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When our Tools Become our Master: Psychological and Sociological Implications of Rapid Technological Development

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Introduction

One of my favorite professors in graduate school often warned me of the danger inherent in relying too heavily on existing theory when interpreting research data that I collect. His concern was with the all-too-common tendency for researchers to only view findings within an existing theoretical framework, thus letting the theory dictate conclusions drawn from the data rather than serve as a guide for interpretation. He would say, “Shawn, theory is like whiskey. It’s a wonderful servant, but a horrible master.”

While my professor was speaking of the potential misuse of theory, the underlying warning that our tools can easily become our master is one that I carry with me to this day. This concern is ever-present as I spend the majority of my day sitting in front of the computer, often watching the number of e-mails that I receive skyrocket like the national debt. Over the years, I’ve developed a love-hate relationship with my computer. Granted, my productivity as a researcher and educator has increased exponentially along with advancements in computer technology. The growth of the Internet, in particular, has opened to me a world of possibility that previous generations of academicians couldn’t imagine. On the other hand, rather than making my life easier, I often feel that it is because of these advancements that I’m working harder than ever before. I’m learning that there may be a price to pay for advancement and I’m left wondering if my tools have indeed become my master.
The Stage is Set: Tool Development and Adaptation

Thinking and behaviors change with the use of more advanced tools. This idea is central to the social-historical framework for development put forth by Marx and expanded by Lev Vygotsky [1]. Basically, we create tools to better master our environment. Our cognitions, in turn, become more advanced along with these tools [2]. We are free to improve our thinking to match higher levels of environmental mastery, thus the creation of even more advanced tools. For example, in my research I utilize statistical methods (tools in their own right) that are built on the shoulders of their mathematical predecessors. The mean score begat the correlation, the correlation begat the regression, and so on. With each generation of statistical advancement, researchers are free to ask increasingly complex questions and think about their data in ways that were not possible with previous methods. The tool precedes thought and is the impetus for future behavior.

Inherent in such development is the propulsive nature of change. That is, there is progression (this does not necessarily imply a positive outcome) and not a return to an earlier way of thinking, in essence a regression. This idea is central to most theories of cognitive growth and development. For example, Piaget wrote often of how an individual cannot return to earlier modes of thought once they achieve a different form of thinking [3].

This natural tendency is balanced with an integrative phase wherein the individual (or society for that matter) incorporates new ideas into their thinking. New information is associated with existing knowledge and the individual achieves cognitive growth. But the increasingly rapid rate of development that we see in our technologies is problematic for two reasons. First, we are afforded less and less time to achieve this integration and we are, in effect, reacting to this exponential change without successful incorporation of this new mode of thought. Second, changes that we see occurring are not merely quantitative in nature (e.g., increases in processing speed for computers, increases in computer storage capacity, etc.), they are qualitative shifts in the way that we develop, process, and transmit information. We are forced to very rapidly learn new ways to interact with knowledge itself. The nature of our tool use is changing in a way that we cannot easily apply previous learning to current situations, a foundational aspect of adaptation to one’s environment. Many individuals are, therefore, placed in a position wherein they are reacting to the tool itself rather than use it to better master and adapt to their changing environment.

Sociological Impact

The full impact of the role of technology and the Internet on our society is well beyond the scope of this article. I will, however, detail two examples that highlight how increasingly rapid development impacts our thoughts and behavior.

First, while we might not like to admit it, television viewing has become a routine part of most individual’s daily lives. In fact, it is estimated that the average individual spends roughly 4 hours per day watching television (that’s 9 years of a 65-year life!) [4]. Contrast that with the finding that, on average, a parent spends as little as 3.5 minutes in meaningful conversation with their
children per week [5]. This change has been within the lifetime of many individuals.

Now, consider the move of broadcast media to the Internet. Television broadcasts were a focus of conversation for many individuals as they went about their daily lives. The power of the Internet to deliver broadcast media in the absence of an imposed time structure has changed the nature of this conversational structure. Broadcast viewing has become more under the dictate of an individual’s schedule and, as a result, the socially cohesive nature of shared broadcast experience is quickly becoming a thing of the past. We can clearly see how the introduction of new tools by which broadcast media is delivered has brought about changes in our thinking and our behavior, both our individual behavior and the way that we interact with others.

