The Future of Academic Librarianship

MOOCs and the Robot Revolution

Lura Sanborn

***Lura Sanborn** is a Research and Instruction Librarian at St. Paul's School in Concord, New Hampshire. She evaluates and maintains the library's digital collections and teaches research skills and sources. She enjoys thinking about the future of employment, libraries, and education.*

*Correspondence concerning this column should be addressed to **Kelly Myer Polacek**; email: kmpolacek@gmail.com.*

Many aspects of a librarian's job require so much attention to detail that we forget to take a moment to sit back and imagine the possibilities of the information world. Lura Sanborn offers you that respite here as she ponders the future of libraries . . . with robots. She describes the features of a variety of existing technologies—including a robot currently working for a Connecticut public library—and poses many questions about how digitization and artificial intelligence might affect librarian employment in the future. She combines a refreshingly light style with copious quotes from popular and academic literature. Ultimately, she urges readers to consider possibilities, what those possibilities mean for librarians as a profession, and how our information needs might be met in the future.—*Editor*

Digitizing education is one of the most widely discussed topics in education today. Talk of Massive Online Open Courses (MOOCs), flipped classrooms, and online-only degrees and nanodegrees, fills our news feeds, blogs, trade publications, and conversations. Simultaneously, digital education grows at a breathtaking rate. Class Central, an aggregator and reviewer of MOOCs offered by top tier schools, writes that in 2011, three courses were offered online by Stanford, and that by July 2014, more than 1,800 courses were being offered by a plethora of universities both in the nonprofit and for-profit sectors.[1] According to OCLC, more than 85 percent of higher education institutions offer some form of digital education.[2] In an early 2015 interview, Coursera co-founder Daphne Koller explained that Coursera currently has more than 10 million users in the almost 1,000 courses available on the Coursera platform. She expects that in three years Coursera will be host to 5,000 courses.[3]

You can count me in the crowd that sees open digital education as the next big equalizer and simultaneous restructurer of the academy. This restructuring is because of the potential for a flexible and responsive digital education that adjusts to student learning and offers support in areas where and when the student needs it. This additional practice simultaneously allows the student to soar in areas of particular ability and strength (instead of being wedded to a plodding common curriculum), and it allows for a truly customized, individualized, supportive educational experience, beyond what the podium-based, in-person lecture series can accomplish. The cost (pennies to register and only dollars for a completed MOOC according to two Wharton School professors),[4] the customizable potential, and equality of reach are impossibly appealing. How does the digitization

of education impact librarian teaching and learning? What becomes of the old model, and what is the new model, of academic librarianship?

Nouriel Roubini, a professor at NYU's Stern School of Business, asked in his late-2014 article for *Project Syndicate* "will we still need so many teachers in the decades to come if the cream of the profession can produce increasingly sophisticated online courses that millions of students can take? If not, how will all of those former teachers earn a living?"[5] What if we get more specific about our pedagogues and replace "teachers" with "instruction librarians"? What will fewer on-campus courses and potentially, fewer faculty, mean for librarians? Personally, I fear for language teachers first. Using the World Lens app, you can take a picture of any sign and the app translates the sign into whichever language is desired. How long will it be before Google Glass or other wearable technology of the future automatically translates spoken word, as the words are being articulated, into any language of our choice? Next up for automation could be the driver's ed teachers as we all text away in our autonomously driving vehicles.

If academia is boiled down to rock star profs delivering online courses, as some suggest it will (MIT has been musing on this since the 1970s),[6] where does the research and instruction librarian fit in? With the physicality of an institution becoming of shrinking importance (for both the ivory tower and the library) combined with the potential for unlocking an Internet that contains almost everything (even if it just comes close to that, e.g., the UK Access to Research program) of what need then are research and instruction librarians?

When considering librarian contribution to teaching, learning, and knowledge creation, here's what I think we will be doing over the next five years:

- Broad research support for those courses conducting scientific, historical, and other academic research, with particular focus on extracting content from paywall, library-purchased sources not available on the free web. Examples include: specific course and project LibGuides, working with professors to identify relevant databases for curriculum and projects, and research librarians embedded in digital courses.
- Librarian-created library instruction MOOCs. Although I don't see this exactly yet, there are other marketed-for-librarian MOOCs, such as the Library Advocacy class over on edX, or the library course-slash-professional development hybrid over on the Library Juice platform.
- Direct research support to those profs and students affiliated with the library's parent institution including one-on-one research consultations and responding to research queries specific to professor and student projects via email and discussion boards.

