of Egypt Ministry of Education, 2014).

Public and Private Education

According to a report of the World Bank for the Middle East and North Africa entitled "The Road Less Travelled," the education system in Egypt consists of three levels of education: primary, secondary, and higher education. There are two types of public education in Egypt. The first are those where all subjects are taught in Arabic; the others are charter schools that add the English language as a course of study. Private education includes two types of schools. The first are private schools where English language is taught as a course starting in kindergarten. These are non-government schools that give more attention to the personal needs of the students. The second are language schools where the whole curriculum is taught in English plus a second language, usually French or German. This category includes international schools, which are the most expensive yet tend to be the most technologically advanced.

Religious-oriented schools are divided into two categories. The first is Azhari education, which assign separate buildings for boys and girls and are supervised by the Supreme Council of Al-Azhar. Islamic sciences are taught alongside the curriculum that is taught in public schools; and the graduates of Al-Azhar institutes are automatically enrolled at Al-Azhar University. The second category is the non-Muslim religious schools, which the missionaries built and are currently associated with various churches (Al-Sharief, 2010).

A study by Bakr (2011) that measured Egyptian teachers' attitudes toward computer use in the public school classroom found that despite the positive attitudes toward computer use, teachers are reluctant to use them. In terms of gender, female teachers were more anxious and less confident computer users. The researcher attributed these results to the lack of appropriate training and encouragement from administrators. Computer ownership at home also played a role in these results (Bakr, 2011).

Education for All? According to the 2013-2014 Education for All Global Monitoring Report fact sheet published by the United Nations:

- The Arab states are far from achieving universal primary enrollment. There are still almost 5 million children out of school in the region, 60% of which are girls.
- The enrollment ratio in secondary education had reached 63% in general, but enrollment in technical and vocational schools has declined from 14% in 1999 to 9% in 2011.
- There are still cases of unequal enrollment in secondary education. In Iraq the lower secondary completion rate was 58% for rich urban boys and just 3% for poor rural girls in 2011.
- Women teachers are particularly lacking in countries that have wide gender disparities in enrollment.

Higher Education

The Need for Reform

Many education leaders believe that education systems in some Arab countries have failed to produce professionals with the skills needed for the 21st Century. According to Shepp (2013), in Jordan the need to modify educational outcomes to meet the needs of the current labor market is urgent. For example, Jordan's universities produce far too many engineers for the labor market to employ. Students are tracked in Grade 10 through a series of standardized high school exit exams that determine where and what subject they can study and also what professions they can enter once they complete their higher education. For

those students who do not have an intended career path by the end of senior year, the ability to change tracks later is difficult and choices are limited. Because of that life-defining nature of the Tawjihi (matriculation exams), teachers in high schools adopt the "teach to the test" strategy and the favorite method is rote learning, which has proven unsuitable for creating professionals who are ready for today's global economy standards, which require creativity and critical thinking.

A slightly different problem exists in Egypt. Higher education in Egypt includes state universities and vocational institutions, which fall under the centralized supervision of the Ministry of Higher Education in Cairo. There are also privately-owned Egyptian and international universities. A researcher at the National Centre for Social and Criminal Research sees this system of dual education as counter-intuitive to the main goal of education, which is to create cultural unity. Young Egyptians who are studying the same subjects in different languages with different levels of technology integration and sometimes taught by foreigners can lose their sense of belonging, which results in alienating them within their own community and creating unequal opportunities for the job market (Al-Sharief, 2010).

The Unemployment Challenge

According to Shepp (2013), official data state that over 70% of Jordanians are under age 30, and half of those are under the age of 15. The 15-24 age demographic alone accounts for about a quarter of the population. The youth are the ones bearing the results of the struggling economy and the unemployment rate among young workers is 30%. The World Bank's 2013 World Development Report on Jobs put the jobless rate at 22% among young men and 45% among young women in 2010 (World Bank Group, 2013).

