# LEARNING IN THE AGE OF MIND AMPLIFICATION

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ABSTRACT. This conversation presents insights into learning in the age of mind amplification by the one of the pioneers of digital technologies. The first part of the conversation briefly examines lessons from the recent history of computing and looks into main motivators for developers of early digital technologies. It places development of computers between two strong influences – the hacker culture and the U.S. military – and briefly touches upon the position of women in information science. The second part of the conversation explores historical development of virtual reality and replaces the distinction *real vs. virtual* by the distinction *physical vs. virtual.* It analyses the main strengths and drawbacks pertaining to the metaphor of digital (post)colonization, introduces the concept of mind amplifying technologies, and outlies the distinction between collective intelligence enabled by mind amplifying technologies and artificial intelligence. The third part of the conversation inquires natural limitations to human interactions with technologies. It shows that the Internet is a commons, and places it into the context of the "traditional" commons such as watersheds and airwaves. Looking at the Internet as a (social) science laboratory, it asks eternal questions about human nature and looks into abandoned communalist hopes of social change through personal transformation supported by convivial tools. The last, fourth part of the conversation, challenges the traditional monopoly of schools on learning. It inquires potentials of digital technologies for critical emancipation. It compares traditional methods of knowledge creation with "wisdom of the crowd" effect, and shows that we are moving into a mixed ecosystem which contains both. Finally, the conversation analyses some consequences of (the lack of) Internet freedoms for people's everyday lives, shows that digital technologies have developed much faster than human ability to use them, and concludes that the main uncertainty about future of humankind is closely related to how quickly and how much we learn about technologies, individually and collectively.

Keywords: mind amplification; wisdom of the crowd; hacker ethic; real vs. virtual; physical vs. virtual; communalism; conviviality

Howard Rheingold is the true pioneer of digital technologies and the chronicler of the advent of the network society. Howard's name is usually associated with the concept of virtual communities, that he is credited for inventing. During his rich career, however, he has left deep traces in various fields from journalism through social and cultural critique to teaching, and his interests have included a wide range of topics including but not limited to history of digital technologies, artificial and collective intelligence, mind amplifiers, media literacy, and learning innovation. In 1994, Howard served as the editor of *The Whole Earth Review* and editor in chief of *The Millennium Whole Earth Catalog*. Simultaneously, he was one of the principal architects and the first Executive Editor of *HotWired*. In 1996, he founded *Electric Minds,* which became one of the ten best web sites of 1996 by *Time* magazine. After that, he started own consultancy business for virtual community building. In 2005 Howard joined Stanford University, then Berkeley University, and then accepted visiting professorship at the Institute of Creative Technologies, De Montfort University in Leicester, UK. In 2008, he won the MacArthur Foundation's Digital Media and Learning competition. In 2012, he was invited to give Regents' Lecture at University of California, Berkeley. In the winter of 2015 Howard taught his last quarter at Stanford, but he remains engaged in selected online projects such as the Rheingold University. After retiring from active teaching, he plans to transition to doing art full time.

Howard published numerous books and articles, including *Talking Tech: A Conversational Guide to Science and Technology* (1982) (with Howard Levine), *Higher Creativity: Liberating the Unconscious for Breakthrough Insight* (1984) (with Willis Harman), *Tools for Thought: The History and Future of Mind-Expanding Technology* (1985), *Out of the Inner Circle* (1985) (with Bill Landreth), *They Have a Word for It: A Lighthearted Lexicon of Untranslatable Words & Phrases* (1988), *The Cognitive Connection: Thought and Language in Man and Machine* (1987) (with Howard Levine), *Excursions to the Far Side of the Mind* (1988), *Exploring the World of Lucid Dreaming* (1990) (with Stephen LaBerge), *Virtual Reality* (1991), *The Virtual Community: Homesteading on the Electronic Frontier* (1995), *Millennium Whole Earth Catalog: Access to Tools and Ideas for the Twenty-First Century* (1995), *Smart Mobs: The Next Social Revolution* (2002), *Net Smart: How to Thrive Online* (2012) and *Mind Amplifier: Can Our Digital Tools Make Us Smarter?* (2012).

