A Virtual Reality Journey to the University of the Future: What Kind of Impact Could Artificial Intelligence and Learning Analytics Have on Universities?

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Abstract

The use of artificial intelligence (AI) and learning analytics (LA) in Higher Education (HE) has become a widely discussed topic with continued high relevance in Germany. AI-supported learning will become more important in the organization and teaching in HE [1]. Questions concerning the participation of students in this development as well as the elaboration of ethical guidelines received little attention in the discourse [2]. In this article, we address the problem of inadequate participation from students in the discussion of using AI in universities. As a solution we present a virtual reality (VR) environment, in which possible scenarios of future AI university developments are given. The VR-environment shows different exemplary scenarios in which AI could be used in HE and asks students and professors for an evaluation for each scenario. Students and professors deal with the topic of AI-based learning in HE through the insight of VR and can evaluate the AI scenarios. The results of the evaluation provide information about which forms of AI are ethically acceptable for students. Based on this information we will design an ethical guideline for using AI at universities.

Keywords: future scenario, artificial intelligence, learning analytics, higher education, ethical guideline, technology-supported learning, participation

1 Introduction

AI is becoming a highly important field for the development of HE [2]. In Germany, especially the analysis and prognostic of LA, the support of individual learning opportunities and the development of machine learning tools are trendsetting [3]. The focus of LA programs is primarily to identify potential dropouts in advance and the related goal of significantly increasing the success of studies in HE [1]. While countries such as Australia or the USA have been carrying out LA projects at universities for years [1], Germany is just beginning to introduce LA and AI-supported learning in HE [4].

The main reasons for the current reluctance of using AI in Germany are both uncertainties in data protection and ethical concerns. These relate primarily to the indispensability of human judgement in the HE context and the risk of discrimination, irresponsibility, and lack of transparency through AI and LA [1, 2].

Another problem with using AI, according to a study by the *Institute of Internet and Democracy* in Düsseldorf, is that the opinions of students on technology-improved learning are not examined [2]. The survey of the study shows that students of the University of Düsseldorf are strongly dependent on the AI's user area. Accordingly, AI applications in university administration are considered less critical, while AI applications that are directly related to the students and their performance, are rated as critical. Most

of the survey participants reject dropout detection systems that use AI and LA to identify potential dropouts in advance [2]. This shows a large discrepancy between the HE policy desire to reduce the dropout rate through AI-supported learning and the student opinion on how AI should be used in HE.

This situation is the starting point of our article, in which we discuss how the opinions of students and lecturers can be considered in the debate on AI-supported learning in HE. The aim of our research project is to demonstrate students and professors' possible future scenarios of AI-supported learning in a VR-environment. After each scenario, students and professors are invited to write down their statements on the scenario in a text field within the VR-environment and to participate in a survey about the scenario.

The qualitative and quantitative elements of empirical social research make it possible to clarify what kind of AI-supported learning is desired by students and teachers in the HE context. On this basis, an ethical guideline will be developed, which will provide an orientation for the acceptance of students and professors regarding future AI projects in HE. Through our research project, both students and professors are inspired to think about technology-supported developments in HE and can influence the development of AI in HE.

Our research project is divided into four parts: 1. the elaboration of possible future scenarios and questionnaires, 2. the implementation of future scenarios and surveys in a VR-environment, 3. the testing and using of the VR-environment, 4. the evaluation of the data and the development of ethical guidelines for AI-supported learning in HE.
In this article we will focus on the first part of our project and give you a brief overview of possible AI-based future scenarios.

2. Method of Scenario-Technique

Based on a systematic review [5] and the analysis of various national and international AI tools and programs in the economic as well as in HE sectors, we lay the foundation for diverse future scenarios. Because this analysis is not yet completed, the full results cannot be presented at this point. Instead, we will give you two examples of AI-based future scenarios of the university. On the one hand, these are created on the KPMG study, which presents general future scenarios regarding AI possibilities [6]. The study was conducted in cooperation with KPMG, an international network of firms for auditing and management consultancy, and TRENDONE, a leading European micro-trend research institute, to identify trends and future AI developments in economy and society. In the study, four different AI future scenarios were developed on the indicator's grounds: trust or distrust, and regulation or autonomy. The scenarios address different perspectives such as the perspective of society, the state, or the economy. Our created scenarios based on this perspective and therefore focus on the following actors and aspects: Students, lecturers, HE policy, and overall situation. In the project elaboration following this paper, these perspectives will be further developed and differentiated, as appropriate [6].