Herrera and Mayo (2012) estimate the unemployment rates are 25% in Egypt and 31% in Tunisia. In their article they mention that the unemployment rates are highest among educated youth with high school and university diplomas, and even higher among females. "Among youth who find employment, the overwhelming majority of them work in insecure, very precarious circumstances with no fixed contract, benefits, and salaries below the living wage" (p.73).

Many graduates in Middle Eastern countries, like their counterparts in the United States, face the problems of unemployment and debt for tuition costs upon graduation. As of 2010, 60% of the youth under 30 in Jordan are unemployed. The rate in Egypt is even higher. As jobs become more difficult to find in areas of the Middle East, people were left with the option of waiting for government or military jobs—or migrating out of the area. "Egypt is a sending, transit and receiving country of migration. While Arab countries have traditionally been the main destination for Egyptian labor migrants, an increased supply of Asian workers in these countries, together with high unemployment in Egypt, contributed to the emergence of a major wave of Egyptian emigration to Europe" (International Organization for Migration, 2014).

The solutions could be the creation of business partnerships with interested companies. In the example below, students working side-by-side with practitioners in the field can be a pipeline to tomorrow's careers.

Investing in the Future

Intel is currently Israel's largest single employer, with 8,100 employees. Israel is very important to Intel, so much so that the company is funding a new scholarship to train the next generation of Israeli tech pros. Working with Israel's Education Ministry, the company will spend $5 million over the next five years to provide advanced education to students in junior high and high schools in the "hard sciences" — information science, technology, engineering, math, and others. Students will enroll when they start junior high school (seventh grade), and continue through until the end of high school, attending special advanced classes and work with mentors and teachers from Intel; during school holidays, students will participate in Intel programs, joining lab and camp programs that will reinforce their studies. After high school students who excel in high-tech will be able to qualify for a $30,000 (Canadian) scholarship, supplied by the Schulich Leaders program. Schulich is perhaps the biggest private donor in the world to Israeli high-tech education; in recent years he has given tens of millions to the Technion and personally was responsible for the construction of many of the high-tech "smart classrooms" in the Negev and Galilee – a project on which he spent at least $100 million. This represents a melding of government, corporate, and private resources coming together to help students.

Technology and Higher Education

Saudi Arabia continues to see substantial growth in education funding. Education spending by the Saudi government has nearly doubled over the past six years from US$28.12 billion in 2008 to US$54.54 billion in 2012. This has had a dramatic effect on the number of STEM initiatives as well as the number of universities being established (ICEF Monitor, 2013).

There have been dramatic spending increases in STEM in Saudi Arabia. New universities have been established, focusing on science, technology, and medicine, and some institutions, notably

King Saud University in Riyadh, are beginning to factor more prominently in global rankings. But aside from simply keeping up with demand, it seems clear that these significant new investments are being made with a larger purpose. "Scientific research and innovation in the region have not kept pace with the rest of the world, and increasingly education—applied sciences, research, and technology in particular—is seen as an important driver of social and economic development" (ICEF Monitor, 2013).

In Israel, science and technology are two of the country's most developed sectors, and Technion University has awarded over 100,000 degrees since its founding in 1912. It currently offers degrees in science and engineering, architecture, medicine, industrial management, and education and has 18 academic faculties, 60 research centers, and 12 affiliated teaching hospitals.

Some of the outstanding accomplishments of Technion graduates include successfully designing and launching a satellite, creating a successful anti-Parkinson drug, and using DNA strands to assemble a conductive wire 1,000 times thinner than a human hair. Today more than 70% of founders and managers in the Israeli high-tech industries are Technion graduates.

From the Corporate Perspective

Barriers

Technology plays a vital role in today's corporate training environment. According to Bersin (2014), "Technology is revolutionizing the [corporate training] market." Technological advances in corporate training include: learning management systems, online communication channels, virtual learning, gamification, and MOOCs. Although international spending on employee development reaches into the billions, not every company has the resources to invest in this type of program or the cultural belief system needed to deem such an endeavor as a worthwhile pursuit. Some countries in the Middle East have not historically made employee development a priority. Because of this, the adoption and incorporation of human resource development strategies into business practices is varied and inconsistent.

