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# **Artificial Intelligence in Education: Enhancing Teaching and Learning**

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# Agenda





AI Tools Supporting Education



AI Tools Supporting Research Projects and Writing Thesis



Advantages and Disadvantages of Using AI in Education





# Introduction

Artificial Intelligence (AI) is revolutionizing the field of education by providing innovative solutions to longstanding challenges. This seminar will explore the latest advancements in AI applications designed to enhance teaching methodologies and personalize learning experiences. The aim is to present AI-driven tools that improve the quality of education by adapting to individual student needs, facilitating efficient grading and feedback, and enabling interactive learning environments.



# Introduction: The AI Revolution in Education

Al is not just a technological advancement; it's a revolution that is changing the core of educational practices. Al is enabling a shift from traditional, one-size-fits-all models to more tailored educational experiences.

Personalized Learning: Aldriven systems can analyze student data to create customized learning plans, ensuring that every student progresses at their own pace.

Intelligent Tutoring Systems: These systems provide instant feedback and support, simulating the role of a teacher in a one-on-one setting. Administrative Efficiency: Al automates administrative tasks, allowing educators to focus more on teaching and less on paperwork.

# Introduction: Transforming Teaching Practices

Al is enhancing the role of teachers, not replacing it. By automating routine tasks and providing new tools for engagement, teachers can focus more on creative and critical aspects of teaching.



Automated Grading: AI systems can grade assignments and tests, giving teachers more time for lesson planning and student interaction.



**Enhanced Student Engagement:** AI-powered tools like virtual reality and gamified learning experiences make education more engaging and effective.



**Professional Development:** Al also supports teachers in their professional growth by providing insights into student performance and suggesting targeted interventions.

# Introduction: Advancing Learning Experiences

For students, AI provides a more interactive and adaptive learning environment, catering to different learning styles and needs.



Adaptive Learning Platforms: These platforms adjust content based on student performance in real-time, providing a dynamic and personalized learning journey.



**Virtual Classrooms:** AI facilitates virtual classrooms, where students can engage with peers and teachers worldwide, breaking geographical barriers.



**Lifelong Learning:** Al supports lifelong learning by offering resources and courses that evolve with a learner's career and interests.

# Al tools supporting education



Textbook

ChatGPT, GPTZero, Wolfram Alpha, Knewton, Cognii, Quizlet, ALEKS, Piazza, Synthesia, Socratic, Quillbot, MathGPT Pro, IBM Watson Assistant, Brainly, Education CoPilot, Ditch That

# **ChatGPT**



- •
- $\bullet$
- Helps with exam preparation  ${\color{black}\bullet}$
- $\bullet$
- Provides support for teachers  $\bullet$
- Offers 24/7 access to knowledge ullet

https://openai.com

Supports learning and homework Assists in learning foreign languages Encourages creativity and writing skills

# **GPTZero**

A tool for detecting Al-generated text, allowing users to evaluate whether the content was created by humans or machines.

https://gptzero.me/

It is worth noting that the tool should not be used to penalize students, as there are cases where texts written by AI may be classified as human-written and vice versa.



# **Wolfram Alpha**

- Solving complex mathematical problems
- Visualizations and graphics lacksquare
- Access to a broad range of general knowledge lacksquareStatistical analysis and scientific calculations  $\bullet$ lacksquare
- Interactive experiments



A useful tool in the sciences and technical fields.

<u>https://www.wolframalpha.com</u>



# Knewton

Knewton: A platform that provides personalized learning paths through adaptive learning algorithms that adjust materials and tests to the needs of individual students.

- Personalized learning path  $\bullet$
- **Development of educational materials**  ${\color{black}\bullet}$
- Analysis of learning outcomes  ${\color{black}\bullet}$
- Optimization of time and resources

https://www.wiley.com/en-us/education/alta





# Cognii

An educational virtual assistant that provides personalized tutorials and feedback on students' responses. Interactive responses: Cognii uses NLP (Natural Language Processing) technology to understand and assess students' open-ended answers.

