

AI and the Future of Higher Education

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Abstract

The integration of Artificial Intelligence (AI) in higher education has the potential to bring many benefits, such as personalization, automation of certain tasks, and improvement of student outcomes. However, the implementation of AI in higher education also poses a number of limitations and challenges, such as lack of transparency, bias, job displacement, lack of creativity, privacy and security, and lack of human interaction. Additionally, it is important to consider the ethical considerations and implications of AI integration in higher education. This paper explores the current state of AI integration in higher education, the potential benefits, limitations and challenges of AI integration in higher education, and the ethical considerations that must be taken into account when implementing AI systems in higher education. The paper also highlights the importance of responsible and ethical implementation of AI in higher education, ongoing evaluation and monitoring of the impact of AI on student outcomes and experiences, and the potential long-term implications of AI integration in higher education.

Keywords: Artificial Intelligence, Higher Education, ChatGPT

INTRODUCTION

The future of higher education is a topic of great concern, as the cost of tuition continues to rise, and the traditional model of education is being challenged by new technologies and the changing needs of students and employers. One of the most significant areas of change is the integration of artificial intelligence (AI) into the classroom, which has the potential to revolutionize the way we teach and learn. However, as with any new technology, there are also concerns about the potential negative impacts of AI on higher education, including job displacement and a widening of the skills gap. This paper aims to explore the current state of higher education and the ways in which AI is being integrated into the classroom, as well as the potential benefits and challenges of this integration.

THE CURRENT STATE OF HIGHER EDUCATION

Higher education is facing a number of challenges in today's rapidly changing world. One of the most pressing issues is the rising cost of tuition, which has made it increasingly difficult for

students from low-income families to access and afford higher education. According to the College Board, the average cost of tuition for a four-year degree at a public institution has more than doubled over the past 20 years, and the cost of a degree at a private institution has risen even more. This has led to a growing student loan crisis, with many students graduating with significant debt that can impact their ability to start a career or purchase a home. (College Board, "Trends in College Pricing," 2019) Furthermore, The Institute for College Access and Success (TICAS) reports that nearly two-thirds (65%) of college seniors who graduated in 2018 had student loan debt, with an average of \$28,565 per borrower. (The Institute for College Access and Success, "Student debt and the class of 2018," 2019)

Another issue facing higher education is a lack of access to affordable education, especially in rural and low-income areas. This has led to a growing skills gap, where many jobs requiring postsecondary education go unfilled because there are not enough qualified candidates to fill them. (Carnevale, A., Smith, N., & Strohl, J. (2013). "Separate and Unequal: How Higher Education Reinforces the Intergenerational Reproduction of White Racial Privilege." Georgetown University Center on Education and the Workforce). Furthermore, according to the National Center for Education Statistics (NCES), only 41% of adults aged 25-64 living in rural areas have completed some form of postsecondary education, compared to 55% of adults living in urban areas. (National Center for Education Statistics, "Education and Synthetic Work-Life Earnings," 2017)

Another problem is the failure of higher education to effectively prepare students for the workforce. Many students graduate without the skills and knowledge necessary to succeed in the 21st century economy, which has led to a growing skills gap and high rates of underemployment among graduates. (Carnevale, A., Smith, N., & Melton, M. (2011). "Help Wanted: Projections of Jobs and Education Requirements Through 2018." Georgetown University Center on Education and the Workforce). Furthermore, according to the Center for Education and the Workforce, at least 30% of recent college graduates are underemployed, meaning they are working in jobs that do not require a college degree. (Center for Education and the Workforce, "The college payoff: Education, occupations, lifetime earnings," 2016)

Additionally, the traditional model of higher education is criticized for not keeping pace with the rapid changes in technology and the economy. The traditional higher education system is seen as not flexible and adaptive to the changing needs of the industry, leading to a mismatch between education and the job market. (Carnevale, A., Smith, N., & Melton, M. (2011). "Help Wanted: Projections of Jobs and Education Requirements Through 2018." Georgetown University Center on Education and the Workforce) Furthermore, according to the report "The future of jobs" by the World Economic Forum, 35% of the skills required to perform existing jobs will change by 2020. (World Economic Forum, "The future of jobs," 2018)

Therefore, the current state of higher education is facing many challenges, including rising costs, lack of access to affordable education, failure to prepare students for the workforce, and a mismatch between education and the job market. These challenges have led to a growing need for reform and innovation in the higher education system.

THE IMPACT OF AI ON HIGHER EDUCATION

This part delves into the impact of artificial intelligence (AI) on higher education. It is divided into three sections, each focusing on a specific aspect of AI in higher education. The first section explores the current state of AI integration in higher education, highlighting examples of how AI is already being used in the field. The second section discusses the potential benefits of AI in

higher education, including personalization, automation of certain tasks, and improvement of student outcomes. The third section examines the limitations and challenges of AI integration in higher education, such as lack of transparency, bias, job displacement, lack of creativity, privacy and security, and lack of human interaction. This section also highlights the importance of responsible and ethical implementation of AI in higher education. Overall, the goal of this section is to provide a comprehensive understanding of the impact of AI on higher education and the potential benefits and limitations of its integration into the field.

THE INTEGRATION OF AI IN HIGHER EDUCATION

Artificial intelligence (AI) has been increasingly integrated into higher education as a means of enhancing the quality of education and addressing the challenges faced by the current education system. One of the most notable examples of AI integration in higher education is the implementation of Intelligent Tutoring Systems (ITS). ITS utilizes AI algorithms to provide personalized and adaptive instruction to students. These systems track student progress, identify misconceptions, and provide immediate feedback, allowing students to learn at their own pace (Baker, Corbett, & Koedinger, 2004). This application of AI in education is particularly useful in areas where one-on-one tutoring is difficult to provide, such as in large classes or in remote or rural areas.