In this article, Howard Rheingold discusses his ideas with Petar Jandrić. Petar is an educator, researcher and activist. He published three books, several dozens of scholarly articles and chapters, and numerous popular articles. Petar's books have been published in Croatian, English and Serbian. He regularly participates in national and international educational projects and policy initiatives. Petar's background is in physics, education and infor-

mation science, and his research interests are situated at the post-disciplinary intersections between technologies, pedagogies and the society. Petar worked at Croatian Academic and Research Network, University of Edinburgh, Glasgow School of Art, and University of East London. At present he works as professor and director of BSc (Informatics) program at the Zagreb University of Applied Sciences, and visiting associate professor at the University of Zagreb.

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**Petar Jandrić:** Thank you a lot for agreeing to this conversation, Howard! Since the early days of personal computing, you had a strong interest in its wide social and historical backgrounds. For instance, *Tools for Thought: The History and Future of Mind-Expanding Technology* (1985) provides a fascinating historical account of the advent of the computer starting from Charles Babbage and Lady Lovelace to the (then) latest generation of geeks. How did you get interested in the history of information and communication technologies? What can we learn from that history; why is it important?

**Howard Rheingold:** I wrote *Tools for Thought* because there was a lot of attention to the newly emerging technology and the personal computer. In the early 1980s, Bill Gates and Steve Jobs were getting a lot of deserved attention, but there were a lot of other people who actually created the technologies that they were selling. And I thought that those people ought to be chronicled: people such as Doug Engelbart, John van Neumann, Alan Turing, Ada Lovelace, Charles Babbage, Alan Kay, and many others. I thought that was a very important history, and started doing some writing for *Xerox PARC* where the personal computer had been invented. Through that I met Bob Taylor, who was one of the people I have profiled in *Tools for Thought,* and through him I met Doug Engelbart, who I think was probably the single most important figure in the history of personal computers. Why is it important? You know, I think the answer is obvious. There are very few areas of our lives that have not been influenced by the kind of personal computers and networks that were originally described by Engelbart in 1962 and demonstrated in 1968. It is an enormous force in the world, and it is important for people to understand where it came from and how it works.

**PJ:** During your rich career, you have engaged with everyone who is anyone in the recent history of computing. Who are these people, what drives them to invent new technologies?

**HR:** These days there is so much attention being paid to the enormous amounts of money that people are making in the computer industry. I think it is important to note that most or all of these people did what they did because they wanted a tool to extend their ability to think, and they wanted to help humankind by creating a means for people to solve problems more

effectively. Commercial interests were not the primary reason for people like Doug Engelbart, Alan Kay or John von Neumann, as they were predominantly interested in extending the power of the human mind for themselves and for others.

**PJ:** Situated within fairly small but well connected research communities, early hackers have created a distinct and important culture. It is only by understanding this culture, its basic assumptions and ideas, that we can understand the original aims of early computer developers. In this way, we can reveal the underlying ethos behind computer designs, and gain a better understanding of technologies of today. Could you please describe the early hacker culture? What did it look like, how was it linked to important social movements of the day such as the hippie movement, the anti-Vietnam movement, and student radicalism in general?

**HR:** I am going to decline to do that and instead I am going to refer you to a book by Fred Turner *From Counterculture to Cyberculture* (2010). He wrote an entire book about the influence of *The Whole Earth Catalog* and the counterculture on the cyberculture. It is difficult for me to try and summarize this huge topic except to say that, if you read Fred's book, you will see that if it had not been for the counterculture, the hippie culture, particularly *The Whole Earth Catalog*, we really would not have had personal computing and networks as we have them today. The term personal computer, by the way, was created by Stewart Brand, the publisher and editor of *The Whole Earth Catalog*.