- Personalized learning
- Educational analytics
- Preparation of educational materials

https://www.cognii.com



# Quizlet



A learning and revision tool that uses AI to tailor educational materials and learning techniques to the individual needs of the user:

- Creating study flashcards •
- **Educational games**  $\bullet$
- Tests and practice exercises  $\bullet$
- Language learning
- Personalized learning  $\bullet$
- Mobile learning  $\bullet$

## https://quizlet.com/gb



# ALEKS



ALEKS (Assessment and LEarning in Knowledge Spaces): An educational system that uses AI to map a student's knowledge and provide individually tailored educational tasks.

- Knowledge level assessment  $\bullet$
- Individual learning path  $\bullet$
- Interactive tasks
- Progress monitoring
  - https://www.aleks.com/



# Piazza



## A collaboration platform that uses AI to organize discussions:

- Discussions
- Real-time questions and answers lacksquare
- Collaboration
- Anonymity lacksquare
- Progress tracking
- **Educational resources**
- Statistics and data
  - https://piazza.com



# **Synthesia**

An application that allows the creation of studio-quality videos with AI avatars and narrators in over 130 languages.

- Enhanced engagement ullet
- Multilingual accessibility ullet
  - https://www.synthesia.io/



Creation of personalized educational materials



# Socratic



It is an AI tool that supports learning and homework across various subjects such as mathematics, natural sciences, literature, and social sciences. It offers visual explanations of key concepts and uses Google AI's text and speech recognition technology.

- Homework assistance
- Group learning
- Test preparation
  - <u>https://socratic.org/</u>



# Quillbot Paraphraser



- different words or phrases.
- https://quillbot.com/

• A paraphrasing tool that uses the latest algorithms to help teachers save time when creating educational materials, worksheets, and assessments. Teachers can easily input a sentence or paragraph into the tool, and it quickly generates various alternative versions of the sentences, retaining the original meaning while using



# MathGPT Pro

An AI tool for solving mathematical problems. It allows users to upload images and receive immediate, detailed solutions. It can solve word problems, write explanations, and provide quick answers.

https://www.mathgptpro.com/login





# **IBM Watson**



It is a virtual assistant that can answer students' questions, provide explanations, and offer support on almost any topic. In the classroom, it can be used to answer questions in real-time. This useful tool can assist with student research projects—encourage your class to interact with the virtual assistant to refine research goals, streamline searches, and receive real-time feedback

<u>https://www.ibm.com/watson</u>



# Brainly

An AI-based tool for education that includes a chatbot component. It allows students to ask academic questions and receive answers from a community of students and experts in the field. The chatbot can provide real-time assistance and support with homework, explanations, and problem-solving.

<u>https://brainly.com/</u>





# Education CoPilot





<u>https://app.educationcopilot.com/</u>

An AI platform that supports teachers in quickly generating ideas for tasks, educational support materials, and other teaching resources. It also offers over 10 different tools to facilitate lesson preparation, all aimed



# **Ditch That Textbook**

• 30 tools for use in education

<u>https://ditchthattextbook.com/</u>





## Examples: writing, creating, and editing text content



### **Automatic Abstracts**

Automatic generation of summaries for scientific articles, reports, and books, making it easier for academic teachers to select materials for lectures and seminars, thereby increasing the efficiency of class preparation.



### **Lesson Outlines**

Generating lesson outlines considering different topics and student skill levels, allowing for more effective planning and use of class time.



### **Personalization of Educational Materials**

Developing materials tailored to the individual needs of students, increasing their engagement and understanding of the subject matter. Adapting the content of educational materials for both group work and individual study.

# Examples: writing, creating, and editing text content



### **Exam Questions and Other Exercises**

Generating exam questions based on lecture materials.

Creating quizzes to assess the level of knowledge acquisition

Personalizing tests and quizzes by adapting them to students' proficiency levels.



### Speech-to-Text and Text-to-Speech Conversion

Converting speech to text and text to speech, facilitating the creation of materials and their adaptation to various educational formats.



### **Translations**

Automatic translation of content into different languages, allowing for international use of prepared educational materials

## **Examples: Visualization and multimedia**

### **Image Generation**

 Preparation of advanced multimedia presentations, visualizations of concepts, and infographics that help in understanding complex content.

## **Video Generation**

learning process.

• Creation of instructional and educational videos that enrich teaching materials with dynamic video content, supporting the

## **Examples: Evaluation and correction**

Formulating Evaluation Criteria

Automatic grading of short answers.

