The Contradictions of Science and Technology Development Among Gen Z: A Case Study of the Use of Artificial Intelligence (AI) Among Diponegoro University Students

Fidel **Satrio Hadiyanto [1], *Luke* Verdien Wiranegara [1], *Sri* Sudarsih[1*]**

[1] Department of History, Faculty of Humanities. Universitas Diponegoro, Semarang Indonesia

Abstract. Since the 21st century, Artificial intelligence has become part of people's daily lives. Its history can be traced back to 1950 when Alan Turing created the imitation games, also known as The Turing Test. Its development has been very rapid since then until it is used in various sectors. In 2020, ChatGPT appeared, which is able to create an article just by writing the desired article on the application. As a result, there was a shock to the academic world. This article tries to find out the role of AI among Undip students and its impact on lectures. The research method used is a qualitative method based on literature studies and questionnaires. The use of AI has a positive impact on students in doing their assignments, although it is feared that it will have a negative impact.

[1] Corresponding author: srisudarsih012005@yahoo.com

1 Introduction

1.1 What Is Artificial Intelligence

During the Covid 19 Pandemic, every aspect of life was restricted in order to prevent the spread of the virus among people. Because of it, almost every activity was done at home. The Internet has become a vital source of information and communication. It created a new society that relies on the internet or Artificial Intelligence as part of life. Around 2022, a new product of AI was booming around the world: ChatGPT. This new kind of AI can generate an essay and chat by just commanding what kind of essay the user wants. This became an internet phenomenon, and many people think it will change the ways of life, especially in academic life. But if you research, the product of AI itself is way older than you know. It's changed every lifestyle for decades since its first created around the 50s. But What is AI? Encyclopedia Britannica defines AI as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings [1]. This “intelligence” was based on the logical and rational thinking in human thought that can be mechanised to reproduce artificially. This assumption can be done by using some kind of mechanism that uses a physical symbol system (maths) to transfer intelligence. This attempt can be traced back to the 40s. But according to Stephen Cave and Kanta Dihal, AI was a cultural phenomenon that can be traced back in centuries, even millennia. Until the twentieth century, it became technology when industrialized around the world [2]. Rene Descartes in his book, *Discourse on the Method* mentions automata, a control mechanism designed to automatically follow a sequence of operations or respond to predetermined instructions. He stated that automata can be operated without humans, but are capable to interact with humans, although not all of them [3]. Descartes' idea later became prefigures for an English maths professor to create the first AI computer program.

During World War II, British scientists were making a computer program that could break the German Enigma code. Alan Turing, the lead scientist successfully ed created a decryption machine using a maths mechanism to break enigma code. Later this “computing machine” was used as a reference by Turing to answer his old question, can a machine think? Specifically, how computing machines could solve problems by searching through the space of possible problem solutions guided by

heuristic principles. To answer this question, he prepared a test known as the imitation game or Turing test. This test is to determine whether a computer program can interact with humans by guessing their gender [4]. Later, the result of this test known as the theory of computation became the basis of the AI research field. Along time, AI developed into many kinds like smartphones, the internet, and of course software application.

If we draw a common thread for AI that is developing in Indonesia, it was carried out in 2014 with the creation of the Jakarta Smart City (JSC) initiative and the "Making Indonesia 4.0" program. Introduced and developed to respond quickly to public needs. The JSC initiative has made digital mapping with IoT and AI technologies to enhance smart governance, mobility and living [7].

Entering 2015, the Government of Indonesia requires the development of Artificial Intelligence (AI) in industrial innovation to support the industrial revolution 4.0 with the issuance of Law Number 4 of 2014 [5] "concerning industry which places industry as one of the pillars of the economy and provides a large enough role to encourage the progress of national industry" in a planned manner, this is manifested in the establishment of the National Industrial Development Master Plan (RIPIN) for 2015-2035 [6].

This was further developed in 2018 under President Jokowi's Government to make "Making Indonesia 4.0" which refers to the industrial revolution supported by technology and encourages public (government) and private partnerships in the hope of turning Indonesia into a competitive global player. It promotes both domestic and foreign direct investment in AI-based sectors, this is an initiative to seek to accelerate the automation of Indonesian society and is projected to become one of the world's top 10 economies by 2030 [7].

In August 2020 at the Artificial Intelligence Innovation Summit with the Artificial Intelligence Industry Research and Innovation Collaboration (KORIKA), The Indonesian National Strategy on Artificial Intelligence (Stranas KA) was inaugurated by Indonesian Vice President K.H. Ma'ruf Amin on the commemoration of National Technology Awakening Day. This has made the Stranas KA the main guideline in the development and advancement of artificial intelligence which will become the preparation of the Presidential Regulation of the Stranas KA in the future. This is seriously advancing Artificial Intelligence; it is still based on Pancasila values and Indonesia's Vision and Mission for 2045 [8].

