Mitigating Educational Challenges Through Unlearning

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Abstract: The rapid growth and obsolescence of knowledge cause uncertainty for university actors, such as students, teachers, administrative staff, and technology vendors. They must find new ways of dealing with hindering assumptions, and behaviors toward learning and teaching. To overcome these and achieve educational goals, it is essential to question ineffective ways of teaching and learning, adopt new education processes, and discard inadequate beliefs and procedures. This process is known as unlearning. In this position paper, we explore the potential of unlearning for mitigating educational challenges through unlearning. From a socio-technical perspective, we highlight the value of unlearning as a tool for tackling different challenges in university contexts. Finally, we identify central problem spaces stimulating further discussions.

Keywords: Unlearning, Educational Challenges, Socio-Technical System, Knowledge

1 Educational challenges for the university system

As the field of education is continuously evolving, new challenges arise daily. For instance, the next shock to the university system is already waiting in the wings – ChatGPT and generative artificial intelligence. It is more than obvious that we cannot stay passive given the disruptions in the university environment. To a large degree, these challenges are reinforced by hindering assumptions, outdated beliefs, inappropriate routines, and inhibiting behavioral patterns that prevent universities from adapting to changing circumstances. 'Unlearning' is a promising approach to mitigate these. It can be understood as a process of intentionally letting go of old beliefs, assumptions, biases, and behavioral patterns that are no longer effective or relevant in addressing new educational challenges – i. e. cognitive, beahvioral, and social knowledge [EL11]. It differs from related concepts such as 'absorptive capacity' or 'conceptual change' as it does focus neither on internalizing new, valuable information nor on mental, cognitive knowledge. These knowledge-related challenges can be grasped better, if we view the university as a socio-technical system (see Fig.1) consisting of two sub-systems, i.e. social system (structure, people), and technical system (technology, tasks):

People. Teachers, students, and administrative staff use technology for teaching and learning. However, they may not have sufficient experience in using new technologies, which can impact their learning success. Digital competencies are often not adequately taught in teacher training programs, and this gap has become problematic during the

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COVID-19 pandemic, where digital teaching is essential [St23]. All internal roles in the university are affected by disruptions caused by technology or other factors. Thus, they are forced to update their knowledge and adapt to novel demands, if they want to or not.

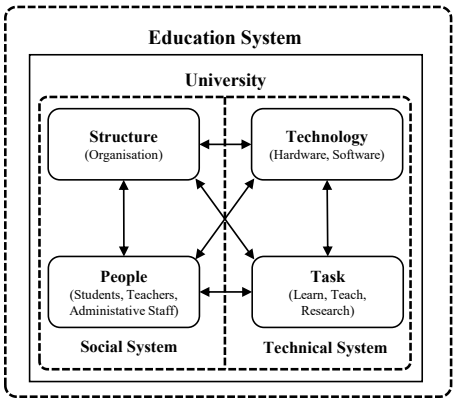

Fig. 1: University system as a socio-technical system

Structure. Universities need flexible structures to support both research and teaching, but their rigid and inflexible routines make it hard to adapt quickly to change, e.g., through COVID-19. Stu.diCo [Tr20] found that students struggled with the increased workload and inadequate IT infrastructure of universities during the pandemic, resulting in poorer support and student success. This highlights the need for more adaptable structures and provisioning to support digital learning – a case for unlearning routines.

Task. Traditional teaching methods can be challenging to transfer to the digital space, as they are often rooted in long-held beliefs and assumptions about how students should learn. Stu.diCo [Tr20] suggests that many students still prefer in-person classes due to the importance of social interaction, but there is also a desire for more digital options. This suggests that there is no single "right" approach to the digital shift in education and that the role of teachers may need to evolve to meet the demands of a changing world.

Technology. Outdated technology can hinder teaching and learning, as IT infrastructure may not be sufficient to support flexible and scalable teaching. Universities struggle to keep up with the speed of technological change, and there is no uniform approach to digital teaching across institutions [CLL21]. This makes it challenging to deliver effective digital teaching, and there is no one-size-fits-all solution to the challenges faced in digitalizing higher education. Actors need to become familiar with new technology first before they can productively adopt it. As with physical infrastructure, there will always be constraints on providing proper technology for teaching and learning.

