Summary: Impacts of Artificial Intelligence on Education

In this modern era, Artificial Intelligence is invading every domain without letting any territory uncharted. Moreover, its presence in education emphasizes its ubiquity. Nevertheless, educational systems are playing an essential role in the construction and evolution of our society thanks to their inherent ability to impart relevant knowledge to learners and concomitantly root fundamental ideas and knowledge necessary to better the life experience. The digitization of education, because of hidden factors, raises principally three concerns:

- **Democratization of Education**. The diversity of the population around the globe unbalance access to high-quality educational content among minorities, notably underserved groups and people with disabilities.
- **Access**, at affordable costs, to exclusive educational program.
- **Addressing of irregularities** including algorithmic biases, model transparency, security and data privacy in the deployment of the AI-based technology to boost the learning experience.

The surge of MOOCs in 2012 brought in a first solution concerning access to high-quality educational programs. The massive learners' adhesion of such a program threatened the educational value. However, the issue around the value remains under control because of the intrinsic lower education value of MOOCs.
Thanks to the aptness of solving complex problems, AI-based technology reveals potential improvements in learners' learning experience with disabilities. On the way of addressing the said issue, several research institutes are funding research programs leading quests towards exploiting AI to make education close to people with disabilities.
Still, the subsequent problems derived from implicit bias are, by and large, open-ended questions. The mere problem of algorithmic bias is an amorphous interrogation; that is, the question's meaning changes over time. Meanwhile, intensive works are conducted in this regard. For example, (Weidinger et al., 2021; Welbl et al., 2021) warm the ethic concerns in language modelling and the potential ways to address them, to only name few.

Positives and Negatives of AI in education

The proposed technology, namely, the use of AI-augmented systems for the improvement of the learning experience of learners, is proposing, with the best of possible, support to educational systems in many ways. A tremendous amount of published works pointed out the potentials of AI to boost education. For example, (Loïc, 2021; Srivastava and Goodman, 2021; Agarwal et al., 2019) investigated the capability of neural networks of generating fluent questions as humans and answering questions in educational settings resulting in application on student examination designing. AI-based learning systems bring huge benefits, including the democratization of assessment by deploying semi- or complete automated systems aiming at producing an evaluation, designing specific learning experiences for people with disabilities.

It is impossible to stay wordless about the potential dangers brought in by such technology. Of course, it is worth reminding the fundamental problem education is currently struggling with and the desiderata. A clear definition is necessary to appraise the added value provided by the newly introduced technology. The main drawbacks are the following. The teacher profession is threatened by the advent of entirely automated learning systems. In the worst case, the substitution of the teacher will yield a domino effect because the machine learns from human experiences, and in such a situation, the humans will learn from machines. Therefore, the complex student-teacher will converge to a stable point where any new knowledge is created. Knowing the learning experience may differ from one zone to another, AI-augmented systems are exposed to biases bore by the data on which the models were trained.

References

Agarwal, A. et al. (2019). "EDUQA: Educational Domain Question Answering System Using Conceptual Network Mapping". In: *ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. DOI: 10.1109/icassp.2019.8683538. URL: http://dx.doi.org/10.1109/ICASSP.2019.8683538.

Loïc, Kwate Dassi (2021). *Semantic-Based Self-Critical Training For Question Generation*. arXiv: 2108.12026 [cs.CL].

Srivastava, Megha and Noah Goodman (2021). *Question Generation for Adaptive Education*. arXiv: 2106.04262 [cs.CL].

Weidinger, Laura et al. (2021). *Ethical and social risks of harm from Language Models*. arXiv: 2112.04359 [cs.CL].

Welbl, Johannes et al. (2021). *Challenges in Detoxifying Language Models*. arXiv: 2109.07445 [cs.CL].