I'd say our short-term outlook is more or less what many of us do right now, perhaps taking place ever more into the digital arena. Bill Gates said, "We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten."[7] What then is our ten-year outlook? I'm betting on robots. The Westport Connecticut Library now has two.[8] What work do these robots do? The folks at Westport have said the robots are there to interact with patrons, allowing patrons to learn and implement programming, and that someday the robots may complete assigned library functions. It would seem one of the easiest placements would be to fulfill basic circulation duties. A robot is more engaging than a self-check out machine. More importantly, robots can learn,[9] and while they might start out as perfect co-workers, as they learn they could slowly take over once-human tasks like checking materials in and out (if libraries still have physical content), providing instructions on how to operate library technology like scan and print stations, or escorting patrons to whatever area of the library is requested. In library schools and circles, I remember both hearing and reading "where is the bathroom?" as among the most frequently asked question in a library.[10] Frankly, I wouldn't mind never being a bathroom usher again.

What impact could robots have on research and instruction services? I think the key here is now that robots are capable of learning they can also ingest massive quantities of information. Could a robot ingest an institution's LibAnswers and both respond to patron email and in-person queries using the LibAnswers database? The University of Manchester has a robot that can form its own hypothesis and then construct the experiment needed to prove it.[11] IBM's Watson can ingest a field's scholarly literature and use it to create new academic hypotheses.[12] (Another bell tolls for the academy?) Surely a robot of such capacity could answer a few basic reference questions? It sounds like, as robots learn and hypothesize, they could also then infer and predict reference questions including those based on ingested LibAnswers and library databases, accompanied by growing-over-time experience.

When asked to think about what the web will look like in twenty-five years for a 2014 Pew study, Google's chief economist, Hal Varian had this to say: "The biggest impact on the world will be universal access to all human knowledge. The smartest person in the world currently could well be stuck behind a plow in India or China. Enabling that person—and the millions like him or her—will have a profound impact on the development of the human race."[13] I agree with Varian's predication but disagree on the timeline. This is not twenty-five years away; I don't think it's even a decade away. Consider that our old pal Watson, after trumping those Jeopardy champions a few years back, is back in the news again this year. Watson is now designed to ingest and analyze data (such as the 23 million articles currently in PubMed) and then report back that data based on a natural language inquiry. Several such examples were given in an October CNBC article including "what advertising medium is providing the best return for our investment?" or "what is the most efficient deployment of my sales force?" Furthermore, it can "make recommendations on flights, hotels, places, destinations and offers" and ask (impressively) "what are the signs of a stroke?"[14] Surely a robot that can make a medical

diagnosis could ingest a library's databases of academic content and reply to an assortment of research questions, right?

Many industries are introducing robots where previously only humans trod (beyond well-known manufacturing placement such as the Foxbots helping to make iPhones),[15] such as Sophie, the human resources interviewing robot, who "is programmed to not only ask and respond to questions, but to also measure an interviewee's physiological responses and compare results with the top 10 percent of the existing workforce."[16] There's AssetDivider to assist divorcing clients. As far back as the 1960s, Weizenbaum's *Eliza* provided Rogerian psychology responses,[17] while today we have Emojiary that allows users to chat-journal their emotions. From their FAQ page: "Emojiary is a bot that is programmed to check in with you about how you feel."[18] Softbank's social robot, Pepper, assists sales associates in Japan as they help customers select the best Nescafe coffee maker for their needs.[19] And over in Spain, the algorithm Iamus composes classical music.[20] With such breadth and depth of service offered by current AI, I suspect I'll be inviting a robot into my library soon.

In mid-February, Japan's major telecommunications company Softbank (owner of a majority share of Sprint) announced its partnership with IBM. Watson will become the company's call center, ingesting a myriad of data allowing it to respond to consumer queries. If a major company with major profit on the line is embracing big data as an answer service, educational and library applications can't be far behind. Possibly in the form of Pepper? Pepper is a social robot owned by Softbank, and Watson is soon to become the "brain" of Pepper. Pepper is being marketed as a personal companion and is expected to become available to Japanese consumers in mid-2015. I guess it all depends on what precisely is in the Watson-brain of Pepper, but if this brain contains the free web, and library databases, and I buy one, doesn't that mean I've got a social-robot-librarian companion? I'm glad Pepper will talk to me about my day, but I am more impressed that it has the potential to help me understand gravity, provide a historical literary analysis of the novel I'm reading, and, if I take Pepper to the art museum, pull up original reviews of Calder's mobiles for my edification. Have I just happily predicted the end of librarianship?

