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## Further Training in Industry 4.0 with AI Tutoring Systems *State of Technology*

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The rapid development of artificial intelligence (AI) is constantly opening up new opportunities, particularly in factory training. For employees, this not only means a significant advantage in the actual manufacturing process, but also in the field of continuing education. This paper provides an overview of AI tutoring systems continuing education in the context of Industry 4.0 by presenting a categorization that discusses different approaches of AI tutoring systems by learning methods, application areas and their respective technologies. In addition, an outlook on the disruptive effect of generative AI on AI tutoring systems in Industry 4.0 is given.

The commercialization of generative artificial intelligence (generative AI) through systems such as OpenAI's ChatGPT has introduced a new generation of AI for use in all areas of life, but also in industry [1, 2].

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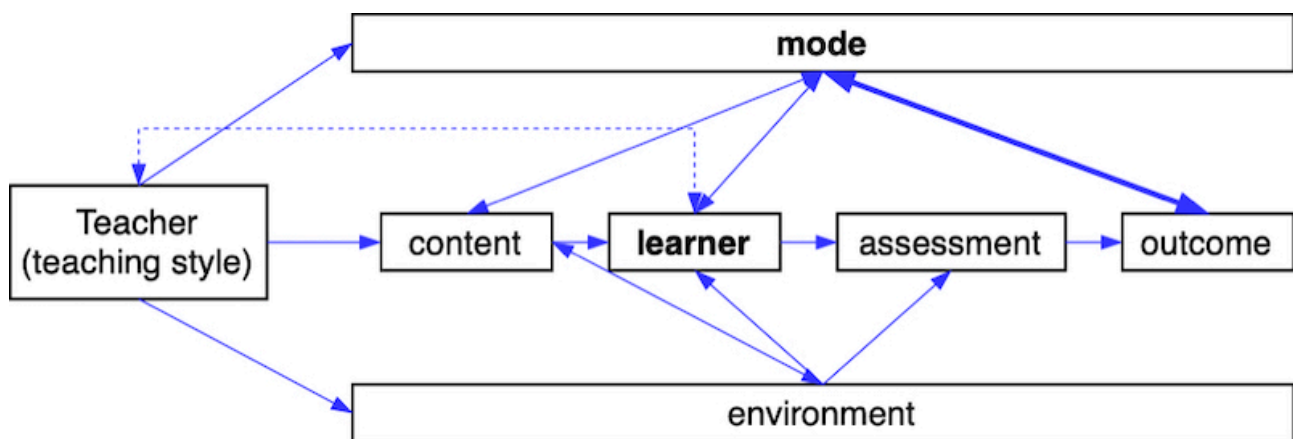


Figure 1: Teaching and learning in the digital environment—model of the components and their interdependencies.

## Categorization of Artificial Intelligence Tutoring Systems

Artificial Intelligence Tutoring Systems (AITS) in Industry 4.0 can be differentiated using various perspectives (**Fig. 1**). On one hand, AITS can be distinguished in terms of the addressed learning approaches [19]. On the other hand, and as **Figure 1** also illustrates, a classification in application, especially regarding company organization, might be beneficial [14, 20].

### Learning approaches

One of the most important tasks of AITS is conveying learning content or supporting both teachers and learners in this process. Various learning approaches or methods can be used in education and training.

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*This contribution was made possible thanks to the ....*

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*Keywords:*

intelligent tutoring systems, ITS, Education 4.0, artificial intelligence, Industry 4.0, adaptive learning, personalized learning

**Teaser**

The commercialization of generative artificial intelligence (AI) through systems such as ChatGPT has ushered in a new era of Industry 4.0. The automatic creation of new content with generative AI is particularly important for the development of AI-based tutoring systems (AITS) that promote digital learning in the context of Education 4.0. However, these systems must first be categorized according to learning methods and their areas of application before they can be successfully implemented.