

Avoiding a digital dark age

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Shawn Ross

As a historian and an archaeologist, I have a long-standing interest in both dark ages and the social impacts of technological innovation. I'd like to start by posing the questions: What is a Dark Age and What is the Digital Dark Age?

In my own work, we often discuss dark ages as products of a systems collapse, something that produces a less complex society than the one that preceded it. In a dark age, communities are smaller, poorer, more isolated, with less economic specialisation and social differentiation, and without the resources to support literacy, education or technology. Even technologies that may have been supported by preceding ages. Denizens of a dark age may look back and wonder at the accomplishments of their predecessors. So, the loss of, rejection of, modern information technology would likely cause such a dark age, as it's a pillar of modern complexity. Eliminating today's technology isn't an option. We need to learn how to live with it. And some concepts related to dark ages, or the aspects of societies that allow them to avoid dark ages, may serve as metaphors. At least they might help a child born today understand and thrive in our digital age. Addressing this problem briefly has been a challenge. So I want to

present three vignettes, each ending with a provocation.

The first vignette I've called "digital city and pathologies of interaction." Interaction is a defining characteristic of human life and a key component of the complexity that supports dynamic societies. Cities are, in essence, the original technology of interaction. For 6000 years, city were the engines of exchange, wealth generation, cultural experimentation, technological innovation. When we're looking back at the past, the decline of cities is often taken as a hallmark of the dark age.

In better times, people move into cities. In fact, until about 1900, people had to move into cities because, for all of their advantages, plague, famine and other problems meant that deaths in cities always outnumbered births. Indeed, it took millennia to develop the ancillary technologies and practices around hygiene, sanitation, transportation and logistics to make life in cities reasonably secure. Those demographic limits to urbanisation have only recently been lifted, and for the first time now, most people live in cities.

As the abstract that was prepared for this forum observed, digital interaction is a defining characteristic of modern human life. Digital interaction is essentially our

new urbanisation, and it incubates its own social contagion. We're all familiar with the discourse around misinformation and fake news, and Jonathan Haidt and others have also explored how the combination of social media and mobile devices has led to increased depression of teenagers.¹ That's just one example that I've come across recently. I'd end with the provocation that we've got to prepare a child born today to navigate this unsanitary online environment and encourage the development of technologies and practices to curb the spread of social contagion. At the same time, though, we should recognise the generative power of the interconnectivity.

I tend to focus on negative things, and I was reminded in the runup to this forum by my co-presenter, Theresa, that we shouldn't overlook the positive parts as well. That interconnectivity, supercharged by the online world, is a place that, like physical cities, fosters exchange and experimentation.

So, my second vignette relates to knowledge, power and magic. A stereotypical view of a dark age involves a monk sitting in a scriptorium copying manuscripts, and there may be a little bit of truth behind this image. With lower literacy rates, access to information can become constrained to a small class of specialists doing things that most don't understand. That monastery image brought to mind Arthur C. Clarke saying that any sufficiently advanced technology is indistinguishable from magic.² Now I'm a professor

at a university, I and my colleagues think of our students as digital natives. But in my experience, their digital literacy is relatively limited. Russell Kirsch (1929–2020), an early computing pioneer, complained that modern devices are so elegant and easy to use that they subtly direct people towards becoming passive consumers of technologies, instead of using technology to do new things. Douglas Rushkoff, a programmer, goes even further, arguing that programming is the new literacy of the digital age and that the illiterate are being directed by the technology and those who have mastered code.³ So, my provocation here is that the world is being divided between those who are digitally literate and those who are not, with the former accumulating power. A child born today risks becoming a passive consumer of technology that might as well be magic. To avoid technological serfdom, that child must become digitally literate, and such literacy would also enable that child to become a creator, using digital tools to do things that no one's done before. Considering the accelerating pace of change, learning how to learn technologies is the key to that. Vernor Vinge's *Rainbows End* is an interesting science fiction take on it.⁴

Finally, I'd like to talk about technological transformations and their discontents, something that's close to my heart as an ancient historian. History is marked by transitions in information technology, from orality to literacy, scroll to codex, manuscript to print, print to mass media,

1 Haidt, J. (2018). [The Coddling of the American Mind: How Good Intentions and Bad Ideas Are Setting Up a Generation for Failure](#), co-written with Greg Lukianoff. New York City: Penguin Press.

