Will Technology Ever Replace Teachers?

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Abstract
Technology has always been present in the classroom. Some technological tools that have been used along history have both aided and challenged teaching. The **hornbook** is one of them and it was one of the first tools ever used in education. Technology advanced to include the **magic lantern**. A brief reference to the **blackboard**, the **pencil**, the **radio**, and the **overhead projector** will be made as some of them are still present in our classrooms today. B. F. Skinner in his pursuit of the science of learning and behavior challenged the American system with his **teaching machine**. The ideas of teaching machines and programmed learning provided the basis for later ideas such as open learning and computer-assisted instruction. Fast forwarding at great speed we come to the XXI century Japanese creation "**Saya**". She is the one that might be the answer to the original question and title of this paper. So, is there hope for us teachers? Is there any future for those of us who believe that teaching is not what we do but who we are? Two practical examples carried out in March 2018 in English Language will be presented as baby steps towards meeting the challenge of an ever-evolving high tech society that needs us educators to develop multiple forms of computer and information literacy that will in turn help our students learn more effectively. **Technology** will never replace teachers, because technology in the hands of great teachers can be **transformational**.

The use of technology in education has provided teachers with an unlimited number of tools to choose from in order to enhance the teaching and learning processes. So far, those tools have been that, tools, an extra help. Tools cannot be considered a threaten, but can we say that this is the case in the XXI century?

Going back in history, it seems that the first technological tool created to walk the path towards literacy in western society and which began with the alphabet, was the earliest form of an alphabet book which was used in English-speaking countries: The hornbook.

The nineteenth-century printer and publisher, Andrew Tuer, said: "*the earliest record I can find of a real horn-book faced with horn and not a mere alphabetical tablet ... is about 1450."* There are even anecdotal references to the use of horn-books made of gingerbread, which meant that a reward for

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children mastering their letters was readily at hand. One reference is that of Matthew Prior (1664–1721), in his poem *Alma*, describing gingerbread hornbooks sold at fairs:

To Master John the English maid
A Hornbook gives of Gingerbread:
And that the Child may learn the better,
As he can name, he eats the Letter:
Proceeding thus with vast Delight,
He spells, and gnaws, from left to right.

This primer had a sheet made of vellum (the term "velum" is derived from the Latin word vitulinum meaning "made from calf") and that sheet was mounted on a wooden frame protected with thin transparent plates of horn. It had the shape of a table-tennis paddle and was usually hung at the child's belt. A hornbook contained first a large cross on the top left-hand corner, then the alphabet in large and small letters. The vowels then formed a line, and their combinations with the consonants were given in a tabular form. At the bottom, it contained the Trinitarian formula – "in the name of the Father and of the Son and of the Holy Ghost, Amen" – followed by the Lord's Prayer.

The hornbook, used for four hundred years, was used as an educational tool at a time when *"religion was universally assumed"* as is stated in "Moral and Spiritual Values in Education: A Challenge to Every American" by William Clayton Bower on page 5. By the end of the XIX century the process of secularization of public schools in America was complete and that meant the disappearance of the hornbook.

Then came the writing slate which consisted of a piece of slate, typically either 4x6 inches or 7x10 inches, encased in a wooden frame. Children used to practise writing and Arithmetic on them. Teaching with slates meant that teachers had no way to present a lesson or a problem to the class as a whole and they had to go to each individual student and write a problem or assignment on each one's slate. In 1801, the rather obvious solution to the problem made its debut. James Pillans, headmaster and geography teacher at the Old High School in Edinburgh, Scotland, is credited with inventing the first modern blackboard when he hung a large piece of slate on the classroom wall. Schools rapidly adopted this innovation. By the middle of the 19th century, almost every classroom in America had a blackboard.

In 1870, technology advanced and classrooms included the Magic Lantern, a primitive version of a slide projector that projected images printed on glass plates. By the time World War I ended, around 8,000 lantern slides were circulating through the Chicago public school system.

Another well-known tool is the pencil which chore is not made of lead but of graphite at least since 1565. That was when a recognizable ancestor of the present-day pencil was first documented in England. It owed its existence to the discovery of extensive graphite deposits in the Cumbrian hills. People thought they had stumbled on lead glance, which they sawed into thin rods and sandwiched between pieces of wood to make the first crude 'lead' pencils. It was not until the late 18th century that the chemist Karl Wilhelm Scheele showed that the supposed lead ore was in fact quite a different substance. He named it graphite, derived from the Greek word for writing. Though very much softer than diamond, it is also a form of carbon and is completely non-toxic. The expression 'graphite pencil' never really caught on, and to this day we speak of pencil leads.

The radio also had its impact in the teaching and learning field. Robert J. Nelson and Richard E. Wood published a paper in 1975 entitled: "Using Radio to Develop and Maintain Competence in a Foreign Language." In that paper they present the case of professor Sandra J. Savignon who worked at the University of Illinois. This professor adapted the daily news broadcasts in French as the main curriculum material for a conversation course. Professor Savignon combined direct listening,

recording and transcripts in her syllabus. Her experience contained lessons for the teacher as well as the student. This is what she concluded:

> "The most important and really all-inclusive contribution of France-Inter (the name of the French broadcast station) to developing the communicative skills of my students is that it brought lively, up-to-date French language and culture into the classroom, and students responded with an enthusiasm akin to the enthusiasm of an American Year Abroad Student who steps off the plane at Orly. This is for real. No more book phrases to be drilled and then inserted into a simulated exchange. Once the student is put in contact with the real thing, the teacher can step down from centre stage. He is no longer master of ceremonies but coach, as the students, individually and as a group, work toward understanding and responding to this new presence."

