THE WORLD IS FLAT(TER):
REFLECTIONS ON THE EVOLUTION OF LIBRARIES IN A DIGITAL AGE
Katie King, Library Director, Southern Nazarene University

The world is flat, or so argues Thomas Friedman in *The World is Flat: A Brief History of the Twenty-First Century.* This metaphor is his way of explaining how the convergence of several major forces contributed to the ongoing process of rapid social, political, technological and business change in the twenty-first century, which has lessened the impact of geographical constraints on one's ability to contribute to a global market. Essentially, many different people in many different places are now empowered to connect, compete and collaborate in myriad ways.[1] This transformation has changed and is changing the paradigm in which all entities and institutions operate, the implications of which have yet to be fully realized, and academic libraries and the educational environments they serve must engage in transformation, too. By reflecting on how technology has changed, we can begin to address how these advances affect academic libraries, specifically with regard to access and acquisitions.

Technology has evolved significantly in the last thirty years, and, while a thorough examination of how technology has developed is outside this scope of this article, it is important to briefly address a few changes that directly affect how academic libraries and their affiliated institutions operate, namely, the popularity of personal computers, the development of communications infrastructure, and the ubiquity of smart mobile devices. In the 1950s and 1960s, computers as society knows them today did not exist. Rather, most computers were mainframes produced by IBM whose components filled entire rooms. They were primarily used by large corporations, governments, and laboratories to process large amounts of data, were prohibitively expensive, and were hard to program.[2] However, innovations in hardware components, like transistors and integrated circuits, led to steady increases in computing power, and these parts began to be commercially produced and refined.[3] This steady increase in both hardware innovation and computing power essentially meant that smaller parts could deliver more data more efficiently than larger parts, which paved the way for the invention of the first minicomputer, the Altair 8800. These first minicomputers were often sold to medium-sized businesses or divisions within larger companies, but they also attracted the attention of people like Bill Gates, Paul Allen, Steve Jobs, and Steve Wozniak. Bill Gates and Paul Allen paired up, founded Microsoft in 1975, and focused initially on developing operating systems that ran on the first personal computer (PC) released in 1981. Steve Jobs and Steve Wozniak founded Apple together and released their first PC, the Macintosh, in 1984, which competed directly with the PC that ran Microsoft's operating system.[4] From then until now, Microsoft and Apple have been in direct competition with each other, which has fueled innovations in operating systems, personal

[1] Friedman, Thomas L.. 2005. *The world is flat: a brief history of the twenty-first century*. New York: Farrar, Straus and Giroux: p. 205.

[2] 2006. "Computer Evolution." *Forbes* 178, no. 5: 104-105. Business Source Premier, EBSCOhost (accessed January 3, 2013).

[3] Ceruzzi, Paul E. 2010. "'Ready or not, computers are coming to the people': Inventing the PC." *OAH Magazine Of History* 24, no. 3: 25. MasterFILE Premier, EBSCOhost (accessed January 3, 2013).

[4] Gelernter, David. 1998. "Bill Gates. (cover story)." *Time International* (South Pacific Edition) no. 49: 150. MasterFILE Premier, EBSCOhost (accessed January 3, 2013).

computers, hardware, software, and other devices to the benefit of the PC user. By the 1990s, personal computers were relatively affordable, and, thanks to developments in communications infrastructure, were also desirable. Since that time, PCs have continued to see increases in specifications like processing speed, RAM (random access memory) speed, and hard drive storage space and decreases in size, weight, and price.

