A Systematic Literature Review: Impact of Generative AI as Technology to Learning in Higher Education

Winanti [1*], Sucipto Basuki[2], Nurasiah[3]

[1,2,3]Winanti
Universitas Insan Pembangunan Indonesia, Tangerang, Banten Indonesia
*winanti12unipem.ac.id

Abstract- The development of generative Artificial Intelligence (AI) technology cannot be avoided because developments have entered all domains of life, including the world of education. Universities are preparing themselves to implement generative AI to support learning to be more efficient and effective without having to fear the threats it poses. The method used in this paper is a systematic literature review by exploring existing research through predetermined keywords. Extraction and selection of previous research results that are relevant to the topic are carried out and irrelevant topics are removed from the discussion. The papers produced from previous studies used as sources for the systematic literature review were 28 selected study papers, with range from 2004 to 2023. The most papers published in 2023 being 23 papers. The authors of the papers used were 24 authors from academic background, while the rest from industry and general publics. Generative AI, especially ChatGPT usage capabilities of learning in higher education, can create sophisticated text as humans do, as a virtual tutor and answer questions quickly, edit videos, help with manufacturing design, and act as language generation, language translation, and summarization. The advantages of Generative AI as a choice that cannot be underestimated and avoided and can be a responsive friend with accurate judgment. In order not to harm students, there needs to be strict and clear regulations so that the use of generative AI does not harm students, lecturers, and universities. Generative AI also has negative impacts, including decreasing knowledge productivity, ethics, and law becoming challenges, cheating, and hampering skill development, producing biased information, and low levels of privacy. In the future, universities should prepare clear regulations and policies for data security and privacy so that data remains safe and generative use has a positive and beneficial impact on higher education.

Keyword: Generative AI, Technology, Learning, Higher Education

1. Introduction

Artificial intelligence-based conversational agents or ChatGPT are capable of writing essays with text-based conversations (chatbots) or speech (virtual assistants). Produces sophisticated text that is indistinguishable from human-generated text [1]. People in various fields, economic levels, education, and ages are starting to use ChatGPT to edit research resource content. Natural language generation incorporates structured information into human language [2]. It is permanently available, scalable, and can be accessed independently and simultaneously in large numbers with different needs [3].

Technological developments and revolutions have had a big impact and benefits on the way we think, work, interact, act, and make decisions in everyday life. Artificial Intelligence (AI) is one of the fastest-adopted technologies, including in the world of education. The emergence of ChatGPT and AI tools like Google's Bard, and Microsoft's Bing sparked intense discussions. Universities and educators must respond quickly to the impact of this technology [4]. The ability of machines to adopt/imitate habits and ways of working as well as human intelligence through various techniques and methods that enable computers to understand, learn, and make decisions based on the data provided. These two things are the capabilities and performance of Artificial Intelligence (AI). Generative modeling artificial intelligence (GAI) becomes a framework for machines without the need for supervision by imitating human intelligence using statistics, probability, and others. Learning innovation with generative AI uses digital content not only through video, images/graphics, text, audio, and video but also through training, studying patterns, and distribution [5].

The benefits as well as challenges and new pressure for universities to utilize Generative AI as a learning support that is efficient, effective, and easy to use. The biggest challenge in teacher activities is having to adapt to the latest technology [6] and the obstacle for universities is that not all lecturers are technologically literate.

Generative AI becomes artificial intelligence through the creation of new content and ideas, conversations, stories, images, videos, and music. Supported by a machine learning model for large amounts of data (Foundation Model/FM). Digital image

quality, video editing, and prototyping for manufacturing are faster and capable of adding large amounts of synthetic data sets. According to Goldman Sachs, Generative AI is capable of increasing global GDP by 7% or 7 Trillion USD and increasing productivity growth by 1.5 percentage points over the last 10-year period [7].