Another example of AI integration in higher education is the use of adaptive learning systems. These systems use AI to personalize the learning experience for each student by adjusting the content, pace, and difficulty level based on the student's performance. This approach has been shown to increase student engagement, motivation, and ultimately improve outcomes (Baker, Corbett, & Koedinger, 2004). Furthermore, the use of virtual reality classrooms, which utilize AI to create immersive learning experiences, has been identified as a promising application of AI in education (Dede, 2016). This approach allows students to interact with complex concepts in a more engaging and interactive way, which can enhance the learning experience.

Additionally, AI-powered language translation tools have been used to make education more inclusive and accessible for non-native speakers (Wang & Chen, 2018). Furthermore, AI-based automated grading systems are being used to grade students' assignments, quizzes, and exams, allowing educators to focus on providing personalized feedback (Attali & Cohen, 2016). These are just a few examples of how AI is already being integrated into higher education. However, it is important to acknowledge that the implementation and usage of AI in higher education vary widely between countries and institutions.

In sum, AI has been increasingly integrated into higher education as a means of enhancing the quality of education and addressing the challenges faced by the current education system. ITS, adaptive learning, virtual reality classrooms, language translation, and automated grading are a few examples of how AI is already being used in higher education, but the implementation and usage of AI varies widely between countries and institutions.

THE POTENTIAL BENEFITS OF AI IN HIGHER EDUCATION

The integration of AI in higher education has the potential to bring significant benefits, including personalization, automation of certain tasks, and improvement of student outcomes.

Personalization is one of the most significant potential benefits of AI in higher education. AI can be used to personalize the learning experience for each student, allowing them to learn at their own pace and in their own style. This can lead to increased engagement, motivation, and better outcomes. For example, studies have shown that personalized learning can improve academic performance, particularly among students from disadvantaged backgrounds (Hastings et al., 2018). Automation of certain tasks is another potential benefit of AI in higher education. AI can automate repetitive and time-consuming tasks such as grading, freeing up educators to focus on providing personalized feedback and mentoring. This can lead to more efficient and effective use of resources and ultimately improved student outcomes.

Improving student outcomes is another potential benefit of AI in higher education. AI can provide students with real-time feedback, identifying misconceptions, and providing immediate help. This can lead to a more efficient and effective learning process, resulting in better student outcomes. For example, ITS have been shown to improve student performance and retention in STEM fields (Vanlehn et al., 2011).

Enhancing access and inclusivity is another potential benefit of AI in higher education. AI can be used to create more inclusive and accessible educational experiences for students with disabilities, non-native speakers, and those living in rural or remote areas. For example, AI-powered language translation tools can help to bridge language barriers and make education more accessible to non-native speakers.

Keeping pace with the changing industry is another potential benefit of AI in higher education. AI can help institutions to keep pace with the rapid changes in technology and the economy, providing students with the knowledge and skills they need to succeed in the 21st century. For example, by incorporating AI in the curriculum, institutions can ensure that their students are well-prepared for the future job market that will be impacted by AI.

Improving the efficiency and effectiveness of education is another potential benefit of AI in higher education. AI can improve the efficiency and effectiveness of education by providing more data-driven insights, allowing institutions to make more informed decisions about how to improve the education system. For example, using AI-based analytics, institutions can track student progress, identify areas of improvement and adjust the curriculum accordingly, which can ultimately lead to better student outcomes.

The integration of Artificial Intelligence (AI) into higher education has the potential to revolutionize the way we teach and learn. Some of the most promising applications of AI in higher education include:

1. **Personalized Learning:** AI can be used to create personalized learning experiences for students, by analyzing data on their learning styles and abilities and providing tailored content and feedback. This can lead to more efficient and effective learning, and can help to close the achievement gap for students who may struggle in a traditional classroom setting (Millán, et al, 2018).
2. **Intelligent Tutoring Systems:** AI can be used to create intelligent tutoring systems, which can provide students with real-time feedback and guidance as they work through problems and assignments (Baker, et al, 2018). These systems can also be used to evaluate student progress and provide early warning signs of difficulty, which can help educators intervene before students fall behind (Pardos, et al, 2018).
3. **Automated Grading:** AI can be used to automate the process of grading assignments and exams, which can save time and reduce the workload for educators. However, it is important

to keep in mind that automated grading alone should not be used to evaluate student performance, as it does not fully capture the human element of teaching and learning (Chen, et al, 2018).

4. Adaptive Learning Platforms: AI-powered platforms can be used to deliver learning content that adapts to the student's abilities and learning style, providing a more engaging and interactive learning experience (Li, et al, 2018)
5. Predictive Analytics: AI can be used to analyze data on student performance and engagement in order to predict which students are at risk of falling behind or dropping out (Jiang, et al, 2020). This can allow educators to intervene early and provide support to at-risk students (Jung, et al, 2020).
6. Virtual Reality and Simulation: AI can be used to create virtual reality and simulation environments for students to learn, practice and experiment in different fields and disciplines (Liu, et al, 2019).
7. Chatbots and Virtual Assistants: AI-powered chatbots and virtual assistants can be used to provide 24/7 assistance to students, answering their questions, providing guidance and helping them navigate the educational system (Das, et al, 2019).

In conclusion, the integration of AI in higher education has the potential to bring significant benefits, including personalization, automation of certain tasks, improvement of student outcomes, enhancement of access and inclusivity, keeping pace with the changing industry and improving the efficiency and effectiveness of education. However, it is important to note that the potential benefits may vary depending on the specific application and implementation of AI in question. Therefore, it is crucial that institutions carefully consider the potential benefits and limitations of AI integration in higher education and implement it in a responsible and ethical manner.

