Issue se2021
2021

Learning in 2040

A journey to the future of tertiary learning

Thomas Korner
thomas.korner@let.ethz.ch

Educational Development and Technology
ETH Zürich
Zürich, Switzerland

urn:nbn:de:0009-5-52306

Abstract

Gazing into a crystal ball, the author presents his thoughts on how tertiary learning could look in the future. Based on today's emerging technology, future reports and many discussions with colleagues he summarizes five possible characteristics of a university study programme in 2040: Study advisory BOTs, micro masters and nano degrees, ubiquitous individualized learning, learning groups and blockchain technology. In the second part, he focuses on the impact on learning management systems, which will be more customizable, interactive, interoperable, and increasingly reduced to its primary task: managing learning.

Keywords: e-learning; higher education; university; learning management system; LMS

1. Introduction

Providing (innovative) services for higher education typically needs our full attention. Especially in years like 2020, you need solutions which work immediately. However, these solutions are not always synonymous with effective online education or aligned with university strategy. [1][2] It seems crazy to look up from the pressing issues and gaze into a crystal ball in these times. It feels like a waste of time and money, but foresight is always essential and never easy. There are two reasons why you should still invest time into foresight:

1. Imagining utopia makes us think outside of the box. If we put away all «constraint of the known», we can approach the needs and possibilities from other viewing angles. This usually leads to better, previously unknown solutions.
2. You will not «miss the boat». Innovation history has shown that early adopters enjoy advantages for several years, but universities cannot cope with every innovation available in the market. You have to catch the right boat to sail to the future.

Success can become dangerous, because it can make people complacent. Truly successful companies need to be two steps ahead of the current need of the market, and to achieve this, working on a vision of the future is essential. To say it in the words of Harold MacMillan, former PM of the United Kingdom: «Too many people live too much in the past. The past must be a springboard, not a sofa.» [3]

2. Possible characteristics of a future study programme

There are various publications on the specific topic of future tertiary learning available, but only a few of them have the whole university in scope. In 2017 Bert van der Zaar, at that time Rector Magnificus at Utrecht University, determined six trends in the coming decades [4], including digitalization, a shift towards global universities, commercialization of education and personalized learning which does not stop after receiving a degree.

In a recent publication, Ehlers [5] identifies 17 essential future skills (like cooperation competence or learning literacy), which students will need in order to succeed in their work life. Against this background, he defines four drivers for a change of universities within the next years, including a shift towards multi-institutional study experience, focusing on future skills, self-organized, personal learning and lifelong learning. They lead into four scenarios of a future university.

Based on these sources, many additional readings and discussions with scientific colleagues, five possible characteristics of a study programme in 2040 are presented. The selection is entirely based on the personal view of the author.

2.1 Study advisory BOTs

Artificial Intelligence (AI) finds its way into many aspects of work-life and learning at universities in recent years. The influential Horizon Report articulates in 2020 three emerging technologies (partially) based on AI, which significantly impact learning at the university level. [6]

As an early example of what BOTs could look like, the University of Technology Hamburg implemented a reflection process for students called mytrack (as shown in figure 1), including an automated recommendation system for additional courses based on selfreflection. [7]