2 Clark A.C. (1962) *Profiles of the Future: An Inquiry into the Limits of the Possible*, Harper & Row.

3 Rushkoff, D. (2010) *Program or be Programmed: Ten Commands for a Digital Age*, Soft Skull Press.

4 Vinge, V. (2006) *Rainbows End*, Tor Books.

to hypertext to social media; all of which created opportunities, challenges and anxieties. For example, on the cusp of literacy, Plato's Athens used, but distrusted, the written word. Recourse to writing allowed systematic and sustained consideration of the world in ways that had been impossible in an oral society. At the same time, Athenians worried about sophists and rhetoricians separating persuasion from truth. Misinformation has a long history. Athens fostered sophisticated approaches to assessing truth, but also saw a moral panic that included the execution of Socrates. Others have explored similar transitions later: Marshall McLuhan, most famously, in *The Gutenberg Galaxy*.⁵ I'd end with the provocation that a child born today will live in a world shaped by new and unforeseen information technologies.

Today's child would benefit from learning what they can from these previous transitions, whether the principles of logic and argumentation brought to bear against sophism in antiquity, or the media literacy training that facilitated understanding and critique of mass media advertisers. Understanding such transitions would foster the sort of awareness that would help that child to realise the latent possibilities of new information technologies, which are usually used for a time in old ways before their potential is fully reached. I look forward to discussing these matters further later in the session.

Prof Oppermann: Shawn, with the aspect of inequality and talking about our future digital world like an ancient city. I think these are unhygienic places, a really powerful concept. And I'm hoping that no one gets put to death associating with our new

technological uses. Now I'm going to pass to Teresa Anderson. She is a social informativist from Connecting Stones Consulting and someone whom I've worked with in a range of different areas, in particular talking about trusted or trustworthy use of data or trusted environments.

Theresa K. D. Anderson

I'm speaking today from Geawegal land. In my work, I draw on socio-technical histories to help me understand our engagements with emerging technologies. Imagining the past as the present and the present as the future, I'd like to share with you some snapshots from that past. To begin, I want you to picture yourself on the streets of Paris in the 1880s. With the industrial revolution well underway, this is an age of public museums and of technological evangelism, world fairs and expositions like the 1889 Universal Exposition, which celebrate the latest advances in science and technology. Every technology in our lives today was at some point new and emerging. Imagine being one of the visitors walking on the exposition's grand terraces, through the gardens and exhibition hall, getting a glimpse into technologically enabled futures. We'll drop in now to the Paris Exposition of Electricity held in 1881. Electricity is so central to our lives today, especially our digital way of working, that it's hard to imagine life without it. But imagine what it was like before electricity was a commonplace household commodity. And now imagine experiencing the rooms that you're seeing here filled with electric lights, bathing the walls with colours that you've never seen before. You've never seen a windowless room illuminated

⁵ McLuhan, M. (1962) *The Gutenberg Galaxy: The Making of Typographic Man*, Univ. of Toronto Press.

this way, and you can hardly believe that it is even possible. And now imagine sitting at a table with a device called a reading light. One of the other inventions that was presented at this exhibition was the theatre phone. It's a device that would allow you to listen to opera and theatre performances over telephone lines. It was a subscription service, so you paid for the privilege. It was also considered a very fashionable, stylish amusement.

Of course, new ways of communicating bring with them new ways of work and new kinds of workers who are needed to keep the system up and running. An advert from an American telephone company describes female telephone operators working behind the scenes as “weavers of speech.” They were referred to as domestic machines. It is an operator who is holding the wires in her hands as if working yarn on a loom. Here is a little extract from this 1915 ad: “Upon the magic looms of the Bell System, tens of millions of telephone messages are daily woven into a marvellous fabric, representing the countless activities of the busy people. Day and night, an invisible hand shift the shuttles to and fro, weaving the thoughts of men and women into a pattern which, if it could be seen as a tapestry, would tell a very dramatic story of our business and our social life. Out of sight of the subscribers, these weavers of speech sit silently at the switchboards, swiftly and skilfully interlacing the cords, which guide the human voice over the country in all directions.”