Automatic analysis of student work to identify grammatical and stylistic errors, as well as evaluate the structure and logic of the argumentation.

Automatic Evaluation of Student Work Defining evaluation criteria—developing clear and measurable criteria to increase the objectivity and transparency of the assessment process.

## **Examples: Communication**

## **Email Correspondence**

• Supporting the process of creating and editing email correspondence by personalizing messages and speeding up communication with large groups of students.



## **FAQ and Automatic Responses**

information

 Generating frequently asked questions and answers to make it easier for students to obtain the necessary

## **Examples: Inspiration and creativity**

## **Creative Thinking**

• Generating ideas for new topics to be covered in class, concepts, etc., which can serve as a starting point for discussion.

## **Developing Critical Thinking Skills**

- Automatically generating questions that require students to analyze, synthesize, and evaluate information.
- Simulating different perspectives and viewpoints on a given topic, encouraging deeper analysis and discussion.
- Creating various scenarios and case studies that require students to apply critical thinking, deeper analysis, and discussion. Analyzing arguments by identifying their strengths and weaknesses.

# Al in Research Projects and Writing Thesis

Al is transforming research by accelerating the pace of discovery and opening new avenues for inquiry.



**Data Analysis:** AI can process and analyze vast amounts of data quickly, uncovering patterns and insights that would be impossible for humans to detect.



**Predictive Analytics:** AI algorithms can predict outcomes and trends, aiding researchers in hypothesis testing and experimental design.



**Interdisciplinary Collaboration:** AI fosters collaboration across disciplines by providing tools that are accessible to non-experts, broadening the scope of research.

# Al tools that can support research projects and writing thesis

- Huma Conse
- Scite.
- Gram
- Deep
- Write
- Ideafl
- Scribb

# Chat GPT



- Literature Review
- **Hypothesis Generation**
- **Inspiration and Creative Thinking** lacksquare
- Language Support for Non-English-Speaking Researchers It is important to remember, however, that ChatGPT does not replace the thorough analysis and critical thinking required in scientific research. It should be used as a supportive tool, not as the main source of knowledge or the sole method of analysis.

https://openai.com



# Humata

- tool that uses artificial intelligence to analyze documents, allowing users to quickly obtain answers, summaries, and insights from their documents and files
- https://www.humata.ai/



## (⟨>) Humata

# Consensus

- It enables quick finding of answers to scientific questions, conducting literature reviews, and searching for scientific evidence to support arguments. Consensus differs from ChatGPT in that it focuses on searching and summarizing peer-reviewed scientific research rather than generating conversational content.
- https://consensus.app/search/





# Scite.ai

• Scite AI Assistant supports the research process by generating answers based on reliable studies. It allows users to ask questions in plain language and receive responses backed by current, real-world references. It can be used to conduct more thorough literature reviews, find support for scientific claims, or generate questions for discussion and research.



https://scite.ai/



# Grammarly

• A tool for improving spelling and grammar that helps in

https://www.grammarly.com



editing and ensuring that the text is clear and error-free.



# DeepL

- A translator that can help in translating scientific articles or abstracts into other languages with very high accuracy.
- <u>https://www.deepl.com/en/translator</u>





# Writefull

• A tool that uses natural language processing and AI to assess writing quality and suggest improvements.

https://www.writefull.com





# Ideaflip

- A platform for mind mapping and brainstorming that helps in organizing ideas and planning the structure of an article.
- https://ideaflip.com





# **Scribbr**

An AI tool supporting the editing and proofreading of scientific papers, which also offers tools for generating citations and checking for plagiarism.

https://www.scribbr.com





# **Tools for managing bibliography**

- EndNote: Allows users to collect, organize, and cite publications in various styles.
- Zotero: Zotero is a free tool for managing bibliographies, which enables the collection, organization, and sharing of publications along with generating bibliographies.
- Mendeley: Mendeley combines bibliographic management with social networking features, allowing researchers to collaborate, share, and discover new publications.
- RefWorks: Facilitates the collection, organization, and citation of literature sources with ease.
- Cite This For Me: Enables generating bibliographies according to various citation styles.
- **BibTeX**: A tool for managing bibliographies.
- EasyBib: An online tool for creating bibliographies and citations, which allows for the automatic generation of correct sources for various types of publications.
- Qiqqa: A tool for managing academic literature, offering text analysis, organization features, and bibliography generation.
- **BibSonomy**: A social platform for scientists that enables the collection, sharing, and citation of publications interactively.
- Papers: A tool for managing bibliographies and organizing publications, offering features for synchronization across devices and browsing full-text articles.
- **Typeset**: A platform for formatting and publishing scientific articles according to the requirements of specific journals.