The application of Generative AI in higher education is supported by personalized learning, writing assistance, knowledge sharing, and collaborative research and analysis without having to worry about accuracy, privacy, ethical issues, personal development, career prospects, and social values. Generative AI technology able to improve the experience and learning outcomes in higher education. This is a challenge and opportunity for universities to increase more advanced innovation by utilizing generative AI and avoiding misuse of generative AI. Strict monitoring continues to be carried out to prevent plagiarism and ethical violations [8]. However, the challenges for higher education institutions with generative AI, especially in terms of plagiarism and data security, must continue to be vigilant

ChatGPT was launched on November 30, 2022, and has reached 100 million users to become the fastest-growing application [9]. Able to create impressive prose in seconds, create a lot of hype, and predict student assessments and other things in higher education ChatGPT uses advanced language to produce text that looks exactly like it was written by a human and conversations with users that look natural and real [10]. Use of AI to improve support and be accessible to students through an intelligent system that is adaptive and personalized [11].
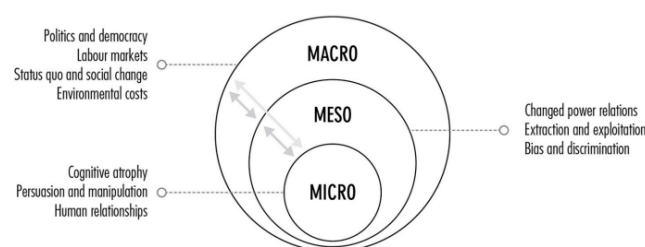

Figure 1 Dangers on the micro, meso, and micro levels Generative AI [12].

The impact of technological change changes values, power constellations, and social structures. Knowing what progress is happening and the impacts that can be detrimental to humans as a community of living creatures. For generative AI to contribute to society, there needs to be socialization by prioritizing fundamental values such as freedom, democracy, sustainability, prosperity, and justice [12]

Utilization of Generative AI technology for learning, writing, and research purposes for students in higher education (1) Supports personalization of learning, if students have difficulty doing assignments Generative AI can act as a virtual tutor and answer questions quickly via ChatGPT. (2) Writing and brainstorming support, students who have difficulty finding ideas/inspiration, ChatGPT can become a virtual assistant. Input questions related to topics; AI output becomes the inspiration for

developing ideas. (3) Research and analysis support the ability to obtain, organize, and consolidate information through literature searches, summarizing reading, and generating hypotheses. (4) Visual and audio multi-media support, students can create works of art that produce images based on commands, text to images, multimedia, and visualizing things. (5) Administrative support Concerning, repetitive and tedious work is handled by AI quickly and efficiently [8].

For education, especially medical education through virtual patient simulations and quizzes for students, criticizing doctor-to-patient communication simulations creating summaries of research articles and helping to write papers on new issues/themes [9]. Practical costs in medical education are quite high and the existence of generative AI helps students carry out virtual simulations without having to pay high costs.
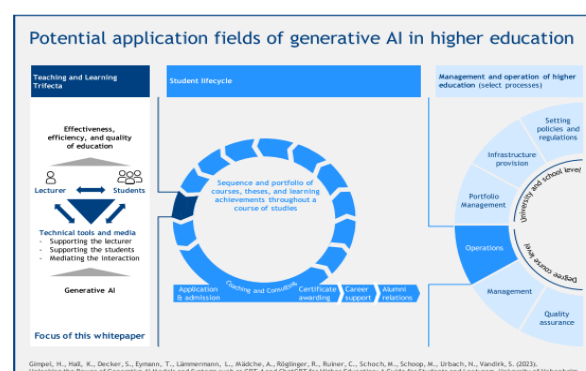

Figure 2 Potential application fields of generative AI in higher education [3].

Generative AI can produce student scientific work that is difficult to detect for plagiarism. Many universities have switched to online assessments whose integrity is questionable, so they occasionally have to look back at exams handwritten by students [13].

Generative AI is able to extract emotions from a text using sentiment analysis methods to detect emotions (angry, happy, doubtful, and anxious) [14]. Generative AI can replace the role of humans in the future, people will be more likely to learn with AI than learn with lecturers so this is a big challenge for lecturers to be more innovative in delivering material by continuing to explore the potential and abilities of students according to their fields and expertise.

The purpose of this paper is to determine the challenges and opportunities to which generative AI is applied as a technology in higher education. The method used is a survey from research that has been conducted previously. This paper consists of background, research methods, results, and discussion and conclusions. The hope is that this paper can provide understanding and information regarding the impact of using generative AI as technology for learning in higher education. This article aims to answer the impact of generative AI as technology in higher education.