In the 1940s the police and the army used an early version of the overhead projector. These first machines used already-existing slide projector technology to project images onto a large screen. But it was 3 M the Minnesota Mining and Manufacturing Company which challenged one of its workers to find a use for the transparencies that were a waste for the company at the moment. Roger Appledorn was the worker who faced the challenge and developed the first overhead projector. Although the idea lacked support in the marketplace, Appledorn went out himself to approach teachers, who saw its potential enough for the product to take off.

Before moving to B.F Skinner's teaching machine it would be wise to analyze some of his conclusions related to visual aids as a tool. He said: "Audio aids supplement and may even supplant lectures, demonstrations, and textbooks. In doing so they serve one function of the teacher. They present material to the student and, when successful, make it so clear and interesting that the student learns." Could we take this as one of the first threatens that we have underestimated and which could have marked the beginning of the end of our profession?

B.F Skinner an instrumental behaviorist went as far as to design and develop a combined system of teaching and testing mediated by a machine. Professor Skinner explains his machine and his programmed learning method in a very interesting video (https://www.youtube.com/watch?v=CFYruzWeFwQ&t=313s). In the video he identifies three main features that can be found in all teaching machines. Students provide continuous responses, there is immediate correction of every response students give and each student can learn at his own pace.

Well, so far it is clear that none of these technological tools though revolutionary and menacing somehow, specially the Skinner Machine, have replaced teachers. But what about Saya the first robot teacher. Saya is a female humanoid robot who taught a science and technology lesson to a class of 10-year-old pupils at Kudan Elementary School in Tokyo. Saya was initially created to work as a receptionist in Japanese companies five years ago but was recently reprogrammed by scientists into its latest incarnation as a schoolteacher.

We are getting closer then to answering the question whether technology will ever replace a teacher Before giving a definite answer it would be best to see if there is anything we can do to befriend technology before turning against it once and for all.

Here is an example of two technology-mediated activities which were carried out in March 2018 in English Language at USAL university.

Task 1

Students had to write Agatha Christie's Biography as a CoI (Community of Inquiry) using the educational platform called Edmodo and information from internet.

First, the 2018 English class on Edmodo was created and students were provided with a code with which they would access the Wednesday English Language 2018 virtual group. After welcoming students to the platform, the activity was described. Students were asked to do research

on Agatha Christie's biography and be ready to write between five or seven lines on a thread that would end up in their own construction of this writer's biography. Student number one would of course state her place and date of birth and the rest of the students would continue chronologically. This meant they had to read what was already written on the thread, before adding any new piece of information. That piece of information had to be relevant and fit chronologically in the thread. The day before the following class, a final comment was written on the thread asking students not to upload anything else. Students were asked to post comments on the impressions they got out of this new experience. Here is what Micaela and Juan Cruz wrote:

Micaela M.: "It was such an interesting and fascinating activity to do. I really enjoyed reading all my classmates posts and learning more about this great author. See you tomorrow!"

Juan Cruz M.: "To be honest, at first I thought the whole thing would wind up being slightly... cluttered, so to speak, yet we managed to pull it off flawlessly. We all rock and deserve a pat on the back. See ya tomorrow everybody"

Their words, clearly express that the activity proved to be useful. In class students participated with enthusiasm when they were asked questions about Agatha Christie's biography and even asked questions among themselves about the posts they had found interesting.

Task 2

The second task implied a bigger challenge than the previous one because students had to write a paragraph as a community of inquiry going beyond the limited frame of the traditional face-to-face classroom. In this second task, they needed more technological tools and knowledge to be able produce the final product, i.e a coherent, well-structured and grammatically accurate paragraph.

For this task, students were divided into groups of three. They had to create a shared document on Google Drive and choose one of the topic sentences we had worked on and analysed the previous class to write the paragraph. On this document they would first write all the ideas they had in mind, then an outline and only then, the paragraph. They could even use Whatsapp for the final editing if necessary.

The teacher had already created a padlet on a virtual bulletin board called Padlet. She shared the link to this padlet with the students via Edmodo, so that students could paste their final documents there. All students had to do was to drag and drop this final collaboratively created document on this virtual bulletin board. They had a week to write the paragraph. They contacted each other and worked virtually, nothing was done on a face-to-face basis. The following class, the class used the auditorium at USAL university as it has an interactive screen. Students could see their paragraphs there on the screen and both teacher and students analysed each of the paragraphs in terms of content, structure and grammar. It was hard for students to analyse the first two paragraphs and the teacher's assistance was needed. However, little by little students got more aware of what it takes to write a coherent, well-structured and grammatically accurate paragraph, and so they ended up correcting the last ones practically on their own.

Coming back to the initial question for the last time, I personally believe that technology will not replace great teachers because technology in the hands of great teachers can be transformational. To conclude, I would like to bring back today into our memory the intro of a TV series I used to watch when I was a child about an astronaut who had had a terrible accident in which he practically died. It said: "Gentlemen, we can rebuild him. We have the technology." Education is suffering now. It is in a critical condition. Wouldn't it be nice if we, teachers, could rebuild education and make it stronger because we have the best of technology today?

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