# Advantages of using AI in education

### **Personalization of**

**learning:** AI can tailor educational materials to the individual needs of learners.

## Automation: AI tools can automate time-consuming processes such as grading or data management.

### Support in writing and

research: Al assists in literature review, text editing, as well as generating hypotheses and research models.

### Advanced data analysis: Al

can analyze large datasets much faster than humans, uncovering patterns and correlations that may be missed by researchers. Resource accessibility: Al can provide students with access to advanced educational resources and research regardless of their geographical location.

Interactivity: AI tools can enhance student engagement through interactive and engaging educational platforms.

# **Disadvantages of using AI in education**



especially in the context of student evaluation and advancement.

## **Ethical Considerations**

With the rise of Al in education and research, it's crucial to consider the ethical implications.

Bias in AI: How do we ensure that AI systems are free from bias and represent diverse perspectives?

**Data Privacy:** Protecting the privacy of students and researchers is paramount in Al-driven environments.

Al's Role: Should Al be a tool or a decision-maker in educational and research contexts? What are the limits?

## Conclusion

Using AI in education requires a balanced approach that leverages the potential of this technology while consciously managing its limitations and challenges. AI has the power to transform education in ways we are just beginning to understand. By embracing these technologies, while remaining mindful of their implications, we can create a future where education is more personalized, research is more efficient, and knowledge is more accessible to all.

## **Future Outlook**

The future of Al in education and research is bright, with the potential to revolutionize these fields further. However, we must approach this future with caution, ensuring that AI enhances, rather than hinders, human potential.

**Continuous Innovation:** How ongoing AI innovations will further personalize learning and expand research capabilities.

**Collaboration:** The importance of collaboration between educators, researchers, and technologists to guide Al's development.

**Preparing for Change:** How institutions can prepare for the inevitable changes AI will bring to the educational landscape.

# **Future Outlook (Chat GPT)**

## **2024-2025: Expanded Use of Automated Grading**

- **Current Trend**: AI tools like Grammarly and GPTZero are widely used for grammar correction and plagiarism detection.
- What to Expect: AI will become more efficient at grading not just objective tests but also subjective essays and projects, freeing up teachers to focus more on personalized student interaction.

## **2026-2027: Advanced Adaptive Learning Platforms**

- **Current Trend**: Platforms like Knewton are already offering some degree of personalized learning paths.
- What to Expect: Al-driven systems will analyze more complex student data to deliver highly individualized learning plans that adapt in real-time based on performance and engagement levels.

# **Future Outlook (Chat GPT)**

## 2028-2029: AI-Powered Virtual Tutors

- **Current Trend**: Tools like ChatGPT are assisting with answering homework questions and personalized tutoring.
- What to Expect: AI tutors will become more intuitive, offering 24/7 support for students and even understanding emotional cues through natural language processing (NLP) to offer guidance based on student stress or confusion.

## 2030-2031: Al-Driven Course Design

- **Current Trend**: Teachers are using AI to develop personalized learning materials.
- What to Expect: AI will be able to generate entire course syllabi based on student needs,  ${\color{black}\bullet}$ career goals, and learning preferences. This could lead to customized degree programs where students receive unique course pathways.

# Future Outlook (Chat GPT)

## 2032-2033: Fully Immersive AI-Enhanced Learning Environments

- **Current Trend**: AI is used for gamified learning and virtual classrooms.
- What to Expect: AI will be integrated into immersive VR (Virtual Reality) environments where students can learn complex subjects like biology, history, and engineering by virtually interacting with the subject matter in real-time.

## 2034: Al as a Co-Teacher in Classrooms

- **Current Trend**: Al is used as a supplementary tool.
- What to Expect: AI will function alongside human educators, managing administrative tasks, grading, and routine instruction, while teachers focus on creativity, critical thinking, and emotional development of students.





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