2. Method

The survey aims to answer all questions specifically based on previous research systematically according to predetermined keywords [15]. The collected data is coded and classified based on keywords related to generative AI in higher education. There are three stages of a systematic literature review, namely planning the review, carrying out the review, and reporting the review by conducting a meta-analysis [16]. The process of searching for articles based on keywords. References are obtained from conference results, both national and international conferences, journals sourced from science direct, springer, google scholar, working papers, and articles on websites [17].

Searching for articles based on existing keywords can be done by searching the internet ("A Systematic Review" OR "SLR") AND ("Generative AI" OR "GenAI") AND ("Learning" OR "Sharing Knowledge") AND ("Innovation" OR "Regeneration" OR "Newness" OR "Renewal"). Determining exclusion criteria so that the theme does not deviate from the predetermined topic. Articles that do not match the topic will be removed or not included. The selected articles are articles published from 2004 to 2023 which is seen in table 1

Table 1 Year of Publication of Article

Year	Amount	Percentage
2004	1	4%
2009	1	4%
2016	1	4%
2019	1	4%
2022	1	4%
2023	23	82%
Total	28	100%

The years of publication of the articles were 2004, 2009, 2016, 2029 and 2022, each with 1 article (4%), while the most articles were in 2023, with 23 articles (82%). Articles from 2004 to 2019 contained theories related to systematic literature reviews, while those in 2022 and 2023 contained themes related to generative AI

Table 2 Number of Studies in Selected Sources

Sources	Studies Found	Candidate Studies	Selected Studies
IEE-Explore	5	2	1
Science Direct	6	4	3
Springer Link	5	4	4
Google Scholar	23	20	19
Website	2	1	1
Total	41	31	28

The number of studies in selected sources consists of studies found from IEEE-Explore 5, Science Direct 6, Springer Link 5, and Google Scholar 23, website 2. Meanwhile, for candidate studies from IEEE-Explore, there are 2, Science Direct 4, Springer Link 4 Google Scholar 19, and Website 1. Papers that have selected studies from IEEE-Explore are 1, Science Direct is 3 papers, Springer Link is 4, Google Scholar is 20 and Website is 1

3. Result

The author's background based on work background includes academics, industry, and the public sector. Based on publishing outlets, it consists of journals, conferences, websites, and working papers. Meanwhile, the author's country of origin can be seen in the table 3.

Table 3 Country of Origin of Authors

Authors	Country	Amount
Robin Bell	United Kingdom (UK)	27
Yogesh K. Dwivedi		
Laurie Hughes		
Emma Louise Slade		
Hanaa Albanna		
Dimitrios Buhalis		
Tom Crick		
Scott W. Cunningham		
Gareth H. Davies		
Denis Dennehy		
Yanqing Duan		
John S. Edwards ag,		
Paul Jones		
Sangeeta Khoran		
Paul Latreille		
F. Tegwen Malik		
Marcello Mariani		
Emmanuel Mogaji		
Siobhan O'Connor		
Savvas Papagiannidis		
Giampaolo Viglia		
Paul Walton		
Barbara Kitchenham		
O. Pearl Brereton		
David Budgen		
Mark Turner		
John Bailey		
Stephen Linkman a		
Heather Bell	USA	30
Nir Kshetri		
Anand Jeyaraj		
Alex Koohang		
Manju Ahuja		
Laurence Brooks		
Varun Grover		
Iris Junglas		
Kai R. Larsen		
Abbas Mardani		