**PJ:** My conversation with Fred Turner is also published in this issue of *Knowledge Cultures* (Turner & Jandrić, 2015) – it is really great to see these interviews coming together! However, I do need you to place development of information and communication technologies in a wider historical context. At the one hand, series of inventions that brought about computers as we know them today were imbued in the free spirit and egalitarianism of hacker culture. At the other hand, however, early development of information technologies has been inextricably related to the army. Could you please describe the dynamics between the two? How did they manage to work together?

**HR:** I think it is pretty clear that the personal computers and computer networks as we know them today would not exist without both of those converging forces. Without a doubt, the United States Department of Defense was the overwhelming financial backer of research that led to first digital computers which were, really, created to do calculations for the first thermonuclear weapons, and the ARPANET, the predecessor to the Internet. However – I try to make that clear in *Tools for Thought* (1985), and, more recently, Walter Isaacson makes that clear in *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution* (2014) – if it was up to the US military, or to the computer industry, or to the academic

computer science, we would not have personal computers and networks that could be used by people outside of the military. It is the people who were making these things, and not their military sponsors, who saw their potentials. These people really wanted to have a personal tool, in terms of a personal computer, to extend the power of the mind – and not just for military purposes – and to use networks to communicate in many ways – and not just for the purpose of defense. So it was the intersection between these two forces, as it is often true in history, which enabled something to happen that would not have happened otherwise.

**PJ:** Working in IT education, it is impossible to ignore the issue of gender – my classrooms are always dominated by male students. Therefore, I found the following paragraph from *Tools for Thought: The History and Future of Mind-Expanding Technology* particularly interesting:

> Goldstine's wife, Adele, herself a mathematician who was to play a prominent role in the programming of early computers (she and six other women were eventually assigned the task of programming the ENIAC), became involved with recruiting and teaching new staff members. Von Neumann's wife, Klara, performed a similar role at Los Alamos, both before and after electronic computing machines became available. The tradition of using women for such work was widespread – the equivalent roles in Britain's code-breaking efforts were played by hundreds of skilled calculators whom Turing and his colleagues called 'girls' as well as 'computers.' (Rheingold, 1985)

Could you please describe the history of women in computing? How does it relate to our present and future?

**HR:** Of course, the first programmer was Ada Lovelace who unfortunately lived many years before computers were available for her to use her talents – it is important to recognize that. More recently, the role of John van Neumann's wife Klara in helping the creation of what is now known as computer programming has come to light. But, of course, just as racism has obscured, hindered and prevented contributions of people who were not white, male domination of technology has obscured and hindered the contribution of females, and it has been very difficult for a woman to achieve a position of prominence in engineering technology. During Second World War, so many men were involved in combat that women were allowed to participate in important roles. And they did: in the code-breaking efforts that involved Alan Turing, and in making computations that led to the creation of the first digital computer. After the war, of course, men came back to reclaim their jobs and women's positions were again suppressed. That is a contemporary social and political issue: really, we are just beginning to see more acceptance of women in engineering and technology.

# Tools for mind amplification

**PJ:** Technologies shape our social and physical spaces. For instance, the combination of cars and cheap oil allows effortless independent travel over large distances, thus enabling specific urban designs such as Los Angeles. However, information and communication technologies have stepped one step further and created the completely new space – virtual reality. Could you please tell us a bit about the historical development of this space? How did it arrive into being, what are its main features?

**HR:** I wrote the book *Virtual Reality* in 1991, and it has been a long time since that I have not really followed it. However, the entire purpose of virtual reality is to put the perceptions of the human user into what appears to be a three-dimensional space that they can navigate and manipulate. That is the entire idea of virtual reality: to use the characteristics of the three-dimensional space to enable people to navigate information spaces and they do it by creating the illusion being immersed in a three-dimensional world.