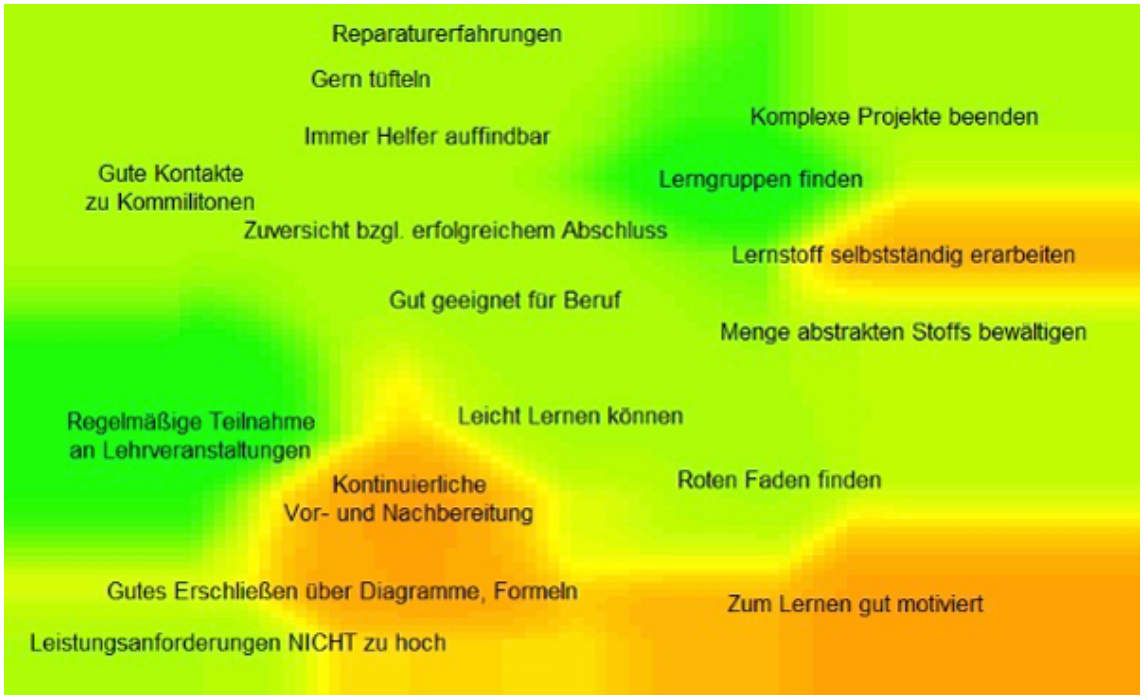

Fig 1: Example of feedback to the way a student learns. The orange areas are fields where a student can improve. ([7], p18)

BOTs based on AI will help students fill competence gaps, propose (online) courses (internal and external), peer groups, and other helpful activities a student should focus on to pass the semester. Additionally, advisory BOTs will help the student during the day and week to cope with the multitude of tasks and find the right work-life balance. It may even monitor the student's well-being and send a signal when the student's health is at risk.

There will be a vital link to adaptive learning systems, probably based on students' preferred learning styles. [8]

2.2 Micromasters and nano degrees

Nowadays a full study programme at a university takes at least three years. The number of degree programmes has increased over the years, reflecting today's employment market's ongoing specialization. With Massive Open Online Courses (MOOCs) people have a way to (formally) educate themselves. [9] A significant number of universities now offer MOOCs which are attached to formal university credit. Big MOOC platforms bundle individual courses to micro masters (EdX, https://www.edx.org/micromasters) or nano degrees (Udacity, https://www.udacity.com/nanodegree). Small Private Online Courses (SPOCs) fill the gap at universities where MOOCs fail (mainly because of high drop-out rates). [10]

It is a small step from there to a degree programme which bundles several of these courses and degrees to a full bachelor's or master's degree offered by a university. This could be how universities continue to hold their role in society as important institutions that formalize knowledge and competencies. Credentialing will be an essential topic in this change, see section 2.5.

2.3 Ubiquitous individualized learning

Learning does not happen only in the lecture hall, that is already known. Universities have been offering learning spaces for decades but only in the last couple of years have these rooms become manifold (a good example, how this could look like, offers [11]) and digital. The COVID-19 pandemic showed that many more spaces could be used for learning than was previously conceptualized. For that reason, most of the content, features and learning opportunities should be available in different formats, depending on the space from which students are accessing it. For example, searchable videos available in different languages for the students who prefer multimedia and have robust internet bandwidth and well-prepared paper-based content (which is different from simple video transcription) for others who prefer less dynamic options, additionally these changes will improve accessibility, which is important to some students.

2.4 (international) (virtual) learning groups

In 2040 learning groups will become even more critical than they are today. As in business or research, work has become a "team player sport". [12] Therefore learning will shift its focus from individual results to group work and one's contribution to it. Meanwhile, students will not be on campus only anymore. They will participate in courses from different places and in different time slots. Thus, forming learning groups that fit a particular student's specific needs will become more and more critical. The tools these groups use will be diverse too, and they will use many different types of meetings (synchronous, asynchronous, virtual, live).

2.5 Blockchain technology

If you talk to admission boards of universities today, they will tell you how work has become increasingly difficult. Universities are finding it more and more challenging to assess the wide range of competencies that applicants bring with them and whether they fit the admission requirements. Companies like Linked-in have shown that there are alternative possibilities to certify competencies.

In 2040 blockchain technology will play an essential role in accreditation between universities and proof competencies of students. Learning paths will be saved into the blockchain and confirmed by colleagues and (well-known) institutions. Some first steps are promising like certifaction.io [13], a Swiss startup company that works together with several universities, companies and SWITCH, the Swiss national research and education network organization. As shown in figure 2, the workflow is elaborated: A university grants a degree to a student and informs the company. The company writes this achievement into an available blockchain, verifies the correctness and creates certification information for the university. The institution shares this information with the student. A future employer can simply approve the authenticity of a degree by accessing the node in the blockchain.