Authors	Country	Amount	Authors	Country	Amount
Sunil Mithas			Katherine K. W. Lee		
Jeretta Horn Nord			Carlos Flaviʹan	Spain	1
Fevzi Okumus			Robin Gauld ai	New Zealand	5
Bernd Carsten Stahl			Alexander Richter		
Viswanath Venkatesh			Hazem Zohny		
Ryan Wright			John McMillan		
Craig Van Slyke			Mike King		
Richard D. Johnson			Mei-Chih Hu	Taiwan	1
Jalal Sarabadani			Marijn Janssen	Netherlands	1
Regina Kaplan-Rakowski			Sascha Kraus	South Africa	1
Kimberly Grotewold			Sven Laumer	Germany	18
Ting Wang			Wil van der Aalst bs		
Brady D. Lund			Henner Gimpel		
Nishith Reddy Mannuru			Kristina Hall		
Zoë A. Teel			Stefan Decker		
Aras Bozkurt			Torsten Eymann		
Junhong Xiao			Luis Lämmermann		
Sarah Lambert			Alexander Mädche		
Angelica Pazurek			Maximilian Röglinger		
Helen Crompton			Caroline Ruiner		
Arpan Kumar Kar	India	11	Manfred Schoch		
Vishnupriya Raghavan			Mareike Schoop		
Janarthanan Balakrishnan			Nils Urbach		
Sriparna Basu			Steffen Vandirk		
Indranil Bose			Olaf Zawacki-Richter		
Rahul Dʹ			Victoria I. Marín		
Rohita Dwivedi			Melissa Bond		
Neeraj Pandey			Franziska Gouverneur		
Nishith Pathak			Ilias O. Pappas	Norway	2
Ramakrishnan Raman			Henrik Skaug Sætra		
Nripendra P. Rana			Jan Pries-Heje	Denmark	1
Abdullah M. Baabdullah	Saudi Arabia	2	Samuel Ribeiro-Navarrete	Poland	2
Mousa Ahmad Albashrawi			Manoj Kumar Tiwari		
Adil S. Al-Busaidi	Oman	1	Michael Wade	Switzerland	1
Yves Barlette	France	6	Jochen Wirtz by	Singapore	3
Soumyadeb Chowdhury			Jürgen Rudolph		
Rameshwar Dubey			Samson TanB Shannon Tan		
Margherita Pagani			David Baidoo-Anu,	Canada	5
Sven-Volker Rehm			Leticia Owusu Ansah		
Frantz Rowe			Gunther Eysenbach		
Lemuria Carter	Australia	12	Peggy Hartwick		
Asanka Gunasekara			Kevin Papin		
Jessica Leigh Pallant			Emmanuel Mensah Bonsu	Ghana	2
Jason Ian Pallant			Daniel Baffour-Koduah		
Ekaterina Pechenkina			AWS	Indonesia	9
Ang Liu			Meyliana		
Miriam Sullivan			Achmad Nizar Hidayanto		
Andrew Kelly			Eko K. Budiardjo		
Paul McLaughlan			Suarifqi Diantama		
Ping Xiao			Dewi Yanti Liliana		
Yuanyuan Chen			Rizki Elisa Nalawati		
Weining Bao			Bambang Warsuta		
Robert M. Davison	Hongkong	5	Sugiyanto		
Cecilia Ka Yuk CHAN1			Ömer Aydin	Turkey	2
Wenjie HU			Enis Karaarslan		
Cecilia Ka Yuk Chan			Weng Marc Lim	Malaysia	1

Authors	Country	Amount
Agostino Marengo Alessandro Pagano	Italy	2
Jenny Pange	Greece	1
Hao Yu Yunyun Guo Yun Dai Cher Ping Lim	Cina	4

Author terbanyak berasal dari negara USA yaitu sebanyak 30 author, UK sebanyak 27 author, Germany sebanyak 18 author, autralia sebanyak 12 author, India sebanyak 11 author, Indonesia sebanyak 9 author, France sebanyak 6 orang, Hongkong, Canada dan New Zealand masing-masing sebanyak 5 author, Cina sebanyak 4 author, Singapore 3 author, Nurwey, Poland, Ghana, Turkey, Italy dan Saudi Arabia masing-masing sebanyak 2 author, Spain, Taiwan, Netherlands, Sorth Africa, Denmark, Switzerland, Malaysia dan Greece masing-masing sebanyak 1 author.
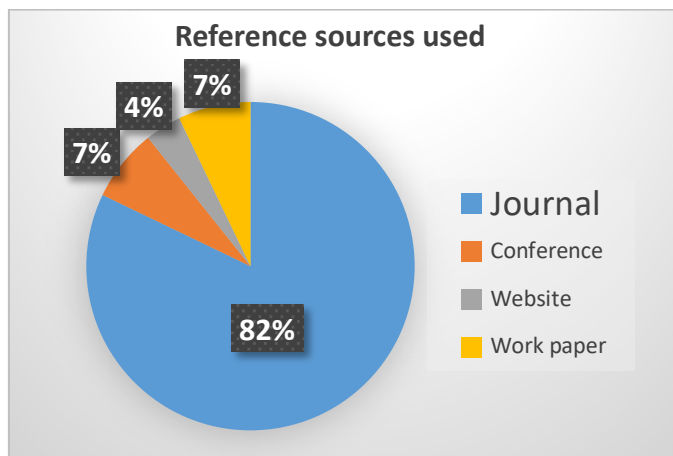

