

# How our way of remembering information has changed

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## abstract

This essay aims to find out how our personal and social memory has been affected by the development of digital technologies. By focusing on two papers and an article, it will reflect how we, as humans, stored information historically and how we do it at present. Then it will look at how learning and teaching has subsequently changed and what the challenges and possibilities of these changes are.

## key-words

technology, computer assisted learning, learning, memory, externalization of knowledge, knowledge and technology

## background

Intrigued by a conversation with Annemarie Bucher, a lecturer in the department of Fine Art at ZHdK, of how the word ‘knowing’ is changing its meaning and learning and keeping information has shifted towards knowledge being ‘knowing where to find the information’ rather than knowing the information itself, I felt I wanted to know more about knowledge, learning and modern technology’s effect on it. With our way of teaching and learning becoming ever more digital, pushed even further by the COVID pandemic over the past few years, a lot has changed in how we perceive, learn, and store information. It is therefore interesting and important to know how digital technology has shaped our learning and trying to find effective ways to adapt and integrate all of the now available tools and services.

Humans have a long history of externalizing knowledge and memory.

Written languages originated in the effort to

externalize information by depicting it in some form. It was with the rise of these first scripts that a schooling system was created. Its aim was to instruct scribes, which were expected to be able to copy, rather than produce knowledge and writing by themselves. This created an understanding of learning in which one master would instruct numerous pupils to copy them exactly.

In the centuries and millennia following this invention of schools and classrooms (Visicato 2000), writing would gain ever more importance in the construction of a social memory. Texts became the prime external symbolic storages (Donald 1991) or artificial memory systems (d’Errico 1998), which means that texts were the means with which events, histories and rules were memorized rather than in orally transmitted songs and stories by bards or people with similar roles. This change was not always welcomed. It is believed for Socrates to have been strongly adverse to writing as a practice of memory, stating it would “[...] introduce forgetfulness

into the soul of those who learn it: [...]”<sup>1</sup>. Nevertheless texts were incorporated into public institutions and played an important role in building up a social memory.

Whenever the means of writing would change, so would the way social memory would be stored and perceived. From slabs to scrolls to books to 0s and 1s. This is part of a mechanism that humans have always made use of. We have always found new ways to externalize knowledge and tasks, invented tools to help us enhance our abilities.

What has changed greatly in the past centuries is the perception of what learning means. From just reproducing what is taught, to producing your own ideas and being expected to draw conclusions, build mental models and apply knowledge to different situations (more on this: Resnick and Resnick (1977; Resnick 1990)).

Something that modern technology has added to this, is the falling away of a need to know information by heart, rather it is important to know where to find information, how to filter incoming data and combining different fields of knowledge. It has also taken away the power from learning institutions to filter, monitor and handpick the information their students see. Textbooks are outdated almost as soon as they’re published and are slow to update the data compared to online databases and digital knowledge and teaching tools. Together with this, the expectation has arisen, that the information we do choose to know by heart always be up to date, otherwise we are expected to rather check online.

## technology as an opportunity

Seeing as the externalization of information and knowledge into our surroundings is a practice that has been around for as long as we

know, technology adds to this array of possibilities. This externalization has led our society to where it is today. It has made inventions possible that have raised our standards of life and has also made it possible to reconstruct what people and civilizations before us might have thought and done.

Whether we want to store information externally or remember it is our choice (Gilbert 2019). While, in the past, it might have been hand-written lists or a reminder in one’s calendar, today this might be a reminder 10 minutes before a meeting, a digital to-do list, that’s easily formatted or any other knowledge stored in a digital format. Of course this does not cancel out the possibility of choosing to write something on paper or print something out. It has been shown, for instance, that taking notes in hand-writing rather than digitally helps retain information better (Carter, Greenberg, & Walker, 2017; Luo, Kiewra, Flanigan, & Peteranetz, 2018; Mueller & Oppenheimer, 2014; for one exception, see Bui, Myerson, & Hale, 2013). The research for this paper and the writing of it have been made only with digital tools, ranging from pdf-readers to text-formatting programs.

Additionally digital technology can be a great opportunity for knowledge to be spread and received to and from a much bigger group of individuals. Seen in services like Skype or Zoom, people who would not have the opportunity to collaborate and exchange their knowledge, can get together and see and talk to each other digitally.

There are multiple schools and universities that offer their classes online and people that would not have the chance or the means to study full-time at that university can attend from around the world. In this way, technology is even emancipating education.

In one case, new technologies have helped to identify a valuable map in the collection of Norway’s National Library. An employee uploaded a scan of the map to reddit, where

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<sup>1</sup>

<https://newlearningonline.com/literacies/chapter-1/socrates-on-the-forgetfulness-that-comes-with-writing>

another user was able to identify it as one of the first printed maps from the Muslim world. Without the combination of knowledge world-wide, the value of the map might have never been discovered.<sup>2</sup>

On top of externalizing the storage of data and information, digital technology has allowed us to externalize parts of our cognition. Computers can help us solve complex mathematical problems, for example, putting us in a position of no longer doing the analytic work but rather preparing information and data for the computer to execute the function.

This can be a huge advantage, as calculations can be made in a fraction of the time needed by humans, tasks can be externalized, and amounts of data can be analyzed in ways not possible before.

## technology as a challenge

Externalizing cognition brings big challenges with it. Already there are algorithms that produce the desired outcome but we cannot understand how. These algorithms functioning as a ‘black-box’ of sorts poses a threat, especially when they are used to analyze data, or even execute whole processes. There is quite a famous example of this, where an algorithm was responsible for filtering applications, that turned out to be racist and misogynistic because of the way it had been programmed. Going forward into developing artificial intelligence further, this will be a huge thing to discuss and find ethical solutions.

In contrast to viewing technology as an opportunity for externalizing knowledge, the note-taking habits of students were studied and it was found that students who take notes digitally tend to learn less and perform worse

in tests (Kayla Morehead, John Dunlosky, Katherine A. Rawson, Rachael Blasiman & R. Benjamin Hollis (2019)).

Having our collective knowledge and social memory stored in a digital format has also been proven to have dangerous effects on how we perceive knowledge. It has led to people judging the quality and integrity of information less by the source and more by how often they have seen and heard it. Studies have also shown that people tend to think information is more true, if it overlaps with their already existing beliefs: this is called the illusory-truth effect (Molokotos 2018).

## conclusion

To conclude, it is clear that technology has had an effect on our cognition and the way we see, work with and store information and knowledge. It is hard to say definitively that it has influenced us in a good or bad way, but it is especially interesting to see how the step to digitalizing knowledge doesn’t seem to be the first that we feel could have a negative effect on our memories and our culture.

Albeit true that information presented to us in digital form are very susceptible to being false, or at least altered with, history shows that this fear has been around for millennia and together with it, the reality that in fact information has been heavily filtered and altered to keep up power structures (in the sense of Rancière 2004)

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<sup>2</sup>

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