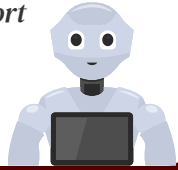


# AI and Data Use Examples in Education

## *Ethical Guidelines on the use of Artificial Intelligence*

- *The use of AI systems in classrooms across Europe is growing and AI is being used in different ways to support teaching, learning and assessment practices.*



AI has great potential to enhance teaching and learning practices and help schools improve the way they are organized and how they operate. However, evidence-based research on the impact of AI in education is still limited so it is important to maintain a critical and supervised attitude.

Sometimes, AI systems can be used in different ways to support teaching or facilitate learning. When we talk about the types of AI systems that are used for teaching, learning, assessment and school administration, a common distinction is made between “**student-facing**,” “**teacher-facing**,” and “**system-facing**” AI systems.

### *Student Teaching*

Using AI to teach students



- **Intelligent tutoring system**

The learner follows a step-by-step sequence of tasks and gets individualized instruction or feedback without requiring intervention from the teacher.

- **Dialogue-based tutoring systems**

The learner follows a step-by-step sequence of tasks through conversation in natural language. More advanced systems can automatically adapt to the level of engagement to keep the learner motivated and on task.

- **Language learning applications**

AI-based learning apps are used in formal and non-formal education contexts. They support learning by providing access to language courses, dictionaries and provide real-time automated feedback on pronunciation, comprehension and fluency.

### *Student Supporting*

Using AI to support student learning



- **Exploratory learning environments**

Learners are offered multiple representations that help them identify their own routes to achieving the learning goals.

- **Formative writing assessment**

Learners are provided with regular automatic feedback on their writing/assignments.

- **AI-supported collaborative learning**

Data on each learner's work style and past performance is used to divide them into groups with the same ability levels or suitable mix of abilities and talents. AI systems provide inputs/suggestions on how a group is working together by monitoring the level of interaction between group members.

# System Supporting

AI to support diagnostic or system-wide planning

- **Educational data mining for resource allocation**

Schools gather student data which are analysed and used to plan how available resources can be best allocated for tasks like creating class groupings, assigning teachers, timetabling, and highlighting students who may require additional learning support.

- **Diagnosing learning difficulties**

Using learning analytics, cognitive skills such as vocabulary, listening, spatial reasoning, problem-solving, and memory are measured and used to diagnose learning difficulties, including underlying issues that are hard for a teacher to pick up but might be detected early using AI systems.

- **Guidance services**

AI based guidance services provide ongoing prompts or choice to create pathways for future education. Users can form a competence profile including previous education and include their own interests. From this data, combined with up-to-date course catalogue or study opportunity information, relevant study recommendations can be created using natural language processing.

# Teacher Supporting

Using AI to support the teacher

- **Summative writing assessment, essay scoring**

AI is used to evaluate and grade learners' written work automatically. AI and machine learning techniques identify features such as word usage, grammar and sentence structure to grade and provide feedback.

- **Student forum monitoring**

Key words in student forum posts trigger automatic feedback. Discussion analytics provide insights to students' forum activity and can highlight students who may need help or are not participating as expected.

- **AI teaching assistants**

AI agents or chatbots provide answers to commonly asked questions by learners with simple instruction and directions. Over time, the AI system is able to broaden the range of answers and options provided.

- **Pedagogical resource recommendation**

AI recommendation engines are used to recommend specific learning activities or resources based on each student's preferences, progress and needs.