Chart 1 Reference sources

Papers based on publishing outlets sourced from journals as many as 23 papers (82.1%), conferences as many as 2 papers (7.1%), websites as many as 1 paper (3.6%), and working papers as many as 2 papers (7.1%). Meanwhile, based on the frequency of publications, the highest number of papers was obtained in 2023, namely, 21 papers (82.1%), followed by papers in 2004, 2009, 2016, 2019, and 2022 with 1 paper each (3.6%). This shows that the paper used as material for the systematic literature review is the latest and is being widely discussed by many researchers.

Previous research results explain that the existence and application of Generative AI have had positive and negative impacts on the world of education as the basis for the findings of this study. These positive and negative impacts are the reference in the analysis and interpretation process of the systematic literature review results as seen in Table 4

Table 4 Positive and Negative Impacts of Generative AI

Positive Impacts	Negative Impacts
a. Improve the world of education business, edit content faster, and get better results [2].	1. Privacy and data security threats [2]
b. Increased lecturer perspective and high student involvement [18], [19].	2. Replacing the role of teachers to reduce the number of teachers [18] and student cheating increases when doing assignments [20]
c. AI is a friend who can respond quickly like humans [21]	3. It is better to ask questions on ChatGPT than to read books so that students' literacy levels decrease [8]
d. Personalization, adaptive testing, predictive analytics, and chatbots for learning and research [22], [23]	4. Sorting the resulting AI answers takes too much time and effort [19]
e. Curriculum assessment and development as well as technology management are easier [24]	5. Dependence, and misuse of data or manipulating initial data and creating a risk of data misuse [20]
f. Create manufacturing prototypes faster and add large amounts of synthetic data sets [7]	6, Plagiarism and use of invalid sources [20]
g. Reduces anxiety and increases students' self-confidence [19]	7 Replaces the role of evaluator, validator, and teacher/mentor in the learning process [20].

Issues and problems related to the impact of Generative AI on the world of education are becoming increasingly clear. The capabilities and advantages make Generative AI a choice that cannot be underestimated and avoided.

Generative AI technology is a positive opportunity as well as an ethical and legal challenge that hurts individuals, society, and organizations. Benefits for increasing business in various sectors including the world of education. It is necessary to consider the use of Generative AI in light of its limitations, threats to the privacy and security of personal data, and misuse of information [2].

The future of the world of education in the future will coexist with Generative AI as a transformation and reform of the future of education. Questions that must be answered with the existence of AI include how Generative AI is used in the world of education, what ideas should be taken to utilize Generative AI, what Generative AI can help with, and what will become of the world of education with the existence of Generative AI. The

positive side of generative AI is that it is a friend who responds quickly like humans with judgment accuracy [21].

4. Discussion

The positive thing for teachers who use Generative AI is the higher the level of teacher perspective. Increasing the professionalism of lecturers and becoming a valuable tool for students, improving writing, and increasing student involvement in learning. Negative things have an impact on teachers who have to prepare learning well and the level of stress and anxiety for teachers with the replacement of the teacher's role with generative AI [18]. Risks and limitations as well as cultural differences, language, and ethical implications need to be addressed effectively [22].