The countries that make up the region are characterized by extremes of "wealth and poverty, instability and continuity, and high levels of illiteracy coinciding with high levels of educational achievement" (Iles, Almhedie, & Baruch, 2012). As we will see in the next sections, while some countries and companies have successfully merged current practice with local culture creating successful business ventures, some face challenges and are mired in slow growth because of political and financial constraints (Iles et al., 2012). The barriers that slow the growth of a country or an organization can also prove to be obstacles in the area of corporate training.

There are several reasons for the lack of career development in some Middle Eastern countries. Selection for a position or promotion can be highly subjective, depending on personal contacts, nepotism, and family name, and it is common practice to employ friends or family members of existing staff (Iles et al., 2012). Motivation, job incentives, and leadership have different connotations in this area of the world. In many struggling Arab countries, pay scales or raises are based on seniority and years of service rather than being performance based (Iles et al., 2012). If additional qualifications are not required to obtain a promotion or a raise, employee training may not be a high priority. However, from a more positive perspective, here are what some companies and institutions are doing to enhance employee training.

Safety Compliance E-Training

Although cultural barriers exist, several foreign organizations are providing safety skills training for Middle Eastern workers through web-based platforms. The goal of these programs is to improve compliance with safety standards. One such collaboration is The Food Safety and Knowledge Network (FSKN), a project of Michigan State University in conjunction with the Global Food Safety Initiative of the Consumer Goods Forum and other food industry and public sector partners. The initiative's purpose was to design open content to improve basic food safety practices in developing countries (Geith, Vignare, Thiagarajan, &Bourquin, 2010). The FKSN online skills-training program centered on open educational resources and mostly open software tools (Geith et al., 2010). In July 2012, another safety program was launched for the oil and gas industry by Atlas, a United Kingdom training company, and OPITO, the oil and gas industry standards and skills organization, called International Minimum Industry Safety Training (IMIST) in the Middle East (Rowley, 2012). The e-learning program was tailored to meet the varied workforce, language, and geographic needs of the area in order to ensure that workers have a common standard for safety training and knowledge to avoid any hazardous issues. One benefit of this program is that IMIST has the capability to adjust the course to the individual student's needs (Rowley, 2012).

Online Professional Development Opportunities

Although corporate training faces obstacles in developing areas of the Middle East, career development is a growing trend in the rest of the region

(Alyahya, 2011). The first e-Learning university for professional development in the Arab world, Hamdan Bin Mohammed Smart University, provides non-degree programs for career development (Alyahya, 2011). The classes are offered in several formats: face-to-face, blended learning, or completely online. The blended learning option includes self-paced learning and synchronous online learning with face-to-face classes (Hamdan Bin Mohammed Smart University, n.d.). In addition, all the programs are available online, thereby increasing opportunities for people who may have been unable to attend a traditional university such as working professionals and women, who may have been restricted because of cultural barriers (Alyahya, 2011).

Corporate Initiatives

Several corporations in the Middle East are working to include 21st Century corporate training technology trends. Across the Middle East, technology entrepreneurs are endeavoring to improve the economic future of the area (Pecquet, 2014). In a press release dated June 25, 2013, Badgeville, a gamification platform, announced its partnership with Gamifiers in the Middle East. Located in Dubai, the Gamifiers is the area's first digital agency that will develop employee skills using Badgeville's Behavior Platform, via its website and mobile applications (Badgeville, 2013).

In another press release dated August 28, 2014, Eton Institute, the United Arab Emirates' (UAE) largest language and professional development provider, launched a personalized mobile learning application with gamification aspects of progress updates (Eton Institute, 2014).

