A Survey of Opportunities and Risks of AI Systems in Education

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1 Introduction

Artificial Intelligence (AI) systems have made significant inroads into the education landscape, promising enhanced learning experiences, improved efficiency, and personalized educational pathways. As the deployment and research of AI technologies in education continues to gather momentum, it is essential to acknowledge that the impact of these systems extends far beyond their immediate advantages and drawbacks [1]. Engaging in a meaningful and informed discourse about AI in education is imperative to ensure the fair and responsible implementation and development of AI systems in an education setting. In addition, a survey of the Pew Research Center revealed, that a growing share of people are concerned about the development and deployment of AI systems. This includes the fear of potential job loss, privacy concerns and the loss of human connection [2]. In this work, Opportunities and Risks are shown based on current state-of-the-art AI systems while addressing, widespread concerns, as well as showing potential problems which should be addressed in the current rapid development of such systems.

2 Approach

In this work, the Opportunities and Risks of AI systems in Education will be discussed in two focus topics:

1. Teaching

2. Assistive Technologies

First, the current state of adoption of AI systems in these categories are laid out. Then, the opportunities of such systems are presented based on real world examples and their future potential. Then, the risks of AI systems and current research in the context of education is discussed, and possible solutions are presented.

3 The current state of AI and Technology in Education

In this section, the current state of AI and Technology is presented. First, the current technologies used in Teaching are laid out. Then, the assistive technologies deployed at schools are presented.

3.1 Current Technologies in Teaching

Quantifying the actual usage of technological advances in teaching is hard, as it is very subjective to the teacher, as well as the teaching environment. Since 2013, the International Association for the Evaluation of Educational Achievement (IEA) conducts the International Computer and Information Literacy Study in a cycle of 5 years. This study has been designed to capture the current state of how well students and teachers a like are prepared for study, work and life in a increasingly digital world [3]. Its latest evaluation cycle has been conducted in 2018 with the next one starting in 2023. The study, as well as a German counterpart, showed, that the availability of Technology and digital devices vary greatly between schools, students and teachers [4]. In 2018, most teachers and students didn't have their own portable device for school usage. These circumstances got better over the course of the pandemic. However, still around 60% of teachers claim to not have access to their own portable digital device for teaching [4], with 30% of schools not providing Wireless internet access to teachers or students. This goes inline with the usage numbers for Information and Communication Technology (ICT) during lessons, only 43% of teachers use word processing or presentation software programs, with 32% using digital content to supplement school materials [3]. Besides availability, most teachers claim, that missing confidence in the usage of digital devices and tools is one of the main reasons for the missing integration of ICTs. This applies especially for the usage of learning management systems or Education cloud software such as Moodle or ILIAS [3]. As a result, the usage of such systems remains very sparse for in presence lectures. An exception is given, for gamification software, e.g. Quizlet or Kahoot, as 60% of schools report frequent use and good availability [3]. Because of these circumstances, it comes at no surprise, that the use of photocopiers, paper and overhead projectors are still the most used technologies in teaching [5].

3.2 Current Assistive Technologies

4 Opportunities

4.1 Teaching

4.2 Assistive Technologies

5 Risks and Obstacles

5.1 Teaching

5.2 Assistive Technologies

6 Conclusion

7 References

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