In addition to the KMPG study, we have modelled the following example scenarios on already existing AI-supported projects in the university context.

Scenario 1: The University-Utopia of AI

The following scenario is characterized by the KMPG indicator's high trust in AI and high regulation of AI [6]. It is based on various AI projects such as the OPTES joint project [7], the AI Campus [8] and the Pepper-robot from the H.E.A.R.T. program at the University of Marburg [9].

Students: In this future scenario, students receive additional support through AI-based applications. Using LA, students are given individual tasks that adapted to their performance and knowledge. Because of the many individual and digital offers, students can study from anywhere and at any time of the day. Lecturers: Professors benefit greatly from the use of AI. With the support of robots and chatbots, questions from students regarding administrative processes can be answered quickly and do not cost the professors any time. Using various AI-tools, lecturers can send tasks, such as checking exams, to the AI applications. This gives them more time for their own research and for students who require intensive supervision. HE policy: The application of AI in universities and HE institutions solve political challenges, such as the dropout rate of the STEM disciplines, increasing student numbers or student diversity. Overall situation: The various universities' actors and HE institutes are satisfied with the AI applications. Many problems have been solved by the AI and studying and teaching corresponds again to the Humboldtian ideal.

Scenario 2: Welcome to Orwell's World

The second scenario describes a future characterized by the indicator's autonomy of AI and mistrust of the actors in AI [6]. As a basis for this scenario, we have oriented ourselves towards various LA programs that are characterized by supervising AI elements, such as the Course Signals program from Purdue University [10]. At the same time, we have been guided by the monitoring policy in Chinese schools [11]. To clarify: we do not insinuate a negative impact on the signal program in general and only use it as a source of interpretation.

Students: Students are under increasing pressure from the AI application in HE, they are under constant control and have lost many rights regarding their privacy due to poor data protection regulations. AI's evaluations regarding admission procedures, exams and homework are not transparent and cannot be fully understood by professors or developers. Certain groups of people have been classified as fundamentally unfit to study based on AI algorithms and have no possibility to start studying at all. Efficiency and a fast degree are the focus of the study. Lecturers: Lecturers are monitored by the AI and must justify themselves if their courses are not sufficiently attended or if students get poor grades. This situation leads to professors trying to give as much teaching content as possible to the AI applications and their withdrawal from teaching. The exchange between students and professors is becoming increasingly limited. HE policy: Although many challenges in HE policy have been solved by the AI; many other problems arose. Less young people decide to study at university because it seems too controlled and not adequate for their maturity as opposed to pupils at school. For the same reasons, there are also decreasing numbers of graduates who are interested in a career at university or college. Overall situation: The way of studying and teaching has changed greatly through the AI. The idea of efficiency in AI leads to discrimination and the loss of an educational ideal.

3 Conclusion

The briefly outlined scenarios are further specified in the research project and form the basis for next steps. The technical core of the project is the creation of VR videos, which will enable students and professors to experience the scenarios in a visual way.

This kind of dealing with the AI-topic strengthens the power of imagination within the viewers and allows them to get more deeply involved in the scenarios. In the upcoming

survey, the participants reflect and judge the different scenarios and form their own opinion about the different types of AI-supported learning.

To be successful in HE with AI-supported learning, it is essential that students and lecturers can accept and participate in this way of technology-sponsored learning and working. The elaboration of future scenarios outlined in the article is a way to reflect on AI in HE and to hear the opinions of students and professors on this topic. Only through this kind of debate and AI participation, it will be possible to implement technology-enhanced learning.

With our project we would like to improve the discussion and participation possibilities of students and lecturers about AI in HE by researching the opinions of students and lecturers on AI-supported learning and by creating ethical guideline.

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