The theme of *The Invisible Worker* is an important one that I want us to keep in

mind when we're thinking about the future of our child. Another thing to keep in mind is wonder. Today, it might be hard to imagine a world without the telephone. But as a young girl, I had a chance to experience just that when I was visiting the mountain villages that my parents grew up in in Central Europe. My uncle was one of the first in the area to have a phone installed in his home. And so I witnessed someone using a phone for the first time, and it really did feel like magic. But I also remember some of the older women in the village warning me to stay away from the humming electricity towers for fear of unknown spirits that were lurking there. This notion of fear and fascination is not new. This is very much a part of our human history. On one hand, it's something that brings great allure — this idea of having power and connection to magical creations. But there's also often a concern about what we might have unleashed, very much like Pandora's Box.⁶

This co-mingled sense of worry and wonder is also very present in the writing of Jules Verne. His visits to the displays of electricity in submarines at the Paris Exposition of 1867 were what inspired him to write *Twenty Thousand Leagues under the Sea* (1870). And yet, while his work inspires us to dream and to imagine, it also reveals his concern about humans becoming disconnected because of the tools that they create. Curiously, Verne's editor refused to publish his dystopian portrait of Paris in the 20th century⁷ because he felt that it presented an unrealistic view of the future; yet it was similar to the dark age that was portrayed in

6 “Artificial intelligence began with an ancient wish to forge the Gods,” Pamela McCorduck (2004) *Machines who Think*, Routledge.

7 Verne, J. (1994) *Paris au XX^e siècle*, Hachette.

E.M. Forster's 1909 short story, *The Machine Stops*.⁸ The scariest of these tales, the scariest aspect is really just how closely it resembles our present day.

I want to give you a sense of children in this history and some different experiences of childhood from this socio-technical past. Children line up at the 1904 World's Fair in St. Louis, where one of the latest innovations on offer was an ice cream cone. Those who were present, like the Lyons children, could actually savour this delight. We know a lot about this family's history because it is recorded.⁹ Their father was a prominent attorney and both his sons went on to become prominent attorneys in Missouri themselves. We don't know much about their sister, Mildred, but we do at least know the name of the little girl who is savouring an ice cream cone. We know very little about another child whose childhood is very different. She's experiencing it as part of the machinery of a textile mill.

These images remind us of both the promises and the challenges of innovation and that they are not inevitable, but neither is the dark age that Foster portrayed as an inevitable, foregone conclusion. So as the child whom we're thinking about today moves into the future, what is it that we can do to prepare them so that they're protected, fortified and inspired to venture ever closer into the dark woods that are up ahead? What is it that we can do to prepare them for digital and enabled futures that are taking shape around them? How can we equip them to embrace these challenges with a sense of adventure and wonder?

It takes a village to raise a child, and I would argue it takes a socio-technical infrastructure to raise this digital and AI world. So, to have a say in shaping this world, our child first and foremost needs opportunity. We must do better to break the cycles of disadvantage that are so profoundly shaping some of our children's futures. They must have the opportunity to learn to develop strong digital adult literacy and be exposed to knowledge. This includes contested knowledge and contested histories. The child is going to need to have the right to step into their future and experience it with all of its promises and perils. Building resilience along the way, through experimentation and learning and with these tools in their backpack, I would then feel pretty confident that this child will have a voice in shaping their socio-technical future.

Discussion

Prof Oppermann: There's a question from the audience that I will pose to both of you: "We need to challenge the assumption that we need to just live with the technologies created by Big Tech and which benefit shareholders. How might we align incentives so that the technologies we create are made with people in mind and so digital literacy and capability building is implicit in the making process?"