As these examples illustrate, challenges are inherently complex as human needs and technical intricacies are interwoven in a non-trivial fashion. Accordingly, appropriate knowledge from various actors needs to be combined and refreshed – from students, teachers, administrative staff, and technology providers – and all roles need to act in

unison to tackle these challenges. Therefore, our central question is the following: *How can we unlearn hindering beliefs, assumptions, and behavioral patterns to collaboratively construct a resilient education system?* In this position paper, we argue that unlearning can be a powerful tool for universities seeking to address the challenges of rapid knowledge growth and obsolescence. By unlearning outdated or irrelevant knowledge (e.g., mental models, routines, norms), teachers and administrators can create space for new ideas and perspectives, enabling them to adapt more quickly to changing circumstances. We demonstrate how unlearning can be used as a strategy for knowledge management in higher education in times of change – planned and unintentional.

2 Unlearning hindering knowledge as a catalyst for change

We will now suggest how universities can utilize unlearning to address the previously outlined educational challenges. Thus, universities need to organize effective knowledge management orchestrating knowledge-related activities of creation, sharing, and utilization. However, the overwhelming growth of knowledge causes a constant stream of new information that is generated within the university system and beyond. This knowledge explosion requires the university and its actors to deliberately decide which knowledge to retain and which knowledge to unlearn. Thus, all university actors need to learn, unlearn and relearn to always keep the most valuable and useful stock of knowledge for the organization as a whole.

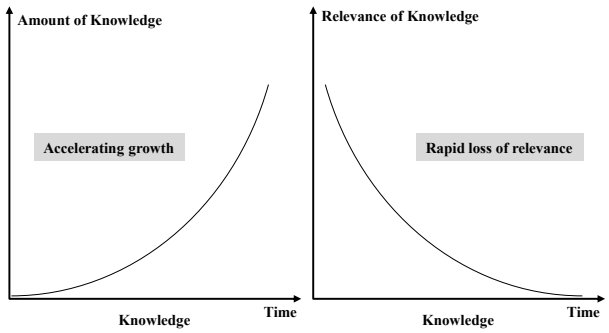

Fig. 2: Knowledge growth and loss of relevance

If everybody has the right knowledge – implicit and explicit – in place, the university will strive. This is easier said than done as knowledge underlies a dynamic process of accelerated growth followed by loss of relevance over time (see Fig. 2). As knowledge grows, it becomes increasingly specialized and complex. At the same time, the relevance of previously acquired knowledge may diminish as new technologies, theories, and practices emerge. Consequently, universities need to continuously (re-)evaluate the value of constituent knowledge to achieve educational goals in novel situations and decide which knowledge to keep and which to discard, i.e. unlearn (see Fig. 3).