Without a stable and functional communications infrastructure, personal computers would not be nearly as popular or as useful as they are today. The year 1969 saw the development of ARPANET (Advanced Research Projects Agency NETwork) – the world's first network for transmitting packets of data between computers. ARPANET was developed by the Department of Defense and connected computers at four universities in California and Utah for the purpose of ensuring that a national communications network would still exist in the event that a military attack eliminated conventional communications systems. In 1972, Ray Tomlinson, a computer scientist working on ARPANET, developed electronic mail. The next year sees the invention of TCP/IP (Transmission Control Protocol/ Internet Protocol), which becomes the standard method of computer communication by 1983.[5] In 1989, Tim Berners-Lee, an English computer scientist working at CERN (European Laboratory for Particle Physics) brought together several existing technological and communications inventions like HTML (hypertext markup language), URLs (universal resource locators), HTTP (HyperText Transfer Protocol), and an internet browser to create the World Wide Web, a system that allowed users to create, organize, and link documents so other users could browse them on the Internet.[6,7] As other companies, like Netscape, perfected the Internet browser and made it more useful, user demand for personal computers as well as digitally transmitted information skyrocketed. As Friedman notes, "Within five years [of the invention of the World Wide Web], the number of Internet users jumped from 600,000 to 40 million.[8]" This also started the Internet boom – investors looked at existing technology, infrastructure, and growing user demand, and concluded that, if everything from data to photos and entertainment could be transported and sold on the Internet, then the demand for Internet-based products and services was unlimited. Two negative side effects of that assumption were the dot-com stock bubble and a huge overinvestment in the fiber-optic cable that carried all this new digital information. However undesirable, that assumption essentially wired the world together.[9]

Because of the convergence of these innovations (and many others), users have come to rely on the ubiquity and the convenience of the Internet to communicate. No one development illustrates this better than does the popularity of the mobile device. Today's mobile device is derived from the cellular phone, the idea for which first occurred to scientists at AT&T's Bell Labs in 1947. However, those scientists were more advanced than the time in which they

---

[5] 2007. "Milestones in the Evolution of Today's Internet." Congressional Digest 86, no. 2: 38. Academic Search Premier, EBSCOhost (accessed January 3, 2013).
[6] Ibid.
[7] Friedman, Thomas L.. 2005. *The world is flat: a brief history of the twenty-first century*. New York: Farrar, Straus and Giroux: p. 60.
[8] Friedman, Thomas L.. 2005. *The world is flat: a brief history of the twenty-first century*. New York: Farrar, Straus and Giroux: p. 62.
[9] Ibid, p. 63.

worked, largely due to the fact that the Federal Communications Commission (FCC) had not yet invented a way to proportion out the electromagnetic spectrum, the public resource on which cellular phone calls travel.[10] It was not until Marty Cooper, a Motorola executive, developed the first cellular handset in 1972 and live tested it in 1973 that the FCC decided to license the spectrum, a job that took them almost a decade to complete. Early adoption of cell phones was slow – handsets were large and bulky, calls were expensive, and fraud was easy to commit. However, by 1996, the FCC released more of the spectrum, which encouraged competition, improved handset size, and drove down costs. Then, in 1998, AT&T introduced its first series of flat-rate calling plans, which made competitors scramble to keep up and made user demand skyrocket. People started using their mobile phones everywhere – the mall, the beach, and even as a replacement for their home phone. In the years from 1998 to 2004, more than 158 million people started using cell phones, a number that has continued to rise faster than the rate at which Americans adopted cable television and the PC.[11] Then, in 2001, Palm, Inc. introduced America's first smartphone– a phone that combines the ability to send and receive phone calls with PDA (personal device assistant) functionality and Internet access all run on an operating system.[12] For the user, this is the best of both worlds; smartphones combine the usefulness and convenience of PCs with the mobility and ubiquity of cell phones and today, most people in America own one.

It is into this "flattened" world characterized by easy communication, information transfer and collaboration made possible by personal computers and smartphones operating on quality communications infrastructure that academic librarians find themselves. The same systemic changes that affected technology and infrastructure have also drastically changed the face of academic librarianship. In the last forty years, academic librarians' paradigms have shifted from primarily serving the physical user by means of a fairly confined set of resources to serving both physical and digital users by means of both finite physical resources and infinite digital ones. This shift affects everything librarians do: serving users in a timely way, sharing, managing, preserving, and organizing resources, working with metadata, collection development, teaching information literacy (critical literacy), marketing, assessment, maintaining a quality web presence, etc. As Ross and Sennyey note, "Librarianship was built upon an ethos of service, but service can no longer be delivered effectively without the application of technology."[13] Two major areas that have drastically changed due to the application of technology are access to and acquisition of resources.

