Libraries and Knowledge in an Age of Information Overload
Insight from Nathan Zeldes, Nov. 23, 2017

Last month I gave an invited keynote lecture at the XV International Conference on University Libraries at UNAM, the national university of Mexico. The invitation was a pleasant surprise – apparently my role as president of the Information Overload Research Group did not go unnoticed. The conference theme was how libraries can face the challenges of the coming years, when infinite knowledge is available to anyone at the swipe of a smartphone screen, and continue to provide value to their users and to society; my keynote was to address the phenomenon of information overload and its repercussions for both libraries and users.

A bonus of going to the conference – I got to visit the iconic National Library of Mexico building!

Crafting the lecture was an interesting and challenging experience for me. It was not a cold start of course: I've been lecturing about info overload for years, and my work as managing editor of Coller Venture Review required me to take a long look at the changing environment of universities and their societal impact. However, here I was asked to combine the two: how is IO detrimental to libraries and readers? And how does IO provide libraries with new opportunities to survive in the 21st century? It took much reflection and many discussions with academic faculty and students to get the answers.

The conference was one of the best I've attended. I met there a lively crowd of librarians, library managers and researchers from around the world, heard interesting talks and panels, and learned a great deal about the challenges and strategies of research libraries today. My keynote, meanwhile, was very well received – evidently having a speaker from outside their specialty gave the audience a fresh look at their world and much to think about. As [tends to happen](#) when travel brings people together across boundaries, everyone gained insight and food for further thought.

This article shares the main points of my lecture, enhanced by what I learned from others there.

The changing knowledge landscape

Perhaps the most startling change in humanity's relationship to knowledge is how these days it has transformed from a good thing to an ambiguous one. Through most of history, knowledge was highly desirable ("Knowledge is Power"), something to seek and pay for. In the middle ages a private person with a dozen books at home was to be envied for such intellectual riches; and one with two dozen books (a rare occurrence) would be twice as envied. Today, if you have 300 messages in your inbox, it's a disaster; but if you have 600, you wish you were dead!

The triumph and the tragedy of our relationship to knowledge is captured nicely by a joke:

> *What would you say to a time traveler from centuries past, who asked you what's new in knowledge access today? Why, you'd say: "Here, I have this device that fits in my pocket, and it gives me access to the entire body of knowledge of the human race... and I use it to argue with strangers and to look at funny photos of cats".*

Our technological triumphs have given us unlimited knowledge access, but today's user population is looking in other directions. And this user population – the consumers of knowledge – is also changing fast. The millennial generation is in a state of constant connectivity to the world's information, yet their attention span is notoriously short. They are also bombarded by so many distracting stimuli that even when they aren't looking at cats, they are not going to lend *War and Peace* from their local library anytime soon. Yet these are the students that academic libraries are there to serve.

The problem facing our libraries

I know many people who think libraries are dead. With so much knowledge available online, and digital media replacing printed books, they feel that the traditional library is already a threatened species. Academic libraries also face another threat: the universities hosting them face a problem of their own. Their monopoly on their three traditional roles – creating knowledge through research, imparting it through teaching, and applying it to achieve societal impact – is disappearing. Much research is done in large corporations; much teaching is available, often for free, online; and much impact is driven by multiple non-academic players. Universities, just like libraries, must change to retain their own relevance.

So – are academic libraries moribund? I think not; in fact, there is much they can do to reinvent themselves and keep their status as key players in the knowledge landscape. And in planning this reinvention process they must keep Information Overload firmly in sight, because it is a key factor in the changing world they must adapt to.

Different kinds of information

I surveyed for my audience the many faces of Information Overload: IO in knowledge work (you know... email and interruptions killing our productivity); IO in Social Media (killing our ability to focus); IO in Medical practice (killing actual patients); IO in Intelligence gathering; and of course IO and Fake News in media consumption. It seems like wherever you look, people are inundated by information. But this, I claim, is a shallow way of looking at the problem.