**PJ:** Since the advent of the first virtual spaces, people have always tried to compare them with the "real" world. However, as virtuality penetrates all aspects of our contemporary reality, the duality *reality vs. virtuality* seems to become increasingly obsolete. How can we try and overcome this persistent duality? More generally, how should we approach the complex relationships between reality and virtuality?

**HR:** I long ago stopped using the distinction *real vs. virtual* and started using the distinction *physical vs. virtual* because the virtual world, long before computers, was as important to people as any other aspects of their lives. The world of books is a virtual world; where are you when you are reading a book? What is that world that you are inhabiting? There are not many people in the industrialized world whose lives are not deeply interconnected with communication technologies, whether it is the telephone, or two billion people on the Internet, or one billion people on Facebook. Communications that people make using these media are essential parts of their lives, so it is real as anything else, it is just not physical.

**PJ:** Speaking of your early experiences with online communities, in *The Virtual Community* you wrote: "I've been colonized; my sense of family at the most fundamental level has been virtualized" (1995: 11). As of recently, Ana Kuzmanić and I have produced several attempts in describing human journey into the digital through the metaphor of digital (post)colonization. What do you think of metaphoric descriptions such as this? What are their main strengths and drawbacks?

**HR:** Metaphors are tools – and that is a metaphor – and they are tools that have utility, and then there are boundaries to their utility. So, I think it is pretty fair to say that technologies invented by one or a few people have

become the central parts of lives of many people. In that sense, you can say that we are all colonized. In many instances (earlier, you raised the issue of the automobile), people who invented or made businesses out of new technologies that became very important, became themselves very influential on other people's lives. So I think that there is a certain reality to the metaphor of digital colonization. I also have to say that it is limited, as colonization benefitted, by far, the colonialists, and ended up repressing the people who were colonized. That is also true of technology, to some extent, but it would be a very big mistake to generalize too far. Have our lives been colonized by clean water and sewage systems? Have our lives been colonized by antibiotics? Or by the ability to call an ambulance on the telephone? Technologies serve people, as well as serve the interests of some people. I think that it is a bit more complicated than colonialism as a political force, and would say that you can use the metaphor of digital colonization to some length but you cannot carry it too far.

**PJ:** From earliest books to this conversation, an important leitmotif in your work is mind amplification through information and communication technology. What is mind amplifying technology? What does it exactly amplify, how does it work? Can it be compared to amplification of our physical powers by tools such as scissors or hammer, or to conscious-changing experiences created by substances such as LSD?

**HR:** You could discover how to make a hammer. And, if you had language, which is a mind amplifying technology, you could tell me how to make a hammer. But when it is possible to use the technology of writing, to describe how to make a hammer, people who are not immediately in your vicinity, people who are across time and across space, can know how to make hammers. Does that not amplify the ability of the person who made the hammer – to spread the power of knowing how to make a hammer to many other people? So that is what I mean by mind amplifying technology. It could be knowing how to make a hammer; it could be knowing how to write how to make a hammer.

And then, of course, alphabetic writing made it possible for many more people, not just a small elite of scribes, to have access to literacy, to understand how to do many things that others have discovered. That is what human culture is about – it is about people teaching each other how to do things. And the tools we use to think – reading, mathematics, computer programming – those tools enable us to think in ways that we were not able to think before. I challenge you to show me how you can think of something like making an automobile if you did not have the power of writing, if you did not have the power of mathematics. Those tools make things possible, they enable empowerment that was impossible before, and when you talk about automating

writing with the printing press then you vastly expand the number of people who have access to literacy.

When you have telephones and internets, you vastly expand the number of people who are able to communicate knowledge to each other. That, I think, is an essential part of the history of humans, back from the beginning of our species, through the history of civilization: our ability to create tools that expand the powers of our minds. And, I certainly would include LSD in that. If you would read John Markoff's book *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (2005), you would see the importance of the experience of LSD in the development of the personal computer. To extend our abilities to think and perceive in new ways, and to translate those into tools that enable others to think and perceive in new ways, is probably the essential part of the human story.

