Digital trends in academia – for the sake of critical thinking or comfort?

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Despite the fast pace at which the world is changing nowadays, people tend to overestimate the influence of new trends. Since its birth, academia has undergone steady changes, and the impact of digital technologies will be a revolution neither in teaching nor in research, but only one single step in a long-term evolution. Let’s go back a few centuries to the origins …

In the Renaissance, extraordinary people like Leonardo da Vinci or Galileo Galilei shaped the idea of brilliant geniuses with universal knowledge in all existing fields of science and humanities. This idea – that being brilliant means to be an expert in nearly all fields at the same time – was followed for a few centuries; accordingly, philosophy was the most studied field at that time. A later example of such a universal genius is the 18th century German poet and writer Johann Wolfgang von Goethe. Although he contributed more to German literature than most of his contemporaries, he also actively carried out research in diverse fields, and thought that his development of a theory of colors (later to be falsified!) was his greatest achievement.

When mankind’s accumulated knowledge became too complex for one person to master, specializations started to develop towards the main disciplines as we know them today; the first university programs for Chemistry were created in the 1850s, for Chemical Engineering in the 1890s. Since then, countless other fields arose and, in 2018, there are about 19,000 distinct degree programs at universities only in Germany.

The novel digital technologies that have emerged in the last few decades enable both students and researchers to gather relevant data from many fields, to read published articles online, and to communicate with peers all over the world. Along with further specialization, a new concept of generalism has also appeared, as people are also needed to connect the specialists of all these distinct fields. With the development of the internet, of advanced online encyclopedias and of powerful searching tools, knowledge has become ubiquitous and hence, has lost some of its value. Searching for information about chemistry with modern search engines is faster and more comfortable than pursuing studies for several years. As a result, in academic teaching, a shift from naïve memorizing to deep understanding and critical thinking is inevitable. Otherwise, digital assistants like Alexa will replace all ETH Zurich graduates in the near future …

But as large as the changes in teaching have been over the last decades, as misguided and arbitrary they were as well. Whereas books and physical attendance of students at lectures were the fundament of teaching for centuries, many of today’s students focus on some kind of online material and watch streamed lectures or YouTube videos on the web. The age of books as a tool for studying appears to be past; many students do not even borrow a single one during their entire Bachelor studies. Academia as a whole evolves towards a teaching philosophy that does not involve books anymore.

Still, most lecturers provide scripts paraphrasing the lecture’s content and containing all the “must-knows” for the exam, albeit with an immense variance regarding scope and quality. Exercises and their solutions are usually uploaded on a magnificent potpourri of webpages, and the lecture itself is often streamed, so that it can later be watched online – the latter at least for the larger courses in the Bachelor programs. One might argue that these developments render the attendance of the lectures in person unnecessary and, to a certain degree, this seems correct.

All these trends are caused by digital technologies; but instead of focusing the student (and lecturer) on critical thinking, they are ultimately rather beneficial to their personal comfort and to the economy of resources. Let’s have a close look at one characteristic example: the former first-year Biology course for Chemists and Chemical Engineers. All lectures were streamed. For most topics, there were clearly stated learning goals along with voluntary multiple-choice tests and links to digital sources providing extra information; there were also old examinations on the VCS webpage (VCS = Federation of Chemistry Students). All this material – as useful and exemplary as it may be – mainly led to one thing: The lowest average attendance of all first-year lectures, with sometimes fewer than 20 students (of 150!). With this overflow of digital tools, many students did not feel there was any benefit in attending the lecture. It was more comfortable to sleep longer – the lecture started early in the morning – and to study the content later, instead of discussing questions with colleagues or with the lecturer.

This clearly shows that digital technologies have to be used with care. They can definitely support both lecturers and students in learning and teaching, but may also have negative side effects. To take this into account, we have to think about the added value of a lecture for the students who attend it. This is a highly subjective question, but, in
my opinion, there is one main component: The direct communication between the students and the lecturer, connected with the possibility for the students to formulate and discuss questions, and with the need for the lecturer to react to these questions; and thereby simultaneously receive feedback for improving the lecture continuously.

Ideally, digital technologies should support the lecturer in transmitting her/his knowledge and skills to the students while improving or, at least, not mitigating the communication between them. A highly elaborated script containing all the relevant content of the class might actually work against this goal. On the other hand, a link to a YouTube video of another professor explaining the same topic with a different approach might be more beneficial – as it can broaden the students’ horizon and encourage them to critically evaluate and compare both approaches. As a guideline, novel technologies should not be included in teaching only because of their availability, but based on a detailed pro-con analysis – and with concrete benefits in mind (other than merely sleeping longer in the morning!).

All in all, the digital revolution and the associated novel technologies will definitely shape academia in a new way. But, from my point of view, it is not mainly a question of surfing versus drilling in the available “big data”, but rather of critical thinking versus comfort. The biggest mistake we can make right now is not to miss some fancy recent developments; the biggest mistake would be to adopt all these emerging trends without carefully assessing their relevance, benefits and side-effects.

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