Second, the way we experience musical entertainment has gone through a number of significant developmental changes within a very short time period as well. During my life, I’ve gone from having my music collection consist of a stack of LP records to a digitally-based format. What once filled a significant corner of my bedroom can now travel with me anywhere I have an Internet connection. Along the way, of course, I’ve seen the rise and fall of the 8-track tape, the audio cassette, and the CD. Changes in media format are not surprising, but the change in the nature of music ownership is a significant shift, both physically and, as a result, psychologically. I no longer own a physical item that is my music. I purchase the rights to listen to the music rather than possess the music itself. This shift, along with the technological advancements that have allowed such a change, has altered the way that we talk about and think about the concepts of music and music ownership. Our tools have indeed changed our thoughts and behavior.

These two examples of how our technological developments influence both our thinking and our behavior do represent a liberation of sorts; first, from time constraint (as in the case of broadcast media) and second, from physical restriction (as for musical entertainment). As I will now detail, however, the increasingly rapid change in thinking that is the natural outcome of such tool development may have profound and possibly quite negative psychological effects as well.

**Psychological Impact**

From the dawn of time (one imagines), older generations felt out of touch with their offspring (and even more so for following generations). This perceived generation gap, however, has quickly widened as fewer and fewer individuals “speak” the same language. A fundamental aspect of successful communication is achieving common ground, a shared understanding between both parties in a conversation. As our thought and language change with rapid technological advancement, we see a reduction in common ground between those immersed in new technologies and those who are not. In that our developing technologies are becoming more and more a part of our daily existence, it is not surprising that we see increasing generational distinctions and a reduction in the “passing on” of knowledge from one generation to the next. Not only is this problematic sociologically, this is likely to bring about increased marginalization for those individuals who fail to keep up with the rapid development.

In addition to the very real concern of technology-driven marginalization, there has been reported
an increase in negative individual reaction to changes in technology as well [6]. Technophobia is the term coined to represent a fear or dislike of technology in general, or of specific technological devices such as computers or the Internet [7]. The rise in such reactions is not surprising given the ever-increasing dependence on our technologies (both individual and societal) and the qualitatively changing nature of our technological use. Again, we are in danger of marginalizing individuals who are resistant to technological change either intentionally or as a defensive and possibly an individually-protective reaction.

**Future Shock?**

This situation is not so different from that presented in the book *Future Shock*, first published by sociologist and futurist Alvin Toffler in 1970 [8]. In Toffler’s work, future shock is defined as an individual’s reaction to the demands of too much change occurring in too short a period of time. According to Toffler, the rapid nature of our technological changes (and resulting social adaptation) will leave many individuals feeling disconnected from their society (and from other individuals). Toffler goes on to detail how a great many of our social problems may very well be symptoms of information overload and a resulting future shock. While Toffler’s ideas have been subject to various criticisms—generally the same arguments leveled against many who extrapolate current development to future events—the societal changes and individual reactions to such change previously mentioned give one reason to pause.

**Conclusion**

The purpose of this article was not meant to be a call to return to snail mail and covered wagons. I’ll not be using an abacus to analyze my research data any time soon. This article, however, is a reflection on the often-overlooked impact that our technological advancements have on individuals and society at large. I’m not advocating for development to stop; that is frankly not possible and likely not completely advantageous. The advancements that we’ve experienced do indeed provide us with opportunities never before imagined.

It is wise, however, for us to take a moment to consider the unexpected ways that the increasingly rapid pace of our advancement might actually be pulling us from an evolutionarily adaptive developmental path that has, to this point, served us well as a species. Tool development and use has opened worlds of possibility that have allowed our species to survive and thrive. If we are not careful, we might find that our natural abilities are stretched beyond their evolutionary limitations and that we are no longer successfully adapting to a rapidly changing environment. We might find that our tools have indeed become our masters.

**Endnotes**


4 THOUGHTS ON “WHEN OUR TOOLS BECOME OUR MASTER: PSYCHOLOGICAL AND SOCIOLOGICAL IMPLICATIONS OF RAPID TECHNOLOGICAL DEVELOPMENT”

Aisha Mcdermond  
on January 30, 2014 at 6:13 PM said:

We are a group of volunteers and opening a brand new scheme in our community. Your website offered us with helpful information to work on. You have performed a formidable process and our entire community will be thankful to you.

nigeria  
on February 4, 2014 at 10:18 AM said:

I also, want a followup to this repair. It’s fascinating. I after had a repair produced on the cast iron exhaust manifold for just a 1932 Packard.

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on February 4, 2014 at 10:39 AM said:

My husband and i ended up getting fulfilled once Chris could conclude his look for in the ideas he was given in your site. It’s now and once again perplexing to just likely be handing out secrets and methods that several some other men and women may perhaps have been selling. So we recognize we now have got the writer to enjoy due to that. Those people illustrations you’ve made, the uncomplicated site menu, the friendships you will assist to create it’s everything about this content is good, that is certainly in particular essential. Thanks for your whole thing!