**PJ:** Could you please draw a link from collective intelligence enabled by mind amplifying technologies to artificial intelligence? Do you believe that electricity-powered machines will once gain the ability to think fully independently of their creators?

**HR:** Well, collective intelligence is obviously something that people do together, and you do not need a computer to do that. A group of people who use writing to come up with a new cultural invention are exhibiting collective intelligence. So, they are doing something that one person is not capable of doing alone. The stories I just told of the emergence of speech and writing and alphabets and printing – those were all about technologies that enable people to do things together. There is a distinction between who is doing that. When you talk about artificial intelligence, you are entering a new territory – a territory where you are talking about tools that actually have human thinking capabilities. Maybe once there will be artificial collective intelligence, but so far the artificial part has to do with the tools that enable humans to think and communicate with each other in ways that enable them to do things and to solve problems that they were not able to do and solve before.

### The Internet is a commons

**PJ:** More than a decade ago, in the interview with Dan Richards, you said: "I am not hesitant to admit that I do find it a little weird and creepy that more and more people spend our time communicating with each other by sitting alone in rooms, staring at screens, moving our fingers" (Rheingold, 1999). However, our understanding of what is normal constantly changes. Only a few years ago, most people would say that using mobile phones in public transport was rude and unacceptable – nowadays, it is completely common and natural. How far can we push our interactions with technology? Is this really all about the social construction of collective norms of behavior, or we

will sooner or later bump into some more generic limitations arising from human nature?

**HR:** I think we are already bumping up against the limitations. I think that here we are dealing with what is called *the social dilemma*, where behavior that is rational and useful for an individual becomes irrational and destructive for a large group of people. You know, people can talk on their phone on the train, but the people who talk too loud are annoying! In the US, I am not sure what the statistics are elsewhere in the world, the largest cause of fatal traffic accidents is now people texting while driving. Obviously, that is something that people want to do, even though it is not only dangerous to others – it is dangerous to themselves. So those are social dilemmas, they are posed by lots of things besides technology, it is the tension between self-interest and the interest of the group. And I guess that there is a lot to be said about that in terms of social, cultural and political environments, in which individuals feel entitled to act in ways that may be annoying, rude or dangerous to others. Again, this extends far beyond technology into the fabric of the society.

**PJ:** Back in 2005, you gave a TED talk about the concept of the commons (Rheingold, 2012b). The talk started with a description of the "traditional" commons such as watersheds and pastures – unsurprisingly, it ended in the virtual worlds of the internet. What are the main differences between the "traditional" commons and the contemporary internet? Which main lessons from our analog past should we remember as we create our digital futures?

**HR:** Traditional commons are not always physical, like fisheries or forests. The radio frequencies, the airwaves, are a commons, for example, and the Internet is certainly also a commons. I think it is important for people to understand that any resource from which people cannot be excluded can be treated as a commons. In the TED talk (ibid.) I mentioned Elinor Ostrom, a political scientist who won the Nobel Memorial Prize in Economic Sciences. She analyzed the popular belief that the only two ways to handle common pool resources (such as watersheds, or the radio spectrum, or the Internet) are either privatizing (i.e. by turning them into private property), or having them owned by the state – and she showed that such belief is plainly wrong. She pointed out that there are many commons, in which the people have come up with arrangements that enable them to share common resources without destroying them.

So there are many conflicts, and important ones, about commons. Scientific knowledge is a commons. Anyone, anywhere, can contribute to it, and if the research proofs to be valid, then it is added to the body of scientific knowledge. This repeats in endless cycles where anybody, anywhere, can build on what other people have already discovered. But now we are seeing many scientific publications disappearing behind paywalls – including a lot

of scientific discoveries that were originally funded from public sources. So, the question of conflict over how to govern commons can go from how people are going to allocate water during drought (which is something that happens right now in California), to how do we collectively handle scientific knowledge that is being privatized.