The past decade has seen much study and discussion of the *quantity* of knowledge generated and consumed. Statements like "Every day, 16 trillion megabytes of data are produced across the globe" are all over the media. In fact, in 2009 I gave another invited talk at the "How Much Information" conference at UCSD, which generated an impressively detailed [report](#) on its theme. But where everyone at that conference was interested in Terabytes, as if *quantity* was the main thing, I spoke of *quality* – of the fact that "[all megabytes are not created equal](#)". Information per se is neither good nor bad – it is its content and context that can turn it either way.

Take Wikipedia: clocking in at over 10 Terabytes (just for the text), it does not cause any sense of overload. Meanwhile 300 emails in the Inbox – 10 Megabytes or so – create huge overload. The key difference is that Wikipedia uses Pull Mode: you go and pull what you need, when you need it; nobody says you should read those Terabytes in their entirety. Email uses a Push Mode setup – the messages keep arriving, and there is an implicit expectation that you read them all. It is this use case difference that makes Wikipedia a boon and email a bane. Unfortunately, users are addicted to Push Mode – which is why they subscribe to endless distributions and feeds, and pay the price.

Part of this price is the phenomenon that Prof. David Levy of Washington State University dubbed "No Time to Think" – which in the academic context refers both to the degraded ability of individual academics to focus their minds, and to the lack of time for professors to interact with their students. The classic model of academic learning – think Socrates and his students arguing and exchanging views – is all but lost to us, with dire consequences. Inundated with information, academics lose the ability to convert it to knowledge, from which they might derive Wisdom.

And this problem is crucial to the discussion at hand: the hope of libraries lies in helping humans extract *quality* out of all that *quantity*. More on this below.

Potential IO remedies from Computer Science

As I prepared to discuss solutions to IO in different domains (Knowledge Work, Medical, etc.) I found a common thread: leading edge computer technologies are increasingly being applied to the problem.

Take Big Data, which I was expressly asked to talk about. Big Data handles the flood of information, while completely circumventing Information Overload. Big Data is a methodology to get insights from Huge data sets (millions or billions of data points) by using algorithms that can extract interesting correlations. A lot of data is involved, but no Information Overload ensues – the computer handles the data, and it never complains! In fact, the more data you put in, the better the outcome of these

algorithms. This methodology has shown impressive results, and is a major factor in the future of our uneasy relationship to information.

Another relevant technology is Artificial Intelligence, which is at the heart of some of the best solutions to email overload available today. The continuing rise in computing power, the growing corpus of training data from our billions of connected devices, and better algorithms have brought us to the point where you can get [an app](#) on your phone that will read the messages in your overflowing Inbox and tell you what action you should take right now.

So – the computer has enabled the overload, and the computer is beginning to help rescue us from it. And it may cooperate with the libraries of tomorrow in relevant ways, as I point out below.

Digitization: a mixed blessing

Many believe that the answer lies in digitizing books. There is strong pressure on libraries to do this, and eliminate their expensive storage of printed paper. The benefit of giving readers remote access online is obvious. But I did caution my audience: digitization is a very expensive business in the long run, and risks losing the knowledge altogether if it is underfunded. To quote a director at a large storage company: "We are facing a coming crisis: the cost of preserving digital information, of migrating it to new media, is prohibitive, and the US can't afford to do it". He was referring to ensuring that digitized collections and online journals remain compatible with new media and file formats. The truth is that paper abides – we can read documents from the middle ages and before – but those 5.25" floppies you may have on your top shelf will never be read again. Any digitization project must be accompanied by migration funds to last it into the indefinite future – or the paper copies should be retained as well as the digital.

Speaking of digital information, I note the black hole we are creating in the historical record of humanity. Until now, historians used to learn about life in the past by mining archived records, letters and legal documents going back centuries. The historians of the future will have no such source – nobody writes paper documents and letters anymore. At the personal and family level, all the terabytes placed on Email, Facebook, Instagram, etc. – all our correspondence, thoughts, and family photos – will be gone even before we are. Our descendants will not have the pleasure we enjoy today, of digging through their great-grandparents' photo albums and letters. It is a sobering thought: we live in the "Information Age" – but we are leaving future generations a big gap in the informational record of our lives and time.

So what will libraries do in the future?

A friend of mine, Prof. Yesha Sivan of Tel Aviv University, once said that libraries are the gas stations on the Information Superhighway – and a gas station fills many needs besides dispensing gasoline.