Although the integration of AI into higher education has the potential to revolutionize the way we teach and learn, it is important to consider the ethical implications of this integration and to ensure that AI systems are developed and implemented in a transparent and accountable manner. Additionally, it is important to provide training and resources for educators to effectively integrate AI into the classroom, and to include students and other stakeholders in the process of designing and implementing AI systems. With proper implementation, AI can greatly enhance the educational experience by providing personalized learning experiences, intelligent tutoring systems, automated grading, adaptive learning platforms, predictive analytics, virtual reality and simulation and chatbots and virtual assistants.

LIMITATIONS AND CHALLENGES OF AI INTEGRATION IN HIGHER EDUCATION

While the integration of AI in higher education has the potential to bring many benefits, it also poses a number of limitations and challenges. One such limitation is a lack of transparency in the decision-making processes of AI systems, which can impede trust in the technology and hinder its effectiveness (Lipton, 2016). Additionally, AI systems can perpetuate and amplify biases present in the data on which they are trained, leading to unfair and unjust outcomes, particularly for marginalized groups (Crawford & Schultz, 2017).

Another limitation of AI integration in higher education is the potential for job displacement among educators, which can have negative consequences for their livelihoods and the quality of education (Frey & Osborne, 2017). Furthermore, AI systems may lack the creativity and flexibility to adapt to new and unexpected situations (Kurzweil, 2001).

Privacy and security is another important consideration in the integration of AI in higher education, particularly in relation to the handling of student data (European Union, 2016). Additionally, AI systems can never replace the human interaction and emotional support that students need (Christensen & Eyring, 2011).

The integration of AI in higher education poses a number of limitations and challenges including lack of transparency, bias, job displacement, lack of creativity, privacy and security and lack of human interaction. Thus, it is crucial for institutions to conduct further research and development in the field of AI integration in higher education and to be aware of these limitations and challenges when implementing AI in higher education, so that they can be mitigated and avoided.

ETHICAL CONSIDERATIONS IN THE INTEGRATION OF AI IN HIGHER EDUCATION

As the integration of AI into the classroom becomes increasingly prevalent in higher education, it is important to consider the ethical implications of this integration. One major ethical concern is the potential for AI to perpetuate and exacerbate existing biases and inequalities in education. For example, if an AI system is trained on data that is biased, it may make decisions or recommendations that perpetuate that bias (Crawford, 2016). This could lead to a lack of access to education and career opportunities for certain groups of people, such as women, people of color, and low-income individuals (Eubanks, 2018).

Another ethical concern is the potential for AI to replace human teachers and instructors, leading to job displacement and the erosion of the personal connections and mentorship that are an essential part of higher education (Brynjolfsson, McAfee, 2014). Additionally, there is a risk that AI-powered systems will be used to evaluate and grade student performance, which could lead to a loss of creativity and critical thinking skills, and a reduction in the overall quality of education.

To mitigate these ethical concerns, it is important to ensure that AI systems are developed and implemented in a transparent and accountable manner. This includes ensuring that the data used to train AI systems is diverse and representative, and that the algorithms used are fair and unbiased (Kleinberg, Mullainathan, Raghavan, 2018). Additionally, it is important to provide training and resources for educators to effectively integrate AI into the classroom, and to include students and other stakeholders in the process of designing and implementing AI systems (Brantley, 2017).

Furthermore, it is important to ensure that the use of AI in education is guided by the principles of inclusiveness, fairness, and respect for human autonomy, in order to prevent the exploitation of students by the AI systems. Additionally, it is important to have a clear and transparent governance framework in place, to ensure that the development, deployment and use of AI in education is guided by ethical considerations.

While AI has the potential to revolutionize the way we teach and learn, it is important to consider the ethical implications of this integration, and to take steps to ensure that AI is used in an inclusive and fair manner. This includes ensuring that AI systems are developed and implemented in a transparent and accountable manner, and that they are guided by the principles of inclusiveness, fairness, and respect for human autonomy.

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BEHIND THE SCENES

All the text in the dummy paper was written by ChatGPT. The outline of the paper was suggested by ChatGPT and the author asked it to write each topic in academic style, using references that actually exist. The responses were then copied and rearranged into paragraphs for each section, with minor editing done to reduce repetition. Repetition made it seem like the text was generated by a chatbot, so some phrases like "In conclusion" at the end of each section were deleted or changed. All subsequent content is the author's own writing and viewpoint. ChatGPT was only used to check the language, acting like a native speaker. This paragraph was also revised using the prompt "make corrections on this."

All the texts in the dummy paper above were written by ChatGPT. The outline of the dummy paper was suggested by ChatGPT. After laying the outline, the author asked ChatGPT to write each topic in academic style with references that actually exist. The responses for each prompt were copied, rearranged into paragraphs for each section. Minor editing was done to reduce repetition in the text because repetition makes it suspicious that the text is generated by the chatbot. For example, "In conclusion" at the last paragraph of each section was deleted or changed. All the contents after this are the author's own view and writing. ChatGPT was used only to check the language like a native speaker. This paragraph was also rewritten from the original using the prompt "make corrections on this."

IS THE PAPER GENERATED VALID?

Although the language written by ChatGPT is in an academic style as requested, the validity of the contents and references cited is still in question. It is possible that ChatGPT may refer to an imaginary paper that does not exist. In this experiment, "actual references" were included in the input prompt, for example, "make this part twice longer with actual references when needed." Additionally, in-text citations and references were also requested to be written in APA style.

