

////Title: Exploring the Evolution of Learning Fuelled by Mobile Technology

////Standfirst:

Research investigating the adoption of new technologies can help to unveil global trends in learning and education. Researchers at Michigan State University, University of Illinois Urbana Champaign, Texas State University and Purdue University have recently carried out a study investigating the use of devices by people in different parts of the world and with various literacy levels to access YouTube videos between 2013 and 2018. Their analyses identified key historical moments when the use of smartphones for online learning surpassed that of other information and communication technologies.

////Main text:

Technology has the potential to initiate deep and long-lasting transformations in society, altering the ways that we work, communicate, and learn. However, it often takes time for newly developed tools to become widely used by people worldwide, even if they are highly useful and innovative.

For instance, Johannes Gutenberg's invention of the movable printing press in 1439 opened new possibilities for education and the dissemination of information on a large-scale. Yet these possibilities were only realised three centuries later, when the public started to gain access to a wide range of printed publications, such as textbooks, journals and newspapers.

Even after mass-printed texts had become widely available, some segments of the population had less access to them for many years, including ethnic minorities, people from low-income families, those with low literacy levels or those who only speak local languages but not the mainstream languages, women, and people with disabilities.

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The adoption of information and communication technologies follows a similar pattern. While the internet was first invented in the 1960s, it only became available to the public 30 years later. For many years, the internet was only accessible to those who could afford expensive technologies, such as home computers.

The use of the internet for educational purposes also became widespread in Europe and America first, as technological devices were initially too expensive or inaccessible for most people living in other parts of the world.

Today, the internet has finally reached people across the entire globe, opening new valuable opportunities for education over the past 15 years, as the numbers of internet users in Africa, the Arab States and Asia have grown exponentially. This appears to have been facilitated by mobile devices, which are more affordable than personal computers.

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While past studies suggest that mobile technology has played a crucial role in enabling online learning, the exact time when smartphones revolutionised how people accessed information in different parts of the world has not yet been clearly identified.

Recently, a team of researchers from Michigan State University, University of Illinois Urbana Champaign, Texas State University and Purdue University carried out a study that could help to pinpoint the exact historical moments when more people worldwide started accessing educational content on their smartphones. Specifically, they examined the devices that had been used to access videos on an educational YouTube channel over a crucial five-year period, between January 2013 and June 2018.

The YouTube channel they focused their study on, called Science Animations Without Borders (SAWBO [saw-boe]), creates educational videos that are accessible for all learners, including those with low literacy levels, the financially disadvantaged and those living in developing countries or geographically isolated regions.

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The research team analysed data they obtained from the SAWBO YouTube channel, specifically looking at what devices people had used to access videos between January 2013 and June 2018. They first looked at different global and regional trends in the type of devices used to access videos, and then prepared a summary of their findings.

Remarkably, by looking at the SAWBO channel's data, the researchers were able to identify key historical moments when the use of mobile technology crossed a tipping point and surpassed the use of other information and communication technologies. This tipping point, defined as the moment when the percentage of video views from smartphones became equivalent to the percentage of views from computers, appeared to take place between 2015 and 2017.

After 2017, on the other hand, they found that the vast majority of users started watching the educational videos from their smartphones, while the percentage of views from computers decreased.

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In addition to pinpointing the moment when mobile technology became the preferred choice for accessing videos on YouTube on a global scale, the researchers looked at differences between different regions. Interestingly, they found that there was significant variation between different regions.

For instance, in Central America and Asia the tipping point for mobile access of SAWBO videos appeared to be in 2015, in North and South America in 2016, while in Europe and Africa in 2017. Notably, in all these continents and regions, the use of mobile devices to watch videos continued to increase after their defined tipping point, while the use of computers decreased.

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The findings gathered by these researchers could have many valuable implications for the understanding of mass digital use and of the global access to online resources. Firstly, they seem to confirm that the reduction of disparities in digital use worldwide is in great part due to the rise of smartphones, which are more affordable and accessible than computers.

In addition, these results highlight the huge value of educational content that can be easily accessed and viewed on smartphones, as a growing number of users in different parts of the world are now using them to navigate the internet. This could have important implications for public service-learning projects, which are aimed at making educational materials readily accessible for more individual worldwide.

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In their paper, the research team also outlines three key factors that they think public-service learning projects should consider, namely learner-related, device-related, and social factors. Also, further content development should consider making sure visuals in such educational animations are created so that salient points can be shown effectively on the smaller screens of cell phones compared to those of larger laptop and desktop computers.

In the future, the team's work could inform other studies aimed at investigating how users in different parts of the world access educational content online. It could also encourage more educators and organisations to create videos or other content that can be easily accessed and viewed on smartphones.

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This SciPod is a summary of the paper 'Breaking out: the turning point in learning using mobile technology', from *Heliyon*. doi.org/10.1016/j.heliyon.2021.e06595

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