As access has moved from a primarily physical endeavor to a more digital one, resources like the library catalog and journal subscriptions have changed. Thirty years ago, users had to go to most libraries, locate the card catalog, and flip through cards to locate the book they sought using data like the title, author, or subject term. Once users found the card that corresponded

---

[10] Mehta, Stephanie N. 2004. "Cellular Evolution." *Fortune International* (Europe) 150, no. 4: 68-73. Business Source Premier, EBSCOhost (accessed January 3, 2013).
[11] Ibid.
[12] 2001. "Verizon to offer Kyocera smart phone." *RCR Wireless News* 20, no. 10: 3. MasterFile Premier, EBSCOhost (accessed January 3, 2013).
[13] Ross L, Sennyey P. The Library is Dead, Long Live the Library! The Practice of Academic Librarianship and the Digital Revolution. *Journal Of Academic Librarianship* 34, no. 2: 145-152.

with the desired book, they wrote down the call number on that card and went to the shelves to locate the book. This process ensured that a user had to physically be in a library when the library was open to discover the resources within it. Now, thanks to the online catalog, that is no longer the case. Librarians (and library third-party providers) have taken the data on those cards and digitized it in such a way that it is easily searchable by anyone who can access the Internet.

The same principle is true for journal subscriptions – in the physical paradigm, users had to go to a library, locate the *Reader's Guide to Periodical Literature*, giant tomes that indexed over 450 of the most popular periodicals published, and locate both the abbreviations key and the index of publications. Armed with these lists, users would then consult the other volumes in the set, searching for journal articles by topic or by author name. This searching process, to the novice, was slow, tedious, and frustrating, and today's users would be totally befuddled by the task. Now, many publishers have moved from a print to an online format, and libraries have purchased online subscriptions to databases that contain many of the most popular and necessary academic works. This ensures that anyone belonging to a particular academic institution can go online, authenticate themselves, search thousands of journals, magazines, and other publications, and can, in many cases, immediately view the complete article online.

The shifts in both the library catalog and journal subscriptions are good, but are wholly insufficient if libraries stop changing there. Libraries must consider the needs of their constituents – academic libraries serve faculty, staff, and students whose information-seeking behavior has been radically changed by the last thirty-plus years of technological and social evolution. So what does that mean for access? Today's users expect to be able to access what they need from any location on any device at any time. For Southern Nazarene University's (SNU) library (and many other libraries, too), this means that many traditional undergraduate students, faculty, and staff who are on-campus behave like distance students when conducting research. This has a profound impact on which resources libraries choose to acquire.

Because the SNU Library is an academic library, anything purchased or licensed must be selected on the basis of usefulness within the programs and classes that SNU supports. SNU is a liberal arts university owned and operated by the Church of the Nazarene, which means that the library must provide resources that support a broad range of subjects and topics as well as theological endeavors, especially those within the Wesleyan-Holiness tradition. SNU has a full-time equivalent (FTE) of 2001, a number that is comprised of traditional and non-traditional (adult and distance) graduate and undergraduate student. Very generally, those are the basic parameters that influence how the SNU Library decides to acquire resources.

Taking those factors into consideration as well as the aforementioned characteristics of shifts in users' information-seeking behavior, it only makes sense that, moving forward, the SNU Library would make acquisitions decisions that favor complete and immediate digital access. Specifically, the library will prioritize e-books over print books, digital full-text journals over print journals, digital newspapers and magazines over print versions, and streaming online audio and video over physical copies. Ideally, all these resources would be searchable via one single access point through which SNU's users could search and discover on both PCs and mobile phones. However, there are some barriers to delivering service this way.

First, not all books necessary to academic endeavors are available in a digital format. Libraries cannot simply digitize the print books they own that are not digitally available due to copyright law, which has not evolved to keep pace with the technological and communications sectors. Copyright law exists to promote the creation of new knowledge by granting authors and creators a temporary monopoly on their work for a specified length of time. However, copyright law essentially ensures that, in some cases, print material bought by libraries is digitally inaccessible due to technical protection measures.[14] Libraries cannot take advantage of legal workarounds due to anti-circumvention laws, which can prevent or restrict the SNU Library from copying, lending, or sharing material, even to those students, staff, or faculty affiliated with SNU.[15]