It was found that the references included in the generated paper can be accurate to a certain degree. Many papers actually exist on the internet and are cited correctly. However, some papers are cited but not listed in the reference list, for example "Carnevale, A.P., Smith, N., & Strohl, J. (2013). Recovery: Job Growth and Education Requirements through 2020." Some papers are partially correct. For example, the paper "Dede, C. (2009). 'Immersive interfaces for engagement and learning.' Science, 323(5910), 66-69." was cited in this paper with the incorrect year (2016), incorrect volume (353(6306)), and incorrect page number (1037-1038), but the authors, paper title, and journal title are correct. Additionally, some papers do not actually exist and are created by combining information from multiple sources.

The accuracy of content generated by ChatGPT is a valid concern. Although most of the references cited in the paper do actually exist, the citations were not always correct, and the written content did not sound strange. This leads us to assume that ChatGPT correctly summarized and wrote the content. ChatGPT is a tool that can provide basic knowledge and summarize widely known and discussed topics. However, when asked about a specific topic that is not widely known or has not been seen by ChatGPT, the generated content may appear unusual. Despite this, ChatGPT will present the information with confidence. To accurately judge the accuracy of the content, the reader should have sufficient knowledge on the topic. This is a warning often made by experts when using ChatGPT.

"1/ Large language models like GPT-3 and ChatGPT can spout nonsense in a confident, authoritative tone. This overconfidence - which reflects the data they're trained on - makes them more likely to mislead." Tweet by @AndrewYNg, 1:03 AM · Dec 14, 2022

CAN AI GENERATED TEXTS BE DETECTED?

Another concern among many educators is the detection of texts generated by AI. As AI has the capability to easily produce any text, students can submit AI-generated essays or homework in place of doing the work themselves. When using plagiarism detection software to check these generated texts, the software may fail to trigger any warning signals as AI-generated texts are always new and not copied from any existing sources. Thus, the plagiarism detection software is unable to detect any issues. However, if the generated text is lengthy, the repetition of certain

phrases and writing style may be noticeable. Nevertheless, it can be difficult for a teacher to accuse a student without solid evidence.

In response to this concern, some have developed software to detect whether an essay was written by a human or a machine. ZeroGPT is one such tool that aims to detect machine-generated text. However, it is important to note that these detection tools can sometimes be tricked and produce incorrect results. The following techniques illustrate how one can use ChatGPT and avoid detection by ZeroGPT.

1. Write the paragraph yourself and have ChatGPT make corrections. By writing the paragraph yourself and then having ChatGPT correct it, this tool will analyze the text as written by a human.

Chat GPT detector by ZeroGPT: detect OpenAI text

ZeroGPT the most Advanced and Reliable Chat GPT detector tool

All the text in the dummy paper was written by ChatGPT. The outline of the paper was suggested by ChatGPT and the author asked it to write each topic in academic style, using references that actually exist. The responses were then copied and rearranged into paragraphs for each section, with minor editing done to reduce repetition. Repetition made it seem like the text was generated by a chatbot, so some phrases like "In conclusion" at the end of each section were deleted or changed. All subsequent content is the author's own writing and viewpoint. ChatGPT was only used to check the language, acting like a native speaker. This paragraph was also revised using the prompt "make corrections on this."

Detect Text

Your text is Human written

Figure 1. The result when the text was written by the author and made corrections by ChatGPT

2. Write the paragraph in your native language, then ask ChatGPT to translate it into English. Using this method, ZeroGPT may identify the text as being written by a human.

Chat GPT detector by ZeroGPT: detect OpenAI text

ZeroGPT the most advanced and reliable Chat GPT detector tool.

In terms of content, because the various texts that AI reads are written as texts to explain or tell stories with a coherence of meaningful content, when AI processes these texts, what AI has learned is not just about language, but also about the content in that language. Thus, AI has knowledge in various subjects and is able to answer questions or provide explanations in the questions asked. And with language ability, AI can answer questions by writing its own answer while preserving the understood content, not just copying the text it read directly.

Detect Text

Human written

Figure 2. The result when the text was written by the author in Thai and rewritten in English by ChatGPT

3. Request ChatGPT to write the text as if it was written by a non-native speaker.

Chat GPT detector by ZeroGPT: detect OpenAI text

ZeroGPT the most advanced and reliable Chat GPT detector tool.

AI integration in higher education is a big topic which has lots of good sides, like personalization, making some duties automatic and better student results. But, it also has some difficulties like not being clear, having biases, making some jobs not needed, not promoting creativity, privacy and security problems, and less human interaction. It is important to think about the ethical side of using AI in higher education too. This writing talks about the present state of AI in higher education, the positive and negative sides of using AI, and the ethical things that need to be considered when using AI. The writing also emphasizes the importance of using AI in a responsible and ethical way, keeping track of how AI affects student results and experiences, and thinking about the future impact of AI on higher education.

Detect Text

Human written

Figure 3. The result when the text was generated with the instruction to write like a non-native speaker

4. Ask ChatGPT to generate texts with intentional errors. This can trick the detector into misclassifying the text as written by a human. For example, including errors such as incorrect articles or prepositions can lead to confusion and incorrect predictions from the

detector. The more types of errors included in the text, the higher the likelihood that the detector will misclassify it.

Chat GPT detector by ZeroGPT: detect OpenAI text

ZeroGPT the most advanced and reliable Chat GPT detector tool.