Based on previous research and referring to several references, ChatGPT usage capabilities of learning in higher education
A. Language Generation where ChatGPT can produce text that is high quality and makes sense. Generative AI with sophisticated tools can simplify the development of generative AI models such as python programming languages Swift and Java. Python itself is most commonly used for easy-to-learn AI coding and supports AI development. Students and lecturers can easily learn these three languages because the library materials are quite extensive and the programming languages are very easy to learn and analyze [14].
B. Question answering, namely the ability to answer questions with high accuracy and being able to retrieve information from external sources such as Wikipedia [18]. In addition, the ability to generate conversational sense and respond naturally to user requests [21].
C. Text completion can complete incomplete text using the context of previous information [5]. The use of generative AI in creating learning content with better creativity to handle complex tasks that require serious solving. Generative AI also allows students to brainstorm new ideas by converting simple text into complete content in seconds. [22].
D. Language Translation, namely being able to translate text from one language to another with reasonable accuracy [21]. Generative AI helps students and lecturers translate large amounts of content through other language translations quickly. Especially learning materials in foreign languages that students often have difficulty interpreting. However, with generative AI, students and lecturers can translate into various languages quickly.
E. Summarization, namely the ability to summarize long texts and provide the most important core information [20]. Generative AI is able to read long texts, especially lecture texts, and summarize them to understand the main idea of the text. Students and lecturers are helped in making summaries of various lecture materials [18]. Generative AI can even summarize various types of content at once so that students can use the content to support broader learning

The affordability of technology to educational needs as student-based innovation through empowering students and improving educational experiences and resources. Collaboration between stakeholders is needed to overcome the challenges of student learning, curriculum adjustments, assessment, development, and governance of technology in higher education [24]. The existence of Generative AI can design more innovative assessments [25]. Personalized learning experiences, adaptive testing, predictive analytics, and chatbots for learning and research. Learning is more efficient and education can be adapted to conditions [22].

There is a need to combine technology with traditional teaching methods for effective learning experiences and develop evidence-based guidelines and policies that are integrated with generative AI [26]. Appropriate regulations to ensure the use and development of Generative AI so that it does not cause negative impacts at the micro, meso, and macro levels [12]. Appropriate policies influence higher education decision making and the use of ChatGPT for the learning process has been implemented in various tertiary institutions to simplify and help students optimize learning outcomes [27]. Generative AI has replaced educational activities which used to be the prerogative of teachers, so it is necessary to separate the role of technology and the role of teachers who remain oriented towards future education. Universities need to make innovative efforts to carry out literacy and encourage teachers to think critically to adopt Generative AI [28].

One of the impacts of generative AI is replacing humans in doing work. As with the work of lecturers who are greatly assisted by generative AI, lecturers must be more innovative in providing learning materials. Generative AI will not replace the core work of lecturers in creating learning experiences, motivating and providing inspiration in finding students' talents and interests. Generative AI is also unable to replace the relationship between students and their families. However, to overcome the potential and social impacts, especially in ethical violations and plagiarism and other violations, it is the main task of stakeholders and universities so as not to cause high anxiety among educators. Changes must be made immediately and policies related to learning must be made as well as possible so that the development of generative AI in the future continues to provide positive benefits and minimizes the negative impacts of generative AI. So that students, lecturers, and universities benefit from generative AI for the progress and improvement of the quality of learning in higher education.

The development trend of Generative AI in the world of education is seen from 4 perspectives, namely (1) Personalized education, (2) intelligent teaching, (3) Collaborative education, and (4) virtual learning. Proposed solutions include developing clear and fair algorithms, improving technology for encryption creating laws or regulations to protect data, and improving the quality and quantity of data [23]. The learning process requires a long time and extra energy to sort student answers using generative AI [19].

5. Conclusion

The literature review was produced by research originating from several sources including Science Direct, Springer Link, Google Scholar, and the website. Most sources were obtained from Google Scholar, followed by Springer Link, Science Direct, and Website. In its use, ChatGPT must have a party that verifies it by scientific essence.

The authors are mostly from academia, followed by public sector and industry, with publication years between 2004 - 2023. The largest number of authors are from USA, UK, Germany, Australia, and India. The rest come from countries such as France, Hong Kong, Canada, New Zealand, China, Singapore, Nurwey, Poland, Ghana, Turkey, Taiwan, the Netherlands, North Africa, Denmark, Switzerland, Malaysia, Indonesia, and Greece

Generate advanced text that exactly matches human creation recognize patterns and create new data based on those patterns and edit content [2]. Automate tasks that were previously completed manually by lecturers and students [4]. Helping with complex tasks, promoting personalized and interactive learning, and facilitating formative assessment with feedback [5]. Write essays with text-based conversations or speech [1] and add large amounts of synthetic datasets [7].