Second, securing online access to e-books, full-text journals, newspapers, and magazines can be tricky and prohibitively expensive. In order to do that, libraries must negotiate contracts with publishers and third-party vendors, two sectors that are also going through a paradigm shift. Right now, most major publishers have not sufficiently innovated to stay relevant in a digital world. Instead of finding creative solutions to the problems that arise, publishers have tightened their grip on their traditional publishing models, which, so far, have been to the detriment of libraries. Publishers have specifically resisted dealing with issues like ownership, discounts, and integration of resources.[16] For example, when a library purchases a physical book, the library owns that copy. It can lend it out, resell it, or give it away. What about a digital copy? Library ownership largely depends on the publisher and the contract the library negotiates; some publishers only license access to material for a specified length of time, which, to the user, means that if a library does not continually pay for access, that material disappears. Also, right now, there is no way to resell or give away a digital book without worrying about legal repercussions (and no library or university wants a lawsuit). Additionally, publishers sometimes charge prohibitively more for a digital copy of a work than for a print copy. They argue that in the print model, libraries usually buy multiple copies of the same work to replace worn out copies, but, since digital copies do not degrade, they need to charge more to stay profitable. The practice of discounting also has not translated well to the digital model. Usually, publishers give discounts to entities (like libraries) that purchase a high volume of material. However, many publishers are not discounting digital purchases, citing the same profitability argument as before. Also, many vendors with differing platforms exist, all of which want libraries to purchase digital material for the people they serve. However, publishers and third-party vendors do not seem to remember that user information-seeking behavior has changed. Users do not want to switch from searching library catalogs to searching on many different vendor pages or platforms – that is disorienting. Rather, people prefer to access all the resources a library offers from a single place, like the library catalog.

Finally, not all students have the ability to access online educational resources. To librarians and other knowledge workers, this two-fold concept is called the digital divide. Initially, the term first applied to the gap between those who were able to purchase the devices

---

[14] Hombal, S., and Prasad, K. 2012. "Digital Copyright Protection: Issues in the Digital Library Environment." *DESIDOC Journal of Library & Information Technology* 32, no. 3: 233-239.
[15] Ibid.
[16] LaRue, Jamie. 2012. "All Hat, No Cattle." *Library Journal* 137, no. 13: 23-33.

and services necessary to access the Internet and those who were not. Generally, research illustrated that people with lower socioeconomic statuses[17] (SES), those who live in rural settings,[18] those who are not fluent in English,[19] and those who belong to a race other than white/Caucasian[20] were less likely to have access to PCs or communications infrastructure while those with higher SESs, those living in urban settings, those who are white/Caucasian, and those who are fluent in English were most likely to have access to devices and services that can access the Internet. Happily, the last decade has seen a substantial decrease in that gap. Now, the term mostly applies to the gap between those who know how to use technological devices in academically meaningful ways and those who do not. Not surprisingly, children from a lower SES are at the most risk – they may have trouble using PCs for education because of disorientation and low confidence due to the lack of experience.[21]

Despite challenges like the digital divide, negotiating access to online resources, and working within copyright law, librarians must continue to engage in the ongoing conversations that center around resource acquisition and access if we are to adequately serve our users. Librarians must understand the current context in which we deliver information – it is a world transformed by rapid technological, social, and political change in which people are empowered to connect, compete, and collaborate globally in new and exciting ways. This paradigm shift presents librarians with a unique opportunity to take advantage of this "flattened" world to create new partnerships and resources that will help fulfill the information needs of our users – and we owe it to ourselves and to them to do so.

---

[17] Payton, Fay Cobb. 2003. "Rethinking the Digital Divide," *Communications of the ACM* 46, no.6: 89-91.

[18] National Telecommunications and Information Administration. 2007. *"Current Population Survey: Households using the internet in and outside the home, by selected characteristics: total, urban, rural, principle city, 2007,"* U.S. Census Bureau, www.ntia.doc.gov/reports/2008/table_householdinternet2007.pdf (accessed January 1, 2012).

[19] Ono and Zavodny. 2008. "Immigrants, English Ability, and the Digital Divide," *Social Forces* 86, no.4: 1455-1479.

[20] Chakraborty and Bosman. 2005. "Measuring the Digital Divide in the United States: Race, Income, and Personal Computer Ownership," *The Professional Geographer* 57, no. 3: 395-410.

[21] Koivusilta, Leena K. et al.. 2009. "Orientations in adolescent use of information and communication technology: A digital divide by sociodemographic background, educational career, and health," *Scandinavian Journal of Public Health* 35, no.1: 95-103.