**PJ:** The Internet is not just a new territory and a huge marketplace – it is also one of the largest (social) science laboratories in the history of human-kind. What can this laboratory teach us about human nature, and about its transformations caused by migration into virtuality?

**HR:** Well, I have to point out that the Internet and social media existed for quite a while before social scientists really took them seriously. Nowadays, there is a strong and growing body of work – survey work, sociology work, and social psychology work – that has given us some understandings of how people use social media and how social media affect people and society. However, I have to say that there is not really a definitive answer. Actually, I do not think there is ever going to be a single definitive answer, in a sense that all people are different. People who are home bound because they are disabled or elderly, if they spend a lot of time on the Internet – that may be very healthy for them. For people like teenagers who spend all of their time playing games – that may not be very healthy for them. So, the context and the circumstances of the individual are very important. We are seeing, for example, studies by Barry Wellman and others (i.e. Haythornthwaite & Wellman, 2002; Rainie & Wellman, 2012), that use widely accepted measures of what is called social isolation to show that people who use social media more than average are not more isolated from their physical and their face to face neighbors. Therefore, I think there are a lot of urban legends about the use of social media that are beginning to actually get some evidence or not.

**PJ:** In the recent conversation (Turner & Rheingold, 2014), you and Fred Turner briefly outlined deep links between the post World War II period, counterculture and cyberculture of the sixties, and contemporary neoliberal capitalism – and these links can easily be applied to commodification and McDonaldisation of education and research. However, there is no doubt that the contemporary Internet – in the best tradition of theorists such as Ivan Illich (Illich, 1971 & 1973) – provides new infrastructural opportunities for emancipatory individual learning (Jandrić, 2014) and social changes such as the Arab Spring (Howard & Hussain, 2013). Should we perhaps try and revise abandoned communalist hopes of social change through personal transformation supported by convivial tools?

**HR:** I think, to be really specific, that some of the values that were dis-seminated into the mainstream by the counterculture had to do with taking more personal control and having more personal autonomy over one's fate by using tools that gave people more power. Hence the fact that Stewart

Brand, creator of the *Whole Earth Catalog*, was the person who created the term personal computer. We already discussed the very important role of the United States Department of Defense in the creation of digital media. However, had it been up to the US Defense Department, or the existing computer industry, or the telecommunications industry, we really would not have the personal computers and networks as we know them. It was visionaries such as Douglas Engelbart and others who really wanted to have tools that would enable personal empowerment.

By this point, digital tools for personal empowerment have been used by billions of people to increase their autonomy and freedom. They are also useful to capitalists, they are useful to terrorists, they are useful to authoritarian governments – in the same egalitarian way that printing press enabled the Bible, and Mein Kampf, and the Communist Manifesto, to reach wide worldwide audiences. I am not saying that technologies are neutral. However, digital technology is a tool that enhances communication. It will enhance communications that many people feel are beneficial, and it will enhance communications that many people feel are destructive.

### Learning in the age of digital media

**PJ:** By and large, education is one of the most important aspects of your work. What is the relationship between digital technologies and human learning? Are we approaching the edge of a new learning paradigm based on mind amplification, or information technologies will continue to provide more and more effective service to the existing patterns of teaching and learning?

**HR:** If you take the long historical view, you will see that access to education has undergone a democratizing and broadening process over centuries. It used to be only the elite, the children of the ruling class, or those chosen by the church, who were given education. The invention of the printing press enabled many more people to educate themselves. Access to education, the rise of the universities, and public education – that really started in the 19th century, and had a great deal to do with the capitalist need to turn agricultural workers into factory workers. Ivan Illich (i.e. 1971 & 1973) and others have written a lot about how schooling expands and broadens access to education, but education enabled by schooling comes in the form in which students are taught to comply with the social order. Paulo Freire and the critical pedagogy movement have written about that in great width and depth.