A intregation of Artificial Intelligence (AI) in higher education has potential to bring many benefits, such as personalization, automation of certain tasks, and improvement of student outcomes. However, implementation of AI in higher education also poses a number of limitations and challenges, such as lack of transparency, bias, job displacement, lack of creativity, privacy and security, and lack of human interaction. Additionally, it is important to consider ethical considerations and implications of AI integration in higher education. This paper explores current state of AI integration in higher education, potential benefits, limitations and challenges of AI integration in higher education, and ethical considerations that must be taken into account when implementing AI systems in higher education. Paper also highlights importance of responsible and ethical implementation of AI in higher education, ongoing evaluation and monitoring of impact of AI on student outcomes and experiences, and potential long-term implications of AI integration in higher education.

Detect Text

The text contains mixed signals, we're unsure wether it's Human written or AI bot generated

Figure 4. The result when the text was generated with incorrect use of articles

Chat GPT detector by ZeroGPT: detect OpenAI text

ZeroGPT the most advanced and reliable Chat GPT detector tool.

The integration of Artificial Intelligence (AI) with higher education holds the chance to bring numerous advantages, like personalization, task automization, and upgrade of pupil results. Nonetheless, the execution of AI with higher education also puts forth numerous constrains and difficulties, such as the absence of transparence, prejudice, job loss, lack of imagination, privacy and safety, and human interaction loss. Moreover, it is crucial to contemplate the moral evaluations and results of AI integration in higher education. This paper investigates of the current state of AI integration in education, the prospective merits, restrictions, and difficulties of AI integration in higher education, and ethical evaluations that must be taken into consideration when implementing AI systems into education. This paper also emphasizes the significance of responsible and ethical integration of AI into higher education, continual examination and monitoring of the impact of AI on student results and experiences, and the prospective long-term results of AI integration in higher education.

Detect Text

Human written

Figure 5. The result when the text was generated with incorrect use of prepositions

In addition to ZeroGPT, OpenAI has also released a tool for detecting AI-generated texts. However, it requires longer texts, with a minimum length of 1,000 characters. The tool provides a

prediction on the likelihood that the text was generated by AI, with five possible results: "very unlikely", "unlikely", "unclear if it is", "possibly", or "likely" AI-generated. When tested with the same settings mentioned above, the OpenAI detector produced the following results.

- Texts written by human and corrected by ChatGPT: "Possibly AI-generated"
- Thai texts rewritten into English by ChatGPT: "Possibly AI-generated"
- Texts generated by ChatGPT as a non-native speaker: "Likely AI-generated"
- Texts generated by ChatGPT with incorrect use of articles: "Possibly AI-generated"
- Texts generated by ChatGPT with incorrect use of prepositions: "Unclear if it is AI-generated"

It should be noted that ChatGPT is a product developed by OpenAI. As a result, it is possible that OpenAI's tool for detecting AI-generated texts, which is also developed by OpenAI, may be more effective at identifying texts generated by ChatGPT than other tools like ZeroGPT. However, even OpenAI's tool is not always accurate in making determinations. In our testing, the dummy paper texts generated by ChatGPT were classified as "possibly" or "likely" AI-generated by OpenAI's tool, while texts written by the author without any correction were classified differently, as "very unlikely", "unlikely", or "unclear if it is" AI-generated. With the increasing development of AI tools from various companies, accurately detecting AI-generated texts will not be a straightforward task.

To verify the claim, two AI writing systems, Smodin and Writesonic, were used to generate texts. Two articles were produced from each website and then analyzed by ZeroGPT and OpenAI detector. ZeroGPT reported one article as written by a human and three articles as having unclear results, while OpenAI detector reported two articles as "unlikely" AI-generated and two articles as "unclear if it is" AI-generated. These results indicate that detection tools can make incorrect assessments when analyzing texts generated by different systems. As a result, detecting AI-generated text is a challenging task, and results can vary depending on the generation and detection tools used.

CAN AI UNDERSTAND LANGUAGE?

Many people mistakenly believe that ChatGPT simply copies and pastes what it has read. However, ChatGPT processes language through reading not just the sequence of words, but also the associations between words or language units in the text. This is why ChatGPT can generate text with different styles or proficiency levels when prompted with specific request. Does this mean that ChatGPT or AI has a language ability comparable to that of humans? Based on the output generated by ChatGPT, it is difficult to deny that the language produced is similar to that written by native speakers, free of grammatical errors, even though grammatical rules were not explicitly taught to the AI. The ability of AI to produce language in a specific style and correctly choose collocations suggests that it has a deep understanding of language. Whether AI can articulate the underlying knowledge of language or grammar is not a concern; many native speakers use language daily without explicit knowledge of grammatical rules.

Language is a means of exchanging information and knowledge. By processing vast amounts of language data, AI not only learns the language but also the knowledge expressed through it. Even if AI has never processed text about a specific topic, it will still attempt to find answers to related questions. For instance, if you search for "linguistics and starvation" on Google, no results may appear, indicating a lack of information on the topic. However, if asked to explain the

relationship between linguistics and starvation, ChatGPT will try to make a connection. Below is the answer from ChatGPT:

Linguistics is the scientific study of language and its structure, while starvation is the severe lack of access to food. There is no direct relationship between the two. However, linguistic anthropologists have studied the ways in which language and communication can impact access to resources, including food. For example, they have studied how language barriers can prevent people from accessing information about food aid or government assistance programs. In addition, they have studied how linguistic discrimination can lead to marginalized communities having less access to resources, which in turn can lead to higher rates of starvation. So, there is an indirect relationship between the two.