SR: Well, that's a hard one. One point bothers me, not only when I see my students but in my role as Director of Digitally Enabled Research at Macquarie. Researchers are using technologies as passive consumers and the commercial products they use con-

⁸ Forster, E.M. (1909) *The Machine Stops*, *The Oxford and Cambridge Review*, <https://librivox.org/the-machine-stops-by-e-m-forster-2/>

⁹ Missouri History Museum Lyons Family Collection Archive.

strains their thinking, shape what they do and their approach to work and put them on a certain path. We need enough technical literacy to understand the software we're being fed, what it does, what the alternatives are and recognising that infrastructure matters. There is a cartoon about a professor saying to a student: "Maybe you should use open-source software to write your paper" and then the student has a tirade: "But I just want to do things that are easy and fast." Then 10 years later, the student comes back and says: "Facebook is running our life" and the professor holds his head in his hands.

Does infrastructure matter? I see a real difference between students and colleagues who get on the commercial track versus the open-source track, which requires a lot more co-creation involvement in the product. If you want to do something a little different, you make your own contribution or you contact the maintainers and co-create something together with them.

I guess educating to a level of digital literacy and including in that fostering and encouragement that infrastructure matters, then you can become task-dependent either yourself, or socially on a larger scale.

TA: The infrastructure we're talking about is both human and technical, and often dominates conversations. Now, there is so much focus on the technical and on the technologies and the power that's needed for the structures that we lose sight of all the human aspects, the social structures and the ways that we can encourage learning and experimentation. Co-creation is an opportunity that more and more people are asking for. Moving forward, it's important that we empower all people and particularly the child born today. We need to make sure that they see that they have the

opportunities, capacities and literacies to challenge and to question and to participate. And alongside that, we need to be training designers of tools to appreciate that that's a non-negotiable, that this is no longer a "nice to have" item in the process of design. One way that I've thought to approach training data scientists and technologists is to get them appreciating that this is the new way forward for them. Having both those aspects in future will be critical for impacting and making change.

Prof Oppermann: Another audience question: "Is there an assumption that the people really have a say in how technology develops? Doesn't it just happen to us?"

TA: It often appears that technology is allowed to happen to us; it feels like it's beyond our control. But if you look at the way a lot of tools end up being used, very often there is a co-evolving engagement that happens. It is getting increasingly difficult to see that co-evolving opportunity when you look at the power that resides in a few very large global production houses. That is critical to keep in mind.

I don't think we can assume that it's automatic or that it's a given that people have a say. But I think increasingly there is an expectation from people who see so many opportunities around them that they should be able to have a voice in that. How much you can speak to that and in the kind of ways that you can engage really depend on where you're sitting; and the part of the world that you're in, the sort of technology expertise you have. It certainly is not an equally distributed opportunity at the moment. But I've never believed the idea that the computer says no and I have no way of making the computer do anything else.

SR: What you see, over and over again, is that technologies are invented and escape into the wild. Someone used the phrase “domesticated” earlier and suggested that people use technologies in unexpected and unintended ways. So, a technology is not always used according to the intention of the creators. And some infrastructures, technologies of creation, have emerged over the past 10, 20, 30, 40 years — things like social programming platforms like GitHub or GitLab — that can facilitate the creation of software. In the physical realm, things like inexpensive 3D printing and computer-controlled milling machines have emerged and open a lot of doors.

Prof Oppermann: Theresa, I was really struck by your description of the Lyons family contrasting with the girl in the fac-

tory. What do those images look like in 2050? What do they tell us?

TA: I’m really scared because I feel like we’re going to see new versions of those contrasting images. I don’t think enough attention is paid to the inequity that is creating one kind of future for privileged children, as opposed to children who are born into poverty and disadvantage and have to face that. So, that is the terror lurking ahead of us.

SR: To me, as a parallel image, is the Google or Amazon programmers on one side doing that and someone who’s an Amazon Mechanical Turk where you get fed little pieces of work online and you sit there, slaving away, getting paid five cents an item. That’s how I would update the 19th century divide.