Schools have had a monopoly on learning. Except for a very small percentage of highly motivated self-learners and independent scholars, for the most part this monopoly is straightforward – if you want to learn, to get an education, you go to school. What the Web has provided in a very short time, let us say in the past twenty years, is access not only to the enormous

amounts of knowledge and information – but also to communication tools that enable people to learn together. So nowadays you can go to YouTube, to Wikipedia, you can use a search engine, you can get access to great lectures, texts, and other learners. Schools no longer have a monopoly on learning. What we are really missing at this point are a population of people who know and understand how to learn together outside of the school circumstances.

So we are beginning to see a lot of experiments with that. In fact, one of these experiments is *Peeragogy Handbook* (2014), a site that I helped organize for hundreds of people who go about self-learning without a teacher or a school. I think that we are really just at the beginning of seeing more and more of the population being able to learn in a significant sense without going to school. That is a huge change – it is not going to do away with the school, but for the first time schools are not a monopoly.

**PJ:** In the introduction to *Smart Mobs*, you say: "I believe that our destiny is not (yet) determined by technology, that our freedom and quality of life do not (yet) have to be sacrificed to make us into more efficient components of a global wealth-generating machine" (2002: xxii). Could you please describe the potentials of digital technologies for critical emancipation? What are their main advantages and drawbacks in regards to technologies and learning for social change?

**HR:** Potentials of digital technologies for critical emancipation are linked to a lot of what Foucault wrote about knowledge and power, and the constant struggle between centralized power and those who do not have power. The Internet and the mobile telephone enabled critical emancipation of many people, millions of people, who did not have the power that, say, centralized governments or very wealthy corporations had, by giving these people the power to communicate, educate, persuade, and to organize political activity. At the beginning, when I wrote *Smart Mobs* (2002), centralized powers from China to the United States were pretty much oblivious to this opening of power, to the empowerment of many people provided by the Internet. Obviously, since then, central governments all over the world – authoritarian governments and otherwise – have become very much aware of this potential. So, the eternal struggle between power and counterpower over technologies continues…

I think one critical uncertainty is whether the newfound ability for the people to spontaneously organize on a large scale (as we have seen in the Arab Spring and in many instances in Brazil and China and the United States and all over the world) is whether that can lead to sustained political movements that have more permanent influence. The Arab Spring got out of control of the revolutionaries; the massive demonstrations in Brazil have not really shown to have grown into a political force that could alter Brazil; politics in the U.S. was dramatically changed when Howard Dean became a

candidate because of bloggers. Nevertheless, the control of politics all over the world is still in the hands of those who have a lot of money and already have a lot of power.

Again, I do not think that this is settled. We are in a period of struggle over control, and I do not think that we can predict with confidence that state governments, neoliberal governments, authoritarian governments such as China's and Iran's, and large scale capitalism, are going to completely be able to control the population. Whether digital technologies such as tools used by the United States Department of Defense to surveil populations is going to give them complete control, or whether the continued development of personal technologies and knowledge how to use them will increase the power of people to more democratically determine their faith, is still undecided. I think that if you assume that centralized power has won, that is a self-fulfilling prophecy. Assuming that it is possible for people to use these technologies to gain more personal power, to make governments more democratic – that does not make these possibilities necessarily true. But not assuming that such turn of events is possible, pretty much surrenders the field to the centralised power.

**PJ:** Your *Peeragogy Handbook* (2014) is not only a great resource about online learning; it is also a prime example of collective writing. As an experienced author, could you please assess the main pros and cons of collective writing? More generally, what do you think of "the wisdom of the crowd" effect? Is this going to become a prevalent way of creation and dissemination of knowledge, or it will remain confined to its niche?

**HR:** Well, we have the Web. We have Wikipedia. We have many examples which show that crowdsourcing the construction of knowledge can do things that were not possible before. You have to make some trade-offs when you have a group rather than an individual author. And, sometimes that trade-off has to do with quality control. Sometimes it has to do with constraints upon your thesis, sometimes it has to do with validity of your claims. So I think that there will always be a place for both, and I do not think that it is a valid argument to predict that collective authorship is going to replace individual authorship. I think that we are moving into a mixed ecosystem, in which both exist and both are important.