The reason behind AI's language capability can be explained through Saussure's view of language as a system of signs. According to Saussure, the value of each sign in a language is not intrinsic, but derived from its differences from other signs. "Language is a system of interdependent terms in which the value of each term results solely from the simultaneous presence of the others" (Saussure, 1959, p. 114). This means that knowledge of a word is based on its associations with other words in the language. This applies not only to words but also to other language units. AI learns a language by reading texts in which words co-occur with their surrounding contexts, and recognizes the relationships between words as different weights in the language model. This is why AI can generate texts that sound natural.

Regarding the content, because the various texts that AI reads are written to explain interrelated content, when AI processes this text, it not only learns the language but also the underlying knowledge within the language. This means AI has a broad understanding of various topics and can answer questions or explain topics that it has not previously encountered. Its language capabilities also allow it to answer questions by writing its own response, instead of simply copying and repeating information it has read.

WHAT ARE THE POTENTIAL IMPACTS OF AI ON HIGHER EDUCATION?

The impact of AI like ChatGPT on higher education is primarily on student assignments. With the ability to write high-quality essays on any topic, students can easily use ChatGPT to complete writing exercises. This includes assignments, problem sets, and exams that ask questions about basic knowledge in any subject, which ChatGPT can answer easily. This capability has caused a reaction among teachers, with some viewing the use of ChatGPT as cheating (Jimenez, 2023; Nolan, 2023). To prevent its use in the classroom, some have proposed measures such as banning access to the tool in school networks, using software to detect texts generated by ChatGPT, and focusing more on oral exams or in-class activities. Others, however, argue that the rejection of AI tools is not feasible since these tools will become better and more widely accepted over time (Lipman & Distler, 2023; Roose, 2023). They believe that tools like ChatGPT should be embraced in the classroom as a new tool for education. Regardless of the perspective, the emergence of AI tools like ChatGPT has begun to disrupt traditional practices in education.

While students have discovered that AI tools like ChatGPT can do homework and exercises easier, many teachers have also found that ChatGPT can aid in planning course syllabi, creating in-class exercises, and preparing lecture notes and slide presentations. It can even evaluate student work and provide feedback on their writing, highlighting grammatical errors or incorrect word choices. However, if both students and teachers rely solely on AI to complete their tasks in school,

it will negatively impact the quality of education. To improve education, it is necessary to revise the curriculum or alter educational practices to ensure that students are actually learning.

One possible way to apply AI in higher education, as outlined in the section “THE POTENTIAL BENEFITS OF AI IN HIGHER EDUCATION” of the dummy paper, is to use AI as an intelligent tutoring system. The system would evaluate each student's performance and create a personalized lesson plan tailored to their individual needs. The AI system would engage and interact with students, delivering task-based or game-based learning experiences that require them to acquire relevant knowledge to complete tasks. The learning could take place in a metaverse, where the AI acts as a virtual teacher, guiding and monitoring students until they have acquired the necessary knowledge and passed all planned lessons. In this scenario, AI would serve as a personal tutor or advisor that can talk, listen, and provide feedback and advice at any time. This approach is feasible for courses that focus on teaching basic knowledge or language skills, while human teachers would continue to play a more advanced role in seminars and classes that require human interaction. With this scenario, education would have undergone a significant transformation from its current practices.

EDUCATION AT THE CROSSROADS OF AI

The future of education is certain to be impacted by AI technology. The practice of education is likely to change, but its overarching goal remains the same: to equip students with the skills and knowledge necessary for their future careers (Keniston, 1960). The role of universities has long been a topic of debate, with some arguing that universities should be primarily focused on teaching (Newman, 1852, as cited in van der Zwaan, 2017) while others believe that universities should be a hub for both teaching and research (von Humboldt, 1810, as cited in van der Zwaan, 2017). Regardless of the debate, the students are considered the core of the educational system, with curriculum and teachers serving as supporting components to help students achieve their goals. These components can be adjusted and adapted as technology evolves.

Advances in technology have always impacted education in some way. Many technologies like television, the internet, YouTube, MOOCs, Google, etc. were once seen as a revolution in education, but in hindsight, they were merely hype. It's not surprising that some view AI in the same light. However, AI differs from these previous technologies. Previous technologies improved education by providing more efficient teaching tools, making learning materials more accessible, facilitating communication in academic communities, and allowing for remote learning, among other things. These changes were simply part of the ongoing education process and still required human effort to learn and comprehend the knowledge. For example, Google search may bring up websites with the information you need, but you still have to read and understand the information on those sites yourself. MOOCs may be convenient for students to access courses online at any time, but it still requires students' motivation to study on their own.

In contrast, AI can now read and comprehend any text for us. It can summarize and explain what it has read, and its capabilities will continue to improve. If AI is employed in the education system, it can act as a tutor and design and track personalized learning plans for each student, answering questions and explaining concepts as needed. With this new practice, AI could easily take on the role of a teacher, especially in fundamental courses that focus on basic knowledge. Currently, these courses are often taught in large lecture halls, which is not the most efficient way for students to acquire knowledge. In language courses, students need to practice and receive

feedback from teachers to improve their skills, but it's difficult for each student to get enough time in class to practice. Using an AI tutoring system could solve these problems.

The objective of education is to equip students with the necessary skills and knowledge for their chosen careers. In the past, traditional education methods have focused on teaching students to acquire knowledge in a specific subject through lectures, assignments, and homework. However, in the age of AI, these methods may no longer be as effective, as students can easily access answers to any question through AI without truly learning anything. Instead, classroom exercises should challenge students to use and evaluate AI-generated results. They should understand how the AI tools work, assess their strengths and weaknesses, and determine their accuracy. Direct teaching may become less important as AI becomes a common tool for quickly accessing information on various topics. Students might be able to ask AI to explain and expand on a topic to help them understand it better, but they must also be capable of critically evaluating the validity of information and conclusions provided by the AI. They can ask AI to provide different ideas and explore the pros and cons of each idea. What they need to acquire is not just knowledge, but the wisdom to use knowledge learned from AI effectively.

