

Education in an Age of Smart(er) Machines

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The Yogi Berra Problem

“Prediction is hard—particularly about the future.” However, we are getting better at it, and the key is to learn to think in terms of questions and possibilities using tools like **scenario planning**. Developing good scenarios requires the interaction of individuals with multiple perspectives: engineers, ethicists, scientists, educators, scholars and other stakeholders. The use of scenarios maps very nicely with many of the functions that we use in design thinking and other human-centered approach.

The Lily Pad Problem

One of the problems that makes prediction about future technologies even harder is that human beings have a difficult time dealing with exponential growth. Nothing in our everyday experience prepares us for the fact that our “digital capacity” has doubled every year for the last 50 years and seems likely to continue on that path for the foreseeable future. There are four technical components that will shape the future that our students will inherit.

- Processing
- Storage
- Network Connectivity
- Algorithms



The Complexity Problem

While drawing on common research and technologies, the practical systems that are likely to shape our future are specialized to accomplish particular tasks. Each application requires years of focused research and a careful, unique construction--sometimes even decades. Many of those projects never become commercially viable, but we have no way of knowing which ones will and which ones won't. Five of these seem to be particularly likely to change the workforce and the economy of the future.

- Artificial intelligence (Machine Learning)
- Robotics
- Deep learning
- Internet of Things (IoT)
- Workplace analytics

The Wicked Problem Problem

“A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems. Poverty is linked with education, nutrition with poverty, the economy with nutrition, and so on....due to the system qualities of these large problems, knowledge of science, economics, statistics, technology, medicine, politics, and more are necessary for effective change. This demands interdisciplinary collaboration, and most importantly, perseverance.”¹

Trying to understand the impact of technology changes of this magnitude is wicked enough, but trying to figure out how colleges and universities should respond to that change while still maintaining their historic role in the society is exponentially more difficult.

The Irrationality Problem: Cognitively Challenged at the Unconscious Level

“We like to think of ourselves as special because we can reason and we like to think that this ability expresses the essence of what it is to be human. In many ways this belief has formed our civilization; throughout history, we have used supposed differences in rationality to justify moral and political distinctions between different races, genders, and species, as well as between “healthy” and “diseased” individuals...

But are we really that rational? ...It seems not. After decades of research, there is compelling evidence that we are not as rational as we think we are and that, rather than irrationality being the exception, it is part of who we normally are.”²

Chance and Happenstance Drive Long-Term Decision-Making

For decades one of the claims of professional schools of education and business has been that we offer research-based solutions to problems that practitioners face in the swampy world of practice. If we look closely at the actual practice of most knowledge workers, we see that theory actually has minimal impact on their daily work. For example, any realistic theory of how careers develop needs to take into account the impact of chance encounters and happenstance. The trajectory of these technologies and their impact the future of schools and universities will be determined by hundreds of individual decisions by individual users.

The “Brain on a Stick” Problem (Individualizing Instruction)

So much of our educational system is focused on cognitive outcomes that allow us to use traditional measures—like multiple choice tests to measure “student achievement” for schools. If we continue to rely on those measures, we likely will miss out on the chance to individualize instruction in radically more effective ways that more accurately reflect how students actually learn. We need to understand more about how emotion and individual student engagement drive learning.

The Filter Bubble Problem

Individualization isn’t a unmitigated blessing. Our ability to use algorithms to tailor our sources of information to confirm our existing biases and make it more difficult for us to build the kind of cooperative structures we will need to tackle these “wicked” problems. The emergence of Facebook and Twitter as news media platforms will have serious impacts on our ability to prepare citizens for the next generation. How will universities deal with this?

The 90% Problem

One of the hardest challenges we face in judging these challenges in preparing our students for the technology of the future is knowing when and how to embrace a technological change. As the machines get better and better, it will be much more difficult for us to know when we can trust them and when we can’t. What might it mean for our society and our workforce if 90% of the population can’t tell if a piece of work was done by a machine or by a person?

(Endnotes)

1 (https://www.wickedproblems.com/1_wicked_problems.php)

2 Vintiadis, E. (n.d.). The Irrationality Within Us. Retrieved February 27, 2017, from <https://blogs.scientificamerican.com/mind-guest-blog/the-irrationality-within-us/>