As I dodge the slings and arrows and eagerly nod along with other librarians excited for a digital future, let me state how much I love my research librarian gig. I love selecting the library's digital content, teaching research skills and sources, constructing research guides, and responding to research queries. But, I have to ask, can I do it better than a robot? Undoubtedly, no. The October 2014 issue of *Science* reports that 47 percent of US jobs "could be taken over by machines in the next decade or two."[21] Although the article does not specifically point to libraries (it does mention pharmacists, reporters, scientists, and chauffeurs) I have a feeling much of the library field will fall into that 47 percent, as possibly will most teaching positions. Perhaps I could ask Amazon's predictive algorithm exactly what percentage of and which posts in the library field will persist beyond the robot revolution. That example of machine learning infers and suggests award-winningly well![22]

If robots join the library staff, how will existing human staff react to incorporating robots into the personnel model? I imagine there will be those who will love it, those who will feel threatened, those who will feel delighted, those who remain skeptical, and those who feel indifferent, while others will experience wonder and awe. As for me? I would love a robot companion. As the robot learns, I can picture myself turning to my android friend for advice regarding educational practices, such as how best to explain a concept, and then co-creating a corresponding research guide with it later. Imagine a work partner who is never grumpy, never gossips, and is always fully present, and never needs refueling with a cup of coffee. I imagine the library robot would out-perform me in short order. And then what? How long will libraries continue to sustain personnel when robots can do the work, all day long, as perfect employees? According to research conducted by Gallup, in 2011–12, only 13 percent of employees worldwide are engaged.[23] Won't the robots be 100 percent engaged, 24/7/365, if we ask them to be?

While I am delighted at the thought of never giving directions to the bathroom again, and would joyously delete my once-weekly night shift, my praise of a robot future is often met by others with doubt and fear. Most people want to know why I'm not scared. Or they ask, "What will we do for money if the robots have all our jobs?" I really don't know. I do think the best way to predict the future is to help to build it. And I am excited for a new way of living. Robots could simplify things, they could reduce the frantic level of our lifestyles wherein most of us don't have the moments needed to feel the sun, meditate, or appreciate the changing of the seasons. Science suggests that removing fear, hunger, fatigue, and angst leads to a good human species. In this calmer place "most people settle into their resting state, a sustainable equilibrium in which the body refuels and repairs itself and the mind feels peaceful, happy, and loving."[24] In a musing moment, the *Economist* suggested that "leaps in machine intelligence could create space for people to specialize in more emotive occupations, as yet unsuited to machines: a world of artists and therapists, love counsellors and yoga instructors."[25]

The STEM fields and for-profit entities are building and employing robots. This is occurring as the academy is being redefined by digital education. The merging of these two world- and work-changing events, seems to guarantee a restructuring of the academy and with it, library research and instruction services. In the short term, what's in it for libraries and their research and instruction programs? Robots that work undesired shifts, perform circulation functions, learn and then apply what they've learned, and can answer research questions as well as teach. Perhaps social-companion robots, a merging of Watson and Pepper, will be both one's personal library and librarian, reading, conducting research and analyzing the results of that research, all on demand, while simultaneously intuiting what it is humans will want to know next.

What's in it on a broader scale, for all humans? Simply more time off? Less work? Remember Kurzweil, the MIT-trained and former MIT faculty member currently working for Google? He has made, taught and written about many AI and technology advances, and is extremely well-known for his futurist predications based on technology. You may remember him from his FutureCast columns for *Library Journal* (remember that enthralling article from 1992 in which he predicted print books would become obsolete?).[26] He has also predicted that "technology will be the metaphorical opposable thumb that enables our next step in evolution."[27] What *is* our next evolutionary stage? Perhaps it is the de-coupling of our sense of worth and self with our employer. Jim Clifton, chair and CEO at Gallup identifies what many in the Western world feel, writing in 2015 that "a good job is an individual's primary identity, their very self-worth, their dignity—it establishes the relationship they have with their friends, community and country."[28] I am reminded here of a Kurt Vonnegut quote, given to Playboy magazine while discussing his novel *Player Piano*. Vonnegut describes the wonder of, in 1949, seeing a milling machine tirelessly perform the work that would have taken a human machinist years of practice at the craft to achieve. He describes a future of such "boxes" making decisions as "not a vicious thing to do." "But it was too bad for the human beings who got their dignity from their jobs."[29] Will robots then allow us to experience a better innate sense of value and worth that is simply attached to being? Will we all experience the delectation of being human, that when robots do the jobs, we automatically become more than our jobs?

Perhaps soon we will all be floating around the hover-deck, adhered to our screens, al la *Wall-E*. I think though, maybe, *maybe*, once the robots come, we'll have more time to simply *be* humans, unlocking our happiness and creativity potential. Fredrickson, a leader in the field of positive psychology states, "overall, 20 years of experiments . . . show that when people feel good, their thinking becomes more creative, integrative, flexible and open to information."[30] Perhaps only after flourishing creatively and joyfully, will we come to an understanding of our own future. Maybe then, in our next technology-based evolutionary phase, will we find we have an answer to the question, "What are humans for?"

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