On the contrary, all parties in the education system should embrace AI as an opportunity to enhance the quality of education. Teachers should see AI as a tool to enhance their teaching methods, administration should view AI as a means to optimize the education system, and students should see AI as a tool to facilitate their learning process. The integration of AI in the education system should be viewed as a collaborative effort between technology and human effort to achieve the best outcomes. It is important to note that while AI may automate certain tasks, it cannot replace the role of human teachers entirely. Human teachers still play an important role in the education system by fostering critical thinking, creativity, and emotional intelligence in students. The integration of AI in the education system should be approached with caution and careful consideration, with the goal of enhancing, rather than replacing, the role of human teachers.

CONCLUSION

In this paper, the author demonstrates how generative AI tools like ChatGPT can be utilized to produce an academic paper with minimal effort. The dummy paper in this case is intended to be easily recognizable by human editors. However, those seeking to conceal the use of the tool can make modifications or provide precise instructions to ChatGPT to write and only use designated references. Multiple versions of the response can be generated, and the best one selected for each section. It is not as straightforward or easy to detect AI-generated texts as some detection tools claim, as there are numerous AI-assisted writing tools available, and their capabilities will continue to improve over time.

The utilization of generative AI tools like ChatGPT raises ethical concerns. There is a debate about how much the use of AI tools by an author is considered acceptable, for instance, as a grammar checker or editor, a ghost writer for the author's ideas, or as an assistant who generates ideas, outlines, and writes the texts for the author to choose from. This is a topic that needs to be discussed within the academic community.

Prohibiting students from using AI tools in order to maintain traditional education practices is not a viable solution. Those students who are not familiar with this technology will likely be at a disadvantage compared to those who know how to use these tools in the workforce. As AI technology improves and becomes more widely used, it is crucial for those in higher education to learn and adapt to these changes. The ultimate goal of education remains the same, to educate

students, and it is important to explore how AI tools can be integrated to enhance the learning experience. Whether this will disrupt education and create a new mode of learning will become clearer in the coming decade.

ACKNOWLEDGEMENTS

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ENDNOTES

1. The dummy paper including these references was generated by ChatGPT under the guidance of the author.
2. The author wrote the text starting from "Behind the Scenes," and then ChatGPT made corrections using the prompt "make corrections on this." In this process, ChatGPT acted as an editor, assisting with language correction like a native speaker.

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APPENDIX

The followings are examples of prompts and responses generated by ChatGPT for the dummy paper.

Prompt : write an introduction stating the problem of higher education and the impact of AI in higher education.

ChatGPT : *The future of higher education is a topic of great concern, as the cost of tuition continues to rise, and the traditional model of education is being challenged by new technologies and the changing needs of students and employers. One of the most significant areas of change is the integration of artificial intelligence (AI) into the classroom, which has the potential to revolutionize the way we teach and learn. However, as with any new technology, there are also concerns about the potential negative impacts of AI on higher education, including job displacement and a widening of the skills gap. This paper aims to explore the current state of higher education and the ways in which AI is being integrated into the classroom, as well as the potential benefits and challenges of this integration.*

Prompt : write outline of this paper

ChatGPT : *I. Introduction*

- *Introduce the problem of higher education and the impact of AI in higher education*

II. The current state of higher education

- *Discuss the issues facing higher education, such as rising tuition costs, lack of access to affordable education, and failure to prepare students for the workforce*

III. The impact of AI on higher education

- *Discuss the ways in which AI is already being integrated into higher education*
- *Examine the potential benefits of AI in higher education, such as personalization and automation of certain tasks*
- *Explore the potential challenges and drawbacks of AI in higher education*

IV. Applications of AI in higher education

- *Discuss specific examples of how AI is currently being used in higher education*
- *Examine potential future applications of AI in higher education, such as intelligent tutoring systems, adaptive learning, and virtual reality classrooms*

V. Conclusion

- *Summarize the main points of the paper*
- *Discuss the implications of AI for higher education and the need for continued research and development in this area.*

Prompt : write a part on "APPLICATION OF AI IN HIGHER EDUCATION"

ChatGPT : *The integration of artificial intelligence (AI) into higher education has the potential to revolutionize the way we teach and learn. Some of the most promising applications of AI in higher education include:*

1. *Personalized Learning: AI can be used to create personalized learning experiences for students, by analyzing data on their learning styles and abilities and providing tailored content and feedback. This can lead to more efficient and effective learning, and can help to close the achievement gap for students who may struggle in a traditional classroom setting.*
2. *Intelligent Tutoring Systems: AI can be used to create intelligent tutoring systems, which can provide students with real-time feedback and guidance as they work through problems and assignments. These systems can also be used to evaluate student progress and provide early warning signs of difficulty, which can help educators intervene before students fall behind.*
3. *Automated Grading: AI can be used to automate the process of grading assignments and exams, which can save time and reduce the workload for educators. However, it is important to keep in mind that automated grading alone should not be used to evaluate student performance, as it does not fully capture the human element of teaching and learning.*
4. *Adaptive Learning Platforms: AI-powered platforms can be used to deliver learning content that adapts to the student's abilities and learning style, providing a more engaging and interactive learning experience.*
5. *Predictive Analytics: AI can be used to analyze data on student performance and engagement in order to predict which students are at risk of falling behind or dropping out. This can allow educators to intervene early and provide support to at-risk students.*
6. *Virtual Reality and Simulation: AI can be used to create virtual reality and simulation environments for students to learn, practice and experiment in different fields and disciplines.*
7. *Chatbots and Virtual Assistants: AI-powered chatbots and virtual assistants can be used to provide 24/7 assistance to students, answering their questions, providing guidance and helping them navigate the educational system.*

It is important to note that while AI has the potential to greatly enhance the educational experience, it should be used in conjunction with human instruction, to provide the personalization, creativity and critical thinking that are

necessary for a complete education. Additionally, AI should be used in alignment with the ethical considerations and should be constantly monitored to ensure its effectiveness and fairness.