This well-stated insight can guide the discussion of what academic libraries will do in the new era. We must simply ask, what needs – besides dispensing printed books – can a library fill?

In the past, many books were hard to come by, and libraries were like sanctuaries where people would go to immerse themselves in the precious wisdom of these books. The image of a great library was like that of a peaceful shrine to knowledge. Today information has become a tsunami, and the library is more like a breakwater protecting its readers from all that information.

A key role of the library in coming years, then, will be to help users to cope with the flood, to identify good sources among the fake, malicious, and plain low-quality information. Librarians will need to guide students towards the valuable sources, using the more powerful search tools at their disposal; and they will need to coach the students and teach them how to do it for themselves later in their career. Librarians can also teach students the critical skill of viewing all information with skepticism and an inquiring mind, which in today's overloaded environment is becoming a vital part of surviving the onslaught of fake information. University libraries must create and deliver classes in this subject – because who better to teach such skills than professional librarians?

One important observation is that this role requires librarians that are *content* experts, alongside those that are technology experts – and I cautioned my audience that library managers may not be safeguarding the right balance between the two types. Content experts are older, more experienced, and more expensive; the temptation to hire young computer-savvy geeks that couldn't tell one philosopher's work from another's is strong, and must be resisted.

And another thought: can computers help librarians in this task? The recent developments in the fields of AI and Big Data analysis, where tools like IBM's Watson or Semantic Scholar can scan millions of academic papers and understand the relationships between them and the essence of their content, give me hope that the next generation of such tools will be able to deduce what is fake and what isn't in online knowledge sources. That would also solve a big problem that slows down the conversion to Open Access publishing: everyone wants more open access to research papers, but we still need respected (and costly) commercial journals to check the reliability of papers and citations. There are many possibilities, and librarians should be at the forefront of applying, or even co-developing, such capabilities.

I heard of another role for libraries when interviewing faculty and students. People go to the library to find a comfortable place to study. To quote one student: "*There is Wi-Fi, there are quiet rooms for self-study, and other rooms for team study, and a room with bean bags for sleeping*"... and here I ask, surely they can do all this at home – study alone, study with their friends, and even sleep. So why the need for the library on campus? The answer is that at home they can't concentrate because of all the

distractions; these young people need the library as a safe refuge from the info overload that would assault their senses anywhere else.

And yet another role: to triage and conserve knowledge. The quantity of knowledge is growing exponentially, and since we can't keep everything in this deluge, someone needs to make correct decisions as to what books and journals to buy, what to discard, what to keep on paper, what to digitize, and what digitized collections to migrate forward. This is a heavy responsibility of library managers; just as we lament the decision of past conquerors to burn the content of the great library of Alexandria, so future generations may take a dim view of our decisions today. The political and cultural biases in the decision process must be recognized and eliminated; the financial constraints must be accepted but juggled in the best possible way. Tread carefully!

Concluding thoughts

The information explosion will only accelerate in coming years; humanity's love/hate relationship with the information we generate will remain a major factor in our culture. Libraries are uniquely positioned to play a role in helping us harness and control the growing mass – and overload – of information.

It is interesting to note how the rise of info overload and fake information is actually playing out to libraries' advantage. The same digital transformation that threatens them may also come to their rescue, as they assume new roles in helping academics and students to deal with the flood and extract wisdom from it. Even now, IO is driving students back to the library as a place to think in peace. All of which means that librarians will need to take a new view of their role, and once they do, they can do a great deal of good.

Rising to this opportunity proactively will ensure the continued relevance of libraries in the brave new world ahead of us.

If you find this interesting, and want to exchange thoughts or action about it, *let me know!*

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Nathan Zeldes has been leading improvement of knowledge worker effectiveness for over 20 years, at Intel and for other companies. He's exchanged knowledge with scores of organizations worldwide, and has founded the Information Overload Research Group, which he chairs. He now advises managers on improving their groups' results through improved tools and work processes.

For more insight articles on Knowledge Worker Productivity, see here. You may also want to check out Nathan's blog at www.nathanzeldes.com, and consider subscribing to his RSS feed and to his Newsletter on that site.