However, the sophistication of generative AI also has an impact on decreasing knowledge productivity. Ethics and law are challenges in themselves [2]. Cheating and hindering skill development, [4]. resulting in misinformation bias and low levels of privacy [5].

The application of generative AI in higher education to support and facilitate learning so that the results are more effective and efficient and not detrimental to all parties requires policies and rules as well as expert validation. Usage regulations and things that are not prohibited must be clear. Because if you use generative AI incorrectly it will be detrimental to students, teachers, and universities themselves. However, on the contrary, the existence of generative AI must have a positive impact on the learning process and help solve various problems in higher education, including in the fields of research and other decision-making.

The steps taken after the literature review are to create a basic concept for implementing Generative AI to support effective and efficient learning for each university. Assessment of student learning outcomes using integrated AI with more transparent and accurate results.

This study has limitations that are not discussed in this literature review and will be developed and conducted in subsequent research such as the number of references used is still limited to 28 papers while research discussing generative AI is very much especially in the last three years. The time period of reference sources is still quite limited and the selection of databases in searching for reference sources is also still very limited. Further research will be carried out after this systematic literature review, namely regarding the creation of a learning model using generative AI as an interactive learning tool

References

[1] R. Huang, "Entrepreneurship education in the era of generative artificial intelligence," *Entrep. Educ.*, vol. 4, no. 0123456789, pp. 1–2, 2023, doi: 10.1007/s41959-023-00099-x.

[2] Y. K. Dwivedi *et al.*, "'So what if ChatGPT wrote it?' Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy," *Int. J. Inf. Manage.*, vol. 71, no. March, 2023, doi: 10.1016/j.ijinfomgt.2023.102642.

[3] C. Ruiner *et al.*, "Unlocking The Power Of Generative Ai Models And Systems Such As Gpt-4 And Chatgpt For Higher Education Henner Gimpel Sciences Karlsruhe Institute of Technology," 2023.

[4] C. Van Slyke, R. Johnson, and J. Sarabadani, "Generative Artificial Intelligence in Information Systems Education: Challenges, Consequences, and Responses," *Commun. Assoc. Inf. Syst.*, vol. 53, no. 1, pp. 1–21, 2023, doi: 10.17705/1cais.05301.

[5] D. Baidoo-Anu and L. Owusu Ansah, "Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning," *SSRN Electron. J.*, no. April, 2023, doi: 10.2139/ssrn.4337484.

[6] E. M. Bonsu and D. Baffour-Koduah, "From the Consumers' Side: Determining Students' Perception and Intention to Use ChatGPT in Ghanaian Higher Education," *J. Educ. Soc. Multicult.*, vol. 4, no. 1, pp. 1–29, 2023, doi: 10.2478/jesm-2023-0001.

[7] "Apa itu AI Generatif? - Penjelasan Kecerdasan Buatan Generatif - AWS." https://aws.amazon.com/id/what-is/generative-ai/ (accessed Aug. 25, 2023).

[8] C. K. Y. Chan and W. Hu, "Students'Voice on Generative AI: Perceptions, Benefits, and Challenges in Higher Education," 2023, doi: 10.1186/s41239-023-00411-8.

[9] G. Eysenbach, "The Role of ChatGPT, Generative Language Models, and Artificial Intelligence in Medical Education: A Conversation With ChatGPT and a Call for Papers," *JMIR Med. Educ.*, vol. 9, 2023, doi: 10.2196/46885.

[10] S. T. B and S. T. C, "ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?," *J. Appl. Learn. Teach.*, vol. 6, no. 1, 2023, doi: 10.37074/jalt.2023.6.1.9.

[11] O. Zawacki-Richter, V. I. Marín, M. Bond, and F. Gouverneur, "Systematic review of research on artificial intelligence applications in higher education – where are the educators?," *Int. J. Educ. Technol. High. Educ.*, vol. 16, no. 1, pp. 0–27, 2019, doi: 10.1186/s41239-019-0171-0.