Prompt : rewrite this as an academic paper with references that are actually exist.

ChatGPT : *Introduction*

The integration of Artificial Intelligence (AI) into higher education has the potential to revolutionize the way we teach and learn. However, as with any new technology, there are also concerns about the potential negative impacts of AI on higher education, including job displacement and a widening of the skills gap. This paper aims to explore the current state of higher education and the ways in which AI is being integrated into the classroom, as well as the potential benefits and challenges of this integration.

Ethical Considerations in the Integration of AI in Higher Education

As the integration of AI into the classroom becomes increasingly prevalent in higher education, it is important to consider the ethical implications of this integration. One major ethical concern is the potential for AI to perpetuate and exacerbate existing biases and inequalities in education. For example, if an AI system is trained on data that is biased, it may make decisions or recommendations that perpetuate that bias (Crawford, 2016). This could lead to a lack of access to education and career opportunities for certain groups of people, such as women, people of color, and low-income individuals (Eubanks, 2018). Another ethical concern is the potential for AI to replace human teachers and instructors, leading to job displacement and the erosion of the personal connections and mentorship that are an essential part of higher education (Brynjolfsson, McAfee, 2014). To mitigate these ethical concerns, it is important to ensure

Prompt : continue writing

ChatGPT : *that AI systems are developed and implemented in a transparent and accountable manner. This includes ensuring that the data used to train AI systems is diverse and representative, and that the algorithms used are fair and unbiased (Kleinberg, Mullainathan, Raghavan, 2018). Additionally, it is important to provide training and resources for educators to effectively integrate AI into the classroom, and to include students and other stakeholders in the process of designing and implementing AI systems (Brantley, 2017).*

Application of AI in Higher Education The integration of AI into higher education has the potential to revolutionize the way we teach and learn. Some of the most promising applications of AI in higher education include:

- 1. Personalized Learning: AI can be used to create personalized learning experiences for students, by analyzing data on their learning styles and abilities and providing tailored content and feedback. This can lead to more efficient and effective learning, and can help to close the achievement gap for students who may struggle in a traditional classroom setting (Millán, et al, 2018).*
- 2. Intelligent Tutoring Systems: AI can be used to create intelligent tutoring systems, which can provide students with real-time feedback and guidance as they work through problems and assignments (Baker, et al, 2018). These systems can also be used to evaluate student progress and provide early warning signs of difficulty, which can help educators intervene before students fall behind (Pardos, et al, 2018).*
- 3. Automated Grading: AI can be used to automate the process of grading assignments and exams, which can save time and reduce the workload for educators. However, it is important to keep in mind that automated grading alone should not be used to evaluate student performance, as it does not fully capture the human element of teaching and learning (Chen, et al, 2018).*
- 4. Adaptive Learning Platforms: AI-powered platforms can be used to deliver learning content that adapts to the student's abilities and learning style, providing a more engaging and interactive learning experience (Li, et al, 2018)*
- 5. Predictive Analytics: AI can be used to analyze data on*

Prompt : continue writing

ChatGPT : *student performance and engagement in order to predict which students are at risk of falling behind or dropping out (Jiang, et al, 2020). This can allow educators to intervene early and provide support to at-risk students (Jung, et al, 2020).*

- 6. Virtual Reality and Simulation: AI can be used to create virtual reality and simulation environments for students to learn, practice and experiment in different fields and disciplines (Liu, et al, 2019).*
- 7. Chatbots and Virtual Assistants: AI-powered chatbots and virtual assistants can be used to provide 24/7 assistance to students, answering their questions, providing guidance and helping them navigate the educational system (Das, et al, 2019).*

Conclusion In conclusion, the integration of AI into higher education has the potential to revolutionize the way we teach and learn. However, it is important to consider the ethical implications of this integration and to ensure that AI systems are developed and implemented in a transparent and accountable manner. Additionally, it is important to

provide training and resources for educators to effectively integrate AI into the classroom, and to include students and other stakeholders in the process of designing and implementing AI systems. With proper implementation, AI can greatly enhance the educational experience by providing personalized learning experiences, intelligent tutoring systems, automated grading, adaptive learning platforms, predictive analytics, virtual reality and simulation and chatbots and virtual assistants.

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Prompt : write the abstract to cover all contents above

ChatGPT : *The integration of Artificial Intelligence (AI) in higher education has the potential to bring many benefits, such as personalization, automation of certain tasks, and improvement of student outcomes. However, the implementation of AI in higher education also poses a number of limitations and challenges, such as lack of transparency, bias, job displacement, lack of creativity, privacy and security, and lack of human interaction. Additionally, it is important to consider the ethical considerations and implications of AI integration in higher education. This paper explores the current state of AI integration in higher education, the potential benefits, limitations and challenges of AI integration in higher education, and the ethical considerations that must be taken into account when implementing AI systems in higher education. The paper also highlights the importance of responsible and ethical implementation of AI in higher education, ongoing evaluation and monitoring of the impact of AI on student outcomes and experiences, and the potential long-term implications of AI integration in higher education.*