

# THE CONVERSATION

2 December 2012, 11.56am AEST

## Education in the information age: is technology making us stupid?



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The pub argument is dead. Google killed it with a little help from your smartphone. Instead of long fought debates about who's right and who's wrong, an answer is nearly always within easy reach.

With so-called intelligent personal assistants becoming more sophisticated, it won't be long before we have the same kind of access to information as the characters from Star Trek: "Siri, at maximum warp how long will it take to reach the bar?"



If information is everywhere, then how can we learn?  
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The question is, does this make us knowledgeable experts or is the easy access to information making us stupid?

### Searching for answers

A recent study suggests that our modern lifestyles are making us "less intelligent" than our ancestors, at least at a genetic level. This research echoes concerns Einstein had when he supposedly said, "I fear the day that technology will surpass our human interaction. The world will have a generation of idiots."

The immediate availability of information has created a particular conundrum in our modern society. When it takes a mere few seconds to find information about almost any topic, the value of knowledge and expertise is being devalued as information becomes cheaper and more accessible. This is despite the fact that information, knowledge and expertise are fundamentally different entities.

For example, suppose you have spent 15 years successfully studying advanced rocket

science at a reputable institution; that should qualify you as an expert. But I'm sure I could find someone prepared to argue with you about the finer points of Saturn V design based on something they read in passing on Wikipedia. Does that make them an expert? Surely not.

Our relationship with and understanding of knowledge and expertise has struggled to keep pace with the rapid democratisation of information. Symptoms of this lag can be seen all around us, particularly in our education systems.

## Critical thoughts

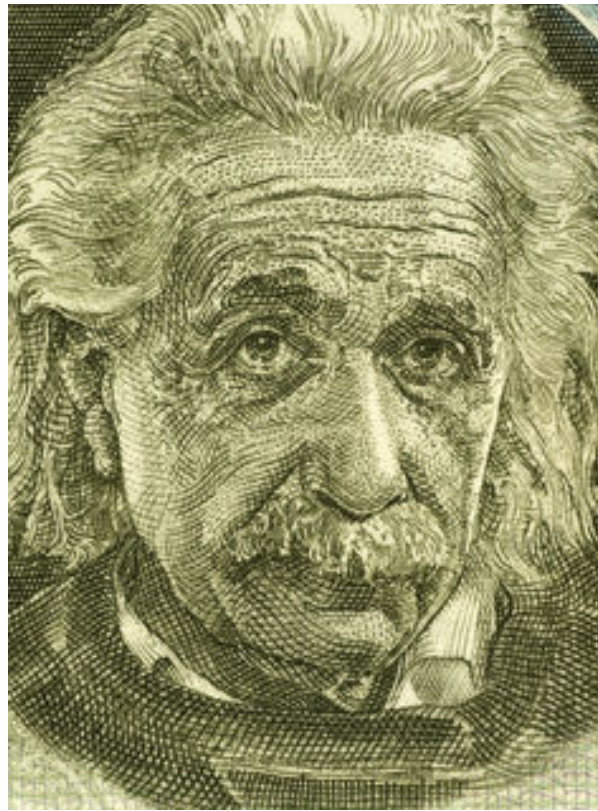
Traditionally, education has been defined by the passing of knowledge from a content expert to a novice learner. The methods of instruction have changed marginally, particularly with the invention of the printing press and a more "industrialised" approach to schooling. But this mechanism of education has remained much the same.

Arguments about the inadequacy of traditional models of education in the information age abound, particularly in higher education. Despite the slow adaptation of education to the information age, the rise of the Massive Open Online Course or MOOC and the apparent imminent death of the lecture are just two examples of the changing educational landscape being brought about by our shifting relationship with information and capability for learning with technology.

At the same time, technological doomsayers – such as British neuroscientist Baroness Susan Greenfield – argue that video games and other innovations of the information age are having a detrimental effect on our brains. Although there is little conclusive evidence to support some of the more outrageous claims being made, there is at least a distinct possibility that while information is everywhere, knowledge is declining and technology is to blame.

So perhaps what is more important is not whether technology is making us stupid but if educational systems need to shift from teaching us what to think, to showing us how to think.

This is not a new idea – famous American anthropologist Margaret Mead was making this



Einstein's words about technology and intelligence ring true today. Einstein image from [www.shutterstock.com](http://www.shutterstock.com)



Baroness Susan Greenfield at the National Press Club in Canberra in 2010. AAP Image/Alan Porritt

argument decades before the invention of Google. But it is taking time for this new reality to filter through to educational policy and to the classroom.

## Easy learning

There are no doubt many reasons why this new paradigm of knowledge is yet to fundamentally change our education systems. Nobel prize winner Daniel Kahneman's work offers one way of understanding why it is so difficult to shift our way of thinking and reduce our reliance on Google: developing expertise is hard work.

Kahneman's research on dual process theory suggests we mostly rely on what he calls "system one" thinking. That is thinking that is fast, efficient, mostly automated, and very

good at detecting patterns, relying on short cuts or heuristics wherever possible. "System two", on the other hand, requires slow, deliberate thought and is much more taxing of cognitive resources. System two is where the heavy lifting is done.

Although this higher cognitive ability is unique to humans, we generally rely on system one if we can.

In terms of what this means for education, psychologist Robert Bjork and his team at UCLA have been investigating what they call "desirable difficulties". A desirable difficulty is a feature of a learning situation that is deliberately made more challenging to enhance learning.

Bjork's research demonstrates that making learning challenging in very specific ways can improve the ways we later use knowledge gained.

Technology has not only made access to information easier, it has arguably made learning easier by making it less challenging and letting us get away with using system one more often. The answers to many questions are only as far away as the nearest search engine or app, so we can avoid any need for the type of analytical thinking required to solve the problem ourselves.

Technologies are generally designed to be pleasing, marketable and to make learning easier; they are not often designed to deliberately vex us in ways that improve knowledge retention.

Similarly, the quality of learning in higher education in particular is often measured in terms of student satisfaction, not how much students have actually learnt. Making learning deliberately challenging for students is not good for ensuring high levels of satisfaction on the My University website.

## Mind field

Technology alone is not making us stupid. We are getting out of having to think too much thanks to a complex set of factors, including the increased availability of information and education systems that have yet to adapt to the new information-rich world we live in.

All is not lost, however. What both Kahneman and Bjork's research reveal is that carefully controlled psychological experiments can improve our understanding of how knowledge and expertise develop in the information age. And their findings can give us clues as to what to do about it.

Of course, applying the controlled laboratory conditions to the classroom is difficult. It's hard to know what exactly is effective and what influence particular technologies are having on learning outside the lab.

In 1899 William James said, "Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality."

If we are to ensure that we are using technology in the most effective ways to educate the next generation, we need to apply the science of learning to the classroom, just as James was arguing over a century ago. This process will undoubtedly require many "inventive minds" to help translate the science into practice.

Ultimately, the future of technology-enabled learning and education is in a synthesis of the science of learning and the art of teaching. Developing expertise in expertise will help us figure out how we can educate future generations of students to become wise and knowledgeable in a world where information is cheap and easy.

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