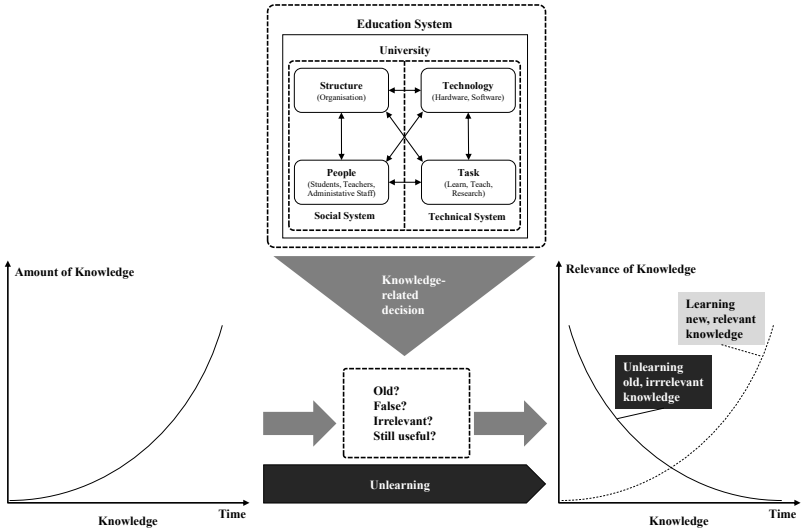

Fig. 3: Dynamic unlearning in the education system

For all actors, it is essential to continuously update their knowledge and adapt their teaching methods to keep up with the latest developments in their field. For *teachers*, this requires ongoing learning and professional development to ensure that they can effectively prepare students for their careers. Similarly, *students* must be equipped with the necessary skills, adaptability, and lifelong learning mindset to navigate the dynamic nature of knowledge in their chosen field. They must be prepared to continuously update their knowledge and adapt to new technologies, theories, and practices as they emerge. *Administrative staff* plays a crucial role in supporting both faculty and students in this process. They may need to adapt their procedures and practices to keep up with the latest developments in their field, and they must provide support and guidance to faculty and students as they navigate these changes. Apart from these, external actors, such as *technology providers*, cannot simply push their solutions into universities, e.g., ZOOM. Instead, they must work collaboratively with teachers, students, and administrative staff to ensure that their solutions meet the specific needs of each role and support the overall success of the university.

Again, this makes clear how entrenched knowledge structures may prevent universities from effectively addressing disruptions caused by technology or other factors. In our role as university teachers, we perceived a lack of critical reflection on the part of some university actors in the light of the shift to digital education due to the COVID-19. There has been little deliberate analysis of the situation and few collaborative efforts to design effective (educational) processes, task fulfillment, and technology use. This lack of reflection has resulted in a situation where the outcome has been "somehow" successful but not as a result of a planned process that takes into account all relevant perspectives. Furthermore, while there has been some recognition of the potential and pitfalls of

digital education, there has not been a thorough and honest discussion between students, teachers, and administrative bodies about how to address these issues (in the future). As a result, there is a need for more deliberate and collaborative efforts to reflect on the knowledge-related challenges – cognitive and behavioral – and opportunities of digital education to design effective strategies that meet the needs of all university actors.

This exemplary reflection of universities' COVID-19 behavior, framed as an unlearning problem, shows that over-focusing on one component of the university system might not be the best advice to mitigate knowledge-related challenges today and in the future.

3 Solution spaces

Three solution spaces can help address unlearning challenges in university education:

Joint sensing: To be able to anticipate changes and trends in the education system, all stakeholders should actively participate in joint sensing [MN17]. This involves sharing perceptions of shifts and trends. Inside the university, it is crucial to listen to each other's perceptions of change and discuss them openly and honestly. Looking outside the university, it can be advantageous to establish a process of constant environmental scanning [Pa96]. In doing so, universities are always aware of changes within the organization and outside. To identify existing structures that block the adaption process, technology can be used as an aid, such as an early warning system. Therefore, we claim that all university actors should engage in joint sensing to better cope with disruptions as they are constantly aware of the utility of their knowledge.

Educational unlearning spaces: Creating educational unlearning spaces is critical to foster experimentation with new knowledge. It involves developing new perspectives, trying out new behaviors, and collectively experiencing and evaluating their effectiveness. Their value has already been proven in different contexts, such as entrepreneurship [CSC11]. Therefore, we think that unlearning spaces for experimentation with new ideas, frames of reference, and behaviors can foster universities' resilience, too. Thereby, all actors can experience the value of new knowledge and the disadvantages of keeping the old knowledge structures in place.

Collaborative, open reflection: All stakeholders should have a safe space to voice their opinions on the disadvantages of existing assumptions, behaviors, and routines. This creates an environment where the advantages of new approaches can be openly reflected and adjustments can be initiated [Ma18]. On the level of teachers, there is already evidence for the utility of collaborative reflection with open minds [Mc20]. Thus, we reckon that if all actors are encouraged to participate in collaborative, open reflection, universities as a whole, as well as their sub-systems, are better equipped to unlearn old knowledge that might act as obstacles in the context of environmental dynamism.

4 Conclusion

Adopting a socio-technical lens, we highlighted the importance of a balance between the human side to enhance educational processes and technology-focused approaches. We presented detailed examples of collaboration between main actors, such as students, teachers, administrators, and technology vendors. In doing so, we exemplified that unlearning – as part of an overall learning process – can support renewing our educational systems by focusing on the knowledge-related tasks of processing new knowledge (e.g., ideas, technology) and discarding outdated knowledge (e.g., beliefs, assumptions, routines). By deliberately unlearning existing cognitive and procedural patterns, new space can be opened up to jointly explore new avenues for learning and teaching in the 21st century as currently unknown demands unfold. Lastly, we provided guardrails for thinking in the form of unlearning-related solutions spaces.

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