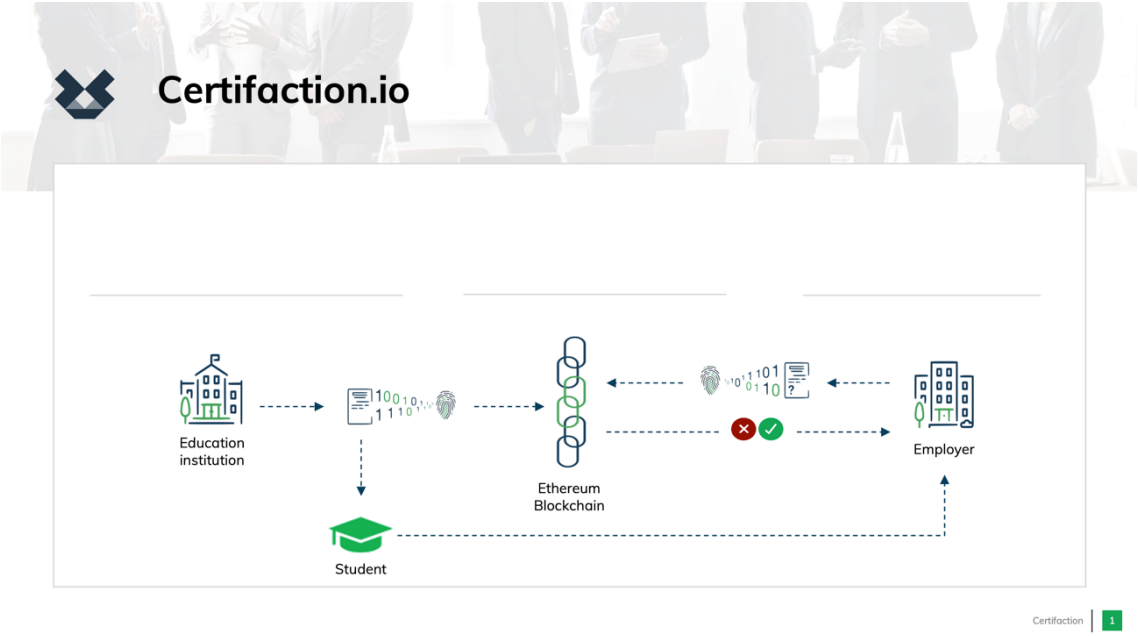

Fig 2. The certification process for student degree at a university (put at disposal [13])

3. What does this mean for a learning platform

All these trends influence how a learning platform should be shaped to address the future.

Providing for the expected increased variety of learning paths and styles, systems have to become more interoperable. The days have gone where one single system can solve every task necessary for fitting the learning and teaching need of an institution. Therefore working with a standard like LTI or xAPI, which enables systems to work together is essential.

ChatBOTs and AI (as described in chapter 2.1) will be an integral part of the futures learning system. As soon as selflearning systems are technically mature, they will open a whole new field of opportunities.

The learning content has to become multilingual on the fly and multimodal. Technology will play an important role to achieve this goal, like the recent version of Microsoft's Powerpoint proves. Presenting with this software allows you to use an automated live transcription of your voice. Additionally, this transcription can be simultaneously translated into dozens of languages. [14]

Personal Learning Environments (PLE) [15] will become even more critical based on individual learning preferences. Physical and virtual PLE will merge with technology we do not know of yet. The institution's learning management system will play an essential role in managing and delivering the right content at the right time in the right way.

As mentioned above, group work will be a central part of learning in 2040. Therefore communication (in all of its ways) will be an essential part of the learning management system.

Last but not least, with a more diverse learning landscape and more individualised learning options students will take over more responsibility for their learning. Therefore they have to have choices on which, how, when, and where they will learn competencies, the learning management system will have to support that.

4. Summary

It is an impractical exercise to try to foresee the reality of learning in 2040. Nevertheless, gazing into a crystal ball provides us with vital ideas. Some are already common today (group work, mobility, micro masters), some others will become a reality as soon as technological progress is at an appropriate stage (BOT, AI, Blockchain).

