Introduction

Digital Opportunities and Challenges in Education

The use of artificial intelligence (AI) in educational environments is becoming increasingly common. This is a change that can improve the teaching and learning process, but the use of AI also raises a number of new issues and challenges. This book aims to provide in-service teachers, teacher students, librarians, and anyone interested in education with the knowledge and understanding needed to use AI in education critically, constructively, effectively, and responsibly. In literature, AI is often portrayed in imaginative ways, with robots threatening to take over the world. In this book, AI is instead handled on the basis of what exists today and how we can and should relate to AI technology to make teaching as good as possible for students. AI in school is not an imaginative future but a near and tangible reality affecting our everyday lives. The book aims to highlight what we know from research on teaching and learning in digital environments, focusing in particular on one of the most significant and controversial technologies taking shape in schools today: AI.

ChatGPT has made it clear that education faces exciting new opportunities and complex challenges. Although fantastic tools exist for creating texts, images, and videos (generative AI), AI is not primarily abstract or mysterious. They are technical systems that work based on concrete data. This data is managed according to principles (algorithms) written by ordinary people. AI exists and functions as part of our society, and AI affects and is affected by both social and individual relationships. We can think of AI not only as technically complex systems – even their creators cannot fully understand – but also as systems shaped by human values, norms, and interactions.

In an increasingly technology-influenced school, it is essential to remember that technology enhances some aspects of reality while reducing others.[1] For example, technology can be thought of as a magnifying glass. When you look through a magnifying glass, some parts of what you are looking at are much clearer and larger, while other parts around you are blurred. Similarly, technology can "enhance" or make some things clearer and more prominent, while at the

[1] Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design* (University Park, PA: Penn State Press, 2005).

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same time "reduce" or make other things less visible. Let's take an example from the classroom. Using a computer to write your notes can help you write faster (this is the amplification). At the same time, it may be more difficult to remember what you wrote compared to writing by hand because you are distracted by other things on the computer (this is the reduction). Therefore, when we use technology, whether it is a computer, a smartphone, or something else, it is vital to think about what the technology makes clearer and better for us and what it makes less clear or more difficult. This helps us understand how we can best use the technology and be aware of the things we might miss or lose along the way. In this book, this is an important dimension. By understanding what is amplified and reduced when AI is part of education, we can make informed choices to equip students in different ways for a future where AI is both a resource and a challenge.

Understanding AI as part of the school is very important because the technology is not used in a vacuum but interacts with and is influenced by a range of social factors. As teachers and educators, we need to understand not only how the technology works but also how it fits into and influences the wider society and culture of which the school is a part. In schools, there are important norms and values that may, for example, clash with the values of the programmers, companies, and culture in the creation of AI systems. This can mean that AI in schools can adopt or reinforce certain educational philosophies, cultural norms, or even prejudices and stereotypes. For example, what is a friend, according to Facebook programmers, and what does friendship mean for schoolchildren? What view of knowledge does MyAI on Snapchat convey when students ask tricky questions about World War II? Is it possible that the creators of the systems are particularly positive about how good the systems are and how easy they are to use?

AI does not only interact with students and teachers as isolated individuals but as part of a broader social context. How students and teachers respond to and use AI is influenced by their previous experiences, their socioeconomic background, their relationships with each other, and many other factors. This complex web of relationships shapes how AI is perceived and used in schools. Who benefits from more and more digital tools in schools? When and how might the class and individual need digital support, and when is it better not to use the technology? Simply providing the classroom with more digital resources has proved unfruitful in previous research.

It is also essential to reflect on how the school is a dynamic and complex environment. Teachers may find unexpected ways to use AI, and students may react to AI in unexpected ways. What works in one classroom or for one group of students may not work for another. This requires understanding the ongoing change and flexibility at the heart of human societies and technological systems. At the same time, there is a growing body of knowledge on how teaching and technology can interact in education. There is a great

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deal of research on how teaching in general and subject-specifically can help students to learn better what is new and difficult. The research (which will be discussed in more detail later) suggests that various digital tools – often built with a dash of AI – can help students memorize facts. However, other knowledge, skills, and attitudes may require different approaches to teaching, where interpersonal relationships are important for students to understand and develop. As a teacher, digital competence means knowing when and how AI systems can help students learn new, challenging, and important things. It is equally important to understand when they impede learning, in which case they should not be used. In teaching, it is, of course, a balancing act where the teacher can choose to switch between different degrees of technology in the classroom depending on the goal of the teaching.

A fundamental difference between humans and AI is that there is no common sense or moral compass in AI systems. It is important to consider issues of ethics and democracy that AI systems are not able to address. Directly related to the development and use of AI are questions such as, who decides how and why AI is used? How do we balance the need for efficiency and personalized information with issues of privacy, fairness, and human dignity? These questions cannot be answered by technological solutions alone; they require an understanding of the school as part of a democratic society with ethical values.

Reflecting on these crucial issues in critical and constructive ways in the school world helps us understand AI and that its opportunities and risks depend not only on the technology itself but on how it interacts with the complex, dynamic, and value-laden human contexts in which the systems are used.

AI systems today offer support that can improve learning and efficiency, but their use can also become a barrier and have unforeseen consequences. AI solutions have been created for other activities that can be adapted and applied in schools. At the same time, AI can become a problem in schools if the systems are based on flawed data, have been created in the wrong context, or if the creators of AI solutions lack an understanding of teaching and learning. Since AI systems are based on measurable data, mathematics, and statistics, there are important limitations in their understanding of human relationships. While AI can use social media data to entice people to click more or stay longer than planned in front of the screen, it is not empathetic in the way that people with lived experience are. This is not least because the neural networks in AI systems are not connected to an emotional center, as human neural networks are.

Measures against the misuse of AI include careful sourcing, discussion, and inclusion of users, knowledge of the subject and the data on which the AI system is based, transparency in development, practical testing, rigorous evaluation, democratic design processes, and enhanced critical thinking. By following these principles, we can work toward a constructive use of AI in schools that supports teachers and students.

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