Silicon Wadi

Israel, which has the highest concentration of engineers in the world (135 per 10,000 people, compared to 85 per 10,000 people in the United States) has consistently pursued an economic development strategy based on both attracting international technology firms as well as launching innovative firms. The high-tech region, nicknamed Silicon Wadi (Valley), is located throughout the coastal plain of Israel and has succeeded in attracting both international and local technology companies. International companies with some of the strongest commitments to employee development can be found in that region, including IBM, Facebook, Google, Microsoft, and Phillips. As far as encouraging local initiatives, in 2012, *Newsweek* named Tel Aviv as one of the best places for high-tech startup companies, placed only second behind its California counterpart.

Conclusion

As diverse as the countries in the Middle East are, so too are the approaches to handling educational technology challenges. In the K-12 section, technology use, standardized tests, e-books, and public vs. private schools could also be familiar themes to the American reader. The Higher Education section started with the need for reform and segued to issues related to unemployment. It was followed by positive examples of corporations and countries that are investing in the advancement of post-secondary students. The Corporate section began with barriers to employee development followed by positive examples of technology initiatives. The common thread that ties all of these sections together is that the countries highlighted in this article recognize the need to prepare their citizens for tomorrow's employment challenges and that educational technology can be a catalyst to help them move forward.

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Guidelines for Journal Submissions

Invitation to Publish

The *Journal of Applied Learning Technology (JALT)* is a quarterly publication devoted to the issues, problems, and applications of applied learning technologies in education, training, and job performance. Its purpose is to inform managers, senior professionals, and developers of specific examples of applications of technology based learning systems for education, training, and job performance improvement in terms of results that can be or have been achieved. The readers should get information directly applicable to their jobs. Articles are invited that examine some phase - technology, evolution, planning, cost, learning successes and failures - of contemporary delivery systems, in line with the foregoing.

The journal audience embraces trainers, professionals, and educators across a broad spectrum of business, industry, and the military, administrators and executives, and academia. The articles should be of interest to a wide range of readers involved in some aspect of lifelong learning.

We are particularly interested in case studies about strategies or techniques that work; training program design; evaluating existing design tools and templates; and adapting design to differing hardware systems and components.

While we do not automatically reject reports of empirical studies, review articles, theoretical articles, or methodological articles, these are usually not as important to our readers as the how-to information in case studies.

We also seek informed, thought-provoking commentary on issues related to interactive program design: how to achieve quality, what makes for better interactivity, and what universal truths may be found to guide design. We also are seeking knowledgeable individuals to review books of interest to our readers.

Anyone interested in providing either commentary or book reviews should contact the editor for information about length and manuscript style.

Readers are invited to share their work in this domain. A blind review process will be used for the selection of manuscripts. In addition, work may be published that has been solicited by the editorial review board. Work submitted for publication in JALT should not be submitted elsewhere. Manuscripts will be acknowledged electronically upon receipt. Decisions about publication will be forthcoming no later than 12 weeks following acknowledgment. Manuscripts are to be prepared in accordance with the publication manual of the American Psychological Association (APA), sixth edition. Follow these guidelines:

First page: Author's name, affiliation, article title, and email address.

Second page: Title, 100-150 word abstract, keywords for indexing purposes.

"About the Author" on a separate page at end of article.

Articles should be 2,000-3,000 words, about eight double-spaced pages.

Relevant images, charts, figures are encouraged.

Preferred submission route

Send proposed articles as a Word doc attachment to Abramson@nova.edu

Style Issues for Publication

- Write to inform. Keep language at a conversational level; do not try to impress the reader with your expertise.
- Identify all acronyms as soon as possible. For example: Instructional design (ID)
- Do not use *JALT* to advertise your company or product. However, feel free to share expertise that may be of use to others.
- Use headings to organize your article.
- Provide literature to support your work and statements. Tell the readers how you built a better mousetrap, not how you invented the concept of mousetrap.
- Provide photographs, charts, screen shots, etc. that enhance your message.

Other Items for Publication

- Letters to the Editor are invited. Letters will be published in *JALT* at the discretion of the Executive Editor.
- Descriptions of new products as used by the target audience will be considered. All such press releases must be signed and contact information provided.