All of them will affect the learning management system of a university as we see it today. This tool will likely not cope with all the emerging needs; therefore, it will have to be as flexible as possible and integrate specialized software for specialized tasks. Learning management systems as today are enhancing their features with every release. This makes them bloated and clunky. Doing this, they often fail to reach their goal to compete with specialized software. Therefore they need to refocus their goal to its core functionality: managing the learning. This means gathering, displaying and providing learning content tools appropriately. Doing this, an LMS of the future can create a consistent look and feel of learning material no matter which tool is behind the content. At the same time, it manages capabilities and grades and merges all learning material into one unique learning environment (onestop-shop for learning) which students often ask for.

Acknowledgement

The author wishes to thank Karin Brown and Andreas Reinhardt for their review and the innovation management team for many intense discussions about the future of higher education.

References

[1] Hodges, C. ; Moore, S. ; Lockee, B. ; Trus, T. ; Bond, A.: The Difference Between Emergency Remote Teaching and Online Learning | EDUCAUSE. In: Educausereview, 27-Mar-2020. [Online]. Available: https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning . (last check: 2021-03-15)

[2] Kortemeyer, G. : That is one giant step for a university, one small leap for digitization. In: VSH-Bulletin, vol. 3–4, 2020, pp. 33– 38.

[3] Quotemaster.org, “Quote Master.” [Online]. Available: https://www.quotemaster.org/q38ee599addbb62c317884b9 c577ac241 . (last check: 2021-03-15)

[4] Zwaan, Bert van der: Higher Education in 2040. A Global Approach. Amsterdam University Press, 2017.

[5] Ehlers, U.-D. : Future Skills: The future of learning and higher education. Springer Wiesbaden, 2020. Open Access: https://link.springer.com/book/10.1007%2F978-3-658-29297-3 (last check: 2021-03-15)

[6] M. Brown et al.: 2020 EDUCAUSE Horizon Report ™ Teaching and Learning Edition Teaching and Learning Edition. 2020. https://library.educause.edu/-/media/files/library/2020/3/2020_horizon_report_pdf.pdf ? (last check: 2021-03-15)

[7] Knutzen, S. ; Klaffke, H.; Schmitt, A.: mytrack- Wege in ein erfolgreiches Studium. Hamburg, Jun. 2020. https://tore.tuhh.de/handle/11420/6306 (last check: 2021-03-15)

[8] Ciloglugil, B.; Inceoglu, M. M.: A learner ontology based on learning style models for adaptive E-learning. In: Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 2018, vol. 10961 LNCS, pp. 199–212. https://link.springer.com/chapter/10.1007/978-3-319-95165-2_14 (last check: 2021-03-15)

[9] Carey, K.: Here's What Will Truly Change Higher Education: Online Degrees That Are Seen as Official. In: The New York Times, 05-Mar-2015. https://www.nytimes.com/2015/03/08/upshot/true-reform-in-higher-education-when-online-degrees-are-seen-as-official.html (last check: 2021-03-15)

[10] Ruiz-Palmero, J.; Fernández-Lacorte, J. M.; Sánchez- Rivas, E.; Colomo-Magaña, E.: The implementation of Small Private Online Courses (SPOC) as a new approach to education. In: Int. J. Educ. Technol. High. Educ., vol. 17, no. 1, Dec. 2020. Open Access https://link.springer.com/article/10.1186/s41239-020-00206-1 (last check: 2021-03-15)

[11] UNSW: Study Spaces | Learning Environments - UNSW Sydney. [Online]. Available: https://www.learningenvironments.unsw.edu.au/physical-spaces/study-spaces . (last check: 2021-03-15)

[12] Chowdhury, T.; Murzi, H.: The Evolution of Teamwork in the Engineering Workplace from the First Industrial Revolution to Industry 4.0: A Literature Review. In: 2020 ASEE Virtual Annual Conference Content Access Proceedings, 2020, vol. 2020-June. Abstract: https://peer.asee.org/the-evolution-of-teamwork-in-the-engineering-workplace-from-the-first-industrial-revolution-to-industry-4-0-a-literature-review (last check: 2021-03-15)

[13] Certifaction.io. https://certifaction.io . (last check: 2021-03-15)

[14] Microsoft: Present Live: Engage your audience with Live Presentations. [Online]. Available: https://support.microsoft.com/en-us/office/present-live-engage-your-audience-with-live-presentations-039aa2cc-67fa-4fb5-9677-46ed8a060c8c . (last check: 2021-03-15)

[15] Harmelen, M.: Personal Learning Environments. In: Sixth IEEE International Conference on Advanced Learning Technologies (ICALT'06), Kerkrade, Netherlands, 2006, pp. 815-816. doi: 10.1109/ICALT.2006.1652565 (last check: 2021-03-15)