**PJ:** The Internet is not just a tool, or a place, or a means to various ends – it is also a site of various social struggles: the questions of net neutrality, encryption debates, Anti-Counterfeiting Trade Agreement… Could you please analyze the relationships between freedoms on the Internet and human freedoms in real social life? Is it possible to simultaneously have regulated Internet and free society?

**HR:** First of all, the Internet has always been regulated. It is regulated by the Internet protocols, which are the underlying technological architecture that is

specifically designed so that control would not be centralized. Tim Berners-Lee did not have to ask permission from anybody to create the World Wide Web. Teenagers who created Google in their dorm rooms did not have to rewire something in the middle of the Internet. So, architecture of the Internet is very important, and one of the things that net neutrality is about is whether incumbent and very powerful economic forces, the owners of the means by which bits are delivered from place to place, can have some say over what is in those bits and which bits travel faster than others.

We have the Web as we know it because anybody could create Wikipedia, or Google, or the Web itself. If there is a small number of companies that control broadband access – and in the U.S. it is essentially a duopoly between Comcast and AT&T – if they are able to say "we are gonna favour those streams of data that pay us," then you are not going to see a YouTube created in the future. The power to innovate will be re-centralized in big companies, and the individual entrepreneur will be at a disadvantage. These individual entrepreneurs may be creating businesses or they may be creating social movements. If this vastly decentralized control where you do not have to ask permission or you do not have to rewire something is changed, then you will have to ask permission, or you will have to pay a fee in order to innovate. Obviously, that would affect the social aspect by disabling empowerment as well as the innovation that has given us things like YouTube and Twitter and Google.

**PJ:** At the very end of this exciting conversation, Howard, I would like to ask one last question. During 1970s, 1980s and even 1990s (changes brought by) digital technologies have often been represented as "unprecedented," "revolutionary," "fundamental," "unforeseen"… As of recently, however, more and more theorists have started to question this discourse of exceptionality (i.e. Morozov, 2013). Indeed, it is hard to argue that technologies of the past had lesser impacts on the society than technologies of the present. As someone who has actively contributed to ups and downs of various digital hypes, could you please try and provide a balanced view to the social role of digital technologies? What, in your opinion, is their real position within a wide historical scheme?

**HR:** I would agree with Morozov that there is a lot magical thinking about the technology. Digital technology is so powerful, and it spread so suddenly, and provides such magic for people, that they tend to believe it has more magic than it actually has. I do not think anyone can dispute the fact that there are something like five billion mobile phones in the world, and several billion of them are smartphones that are literally billions of times more powerful than the first computers that were built by governments costing hundreds of millions of dollars. I think there is no doubt that the fact that you can stream video from your phone would seem miraculous to somebody

twenty or thirty years ago. The Web does empower people and create new institutions in ways that previous technologies have not, and at a much greater speed than previous technologies. But it is not automatically going to educate people because they have access. They need to know how to learn – it is not automatically going to liberate people because they are able to use Twitter or Facebook to organize. The work of building political movements that have long term influence upon the public sphere in a way that actually changes policy requires human agency beyond just being able to amplify the capabilities with technology.

So what is that about? That is about learning, about the literacies of using digital technologies. It took fifty years after the invention of the printing press for the number of books in Europe to go from the tens of thousands to the tens of millions. It took fifty to hundred years for enough people to become literate before we began to see democracies, sciences of collective enterprise, and many of the aspects of the modern world, emerge from the literate population. So we have got the technology that has moved much more quickly than the ability to spread the literacies about it. Therefore, I think that the critical uncertainty about the kind of world we are going to inhabit in the future has to do with how many people know how to use these media and how much they know.

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