[12] H. S. Sætra, "Generative AI: Here to stay, but for good?," *SSRN Electron. J.*, pp. 1–7, 2023, doi: 10.2139/ssrn.4315686.

[13] H. Zohny, J. McMillan, and M. King, "Ethics of generative AI," *J. Med. Ethics*, vol. 49, no. 2, pp. 79–80, 2023, doi: 10.1136/jme-2023-108909.

[14] K. Chatgpt, G. Ai, G. A. Network, L. Review, and B. Ai, "Is ChatGPT Leading Generative AI ? What is Beyond Expectations ? Is ChatGPT Leading Generative AI ? What is Beyond

Expectations ? implementation areas . Even though companies like Google and Meta had chatbots , ChatGPT became popular as insight into the u," no. January, 2023.

[15] B. Kitchenham, O. Pearl Brereton, D. Budgen, M. Turner, J. Bailey, and S. Linkman, "Systematic literature reviews in software engineering - A systematic literature review," *Inf. Softw. Technol.*, vol. 51, no. 1, pp. 7–15, 2009, doi: 10.1016/j.infsof.2008.09.009.

[16] B. Kitchenham, "Procedures for Performing Systematic Reviews," 2004.

[17] Meyliana, A. N. Hidayanto, and E. K. Budiardjo, "The critical success factors for customer relationship management implementation: a systematic literature review," *Int. J. Bus. Inf. Syst.*, vol. 23, no. 2, pp. 131–174, 2016, doi: 10.1504/IJBIS.2016.078904.

[18] R. Kaplan-rakowski, P. Hartwick, K. Papin, and L. Université, "Generative AI and Teachers ' Perspectives on Its Implementation in Education," vol. 34, pp. 313–338, 2023.

[19] S. Diantama, "Pemanfaatan Artificial Intelegent (AI) Dalam Dunia," *DEWANTECH J. Teknol. Pendidik.*, vol. 1, no. 1, pp. 8–14, 2023.

[20] D. Y. Liliana *et al.*, "Kajian Pemanfaatan Teknologi Artificial Intelligence Generatif dalam Aktivitas Akademik di Politeknik Negeri Jakarta," in *SNIV, Seminar Nasional, Inovasi Vokasi*, 2023, vol. 2, no. 1, pp. 523–533.

[21] W. M. Lim, A. Gunasekara, J. L. Pallant, J. I. Pallant, and E. Pechenkina, "Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators," *Int. J. Manag. Educ.*, vol. 21, no. 2, p. 100790, 2023, doi: 10.1016/j.ijme.2023.100790.

[22] T. Wang *et al.*, "Exploring the Potential Impact of Artificial Intelligence (AI) on International Students in Higher Education: Generative AI, Chatbots, Analytics, and International Student Success," *Appl. Sci.*, vol. 13, no. 11, 2023, doi: 10.3390/app13116716.

[23] H. Yu and Y. Guo, "Generative artificial intelligence empowers educational reform: current status, issues, and prospects," *Front. Educ.*, vol. 8, no. June, pp. 1–10, 2023, doi: 10.3389/feduc.2023.1183162.

[24] Y. Dai, A. Liu, and C. Ping, "Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education," *33rd CIRP Des. Conf.*, vol. 00, pp. 1–7, 2023.

[25] M. Sullivan, A. Kelly, and P. McLaughlan, "ChatGPT in higher education: Considerations for academic integrity and student learning," *J. Appl. Learn. Teach.*, vol. 6, no. 1, pp. 31–40, 2023, doi: 10.37074/jalt.2023.6.1.17.

[26] C. K. Y. Chan and K. K. W. Lee, "The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and Millennial Generation teachers?," no. 2018, 2023, [Online]. Available: http://arxiv.org/abs/2305.02878.

[27] P. Xiao, Y. Chen, and W. Bao, "Waiting, Banning, and Embracing: An Empirical Analysis of Adapting Policies for Generative AI in Higher Education," *Rev. Alyoda*, no. 2023–1, pp. 1–33, 2022, doi: 10.35562/alyoda.8744.

[28] A. Bozkurt, "Futures on ChatGPT and Generative Artificial Intelligence (AI): A Collective Reflection from the Educational Landscape," *Asian J. Distance Educ.*, vol. 18, pp. 53–130, 2023.