1.2 The Use of Artificial Intelligence in The Academic World

The education sector has experienced dealing with the phenomenon of digitalization of the education system through innovative technological applications such as the Massive Open Online Course (MOOC) and Artificial Intelligence. MOOC is a learning innovation in the network and is designed to be open, connected, and networked among others. This has been supported by Artificial Intelligence as an artificial intelligence engine designed to search, present, provide fast, precise and interactive information [9].

The type of artificial intelligence that is dominated by academic circles, especially among students, is the Artificial Narrow Intelligence (ANI) type. ANI is a type of AI designed to perform specific intelligence tasks or commands. The algorithm used in carrying out this specific task uses machine learning a neural networks. The ANI system is built to serve and be reliable in one cognitive ability but does not exceed the limits on skills beyond its design. Some examples of service or applications that implement the ANI system are Chatbots (ChatGPT, Notion AI, Bing AI, etc.) [10].

Thus, the use of artificial intelligence in the form of ANI has brought significant changes among students. Furthermore, among students, this artificial intelligence becomes something meaningful and is used in the study process when it takes place. Therefore, what changes are caused by artificial intelligence which used for the development of the intellectual intelligence from individual students?

2 Methods

This research uses qualitative methods, the data collection method consisted of primary and secondary data. The primary data collect with a literacy study approach and data collection using questionnaires forms, all Diponegoro University students to mapping the extent to which this artificial intelligence was used and how often this artificial intelligence was used. The result will get it are respondent data from two scientific cluster. Also, the secondary data from online exploration of journals, e-books, and scientific articles obtained on Google Scholar, Jstore, Sagepub, Z-library, and Google, also government regulations and online news. Both of this data are collaborated to prove the artificial intelligence has been used and be the part of continuity of academic studies to explain the extent of the intellectual influence of each student referred to in research problems. In the literacy study we conducted a Once collected, we

analysed all data according to the applicable methodology and presented it chronologically and coherently.

3 Result and Discussion

3.1 Artificial Intelligence in a Sociological Perspective

One of the concerns that has occurred among students towards the use of artificial intelligence which is something that is being used is the ChatGPT application which dominates the use by students in the continuation of their studies. ChatGPT is an artificial intelligence language model programmed to analysed large amounts of data, recognize patterns and generate human like conversational responses based on the analysis that has been performed. This artificial intelligence has turned to reflexivity and adopted ironic parody forms to respond critically to the emerging language models of artificial intelligence, its affective and technical qualities. Thus, the potential ethical, social significance in its sociological view [11].

In response to this matter, Sociology has defined the changes that occur as a result of the impact of artificial intelligence as a social phenomenon [12]. This is because it has become part of social life and bound between existing social systems. The social system, according to Parsons, is an interweaving of functioning systems such as norms, values, consensus, and other forms of social cohesion. If drawn on the side of education, it is referred to as the academic community or the scientific society, this is a reciprocal relationship between the giver (lecturer) as educators and students as recipients of the results of the education. Both are built into a form of coordination between social systems [13].

This was responded to by A. Balmer Sociologist from Manchester in his publication, that in the social phenomenon of ChatGPT as artificial intelligence, there are problems in ChatGPT in finding sources, attributions and details on arguments. This is because ChatGPT as a model refers to human writing from a data bank and it is still questionable whether this is a form of plagiarism. Due to ChatGPT's status of truth, ownership, and accuracy of its statements can be exercised with care. According to A. Balmer also mentions that studying ChatGPT has an affective aesthetic style that is embedded in l its conversational approaches, which can pose a significant danger to academic and educational research. It is much more difficult to discern the potential scientific, social and ethical ramifications of his style of speech than of his content [11].

3.2 Artificial intelligence as collaborative partner

As we know, researchers have been using AI as a research tool since the 1960s. Most of them come from the field of science and technology, especially computer science as the parent of AI. But in the field of social humanities, some fields such as anthropology are already using AI as a data search tool. Artificial intelligence has become a subject in several divisions like digital ethnography to obtain data from internet users. Anthropologists see AI as a new tool for their research, especially in ethnography to collect data from human behaviour. The definition of Clifford Geertz's cultural anthropology is to become an interpretative science rather than an explanatory one in search of law. Coincidentally, that interpretation matches Turing's imitation game. The Geertzian saw the matches from the result of the test which successfully interpreted the data [14]. Matt Artz in his article stated all fields in anthropology are disrupted with AI as a collaborative partner to seek a wide perspective in their works [15]. For example, linguistic anthropology can study, reclaim, and teach endangered languages generated from AI where all the data can be stored inside "their mind". With Alan Turing's imitation games theory, the computer with AI can generate any data from the researcher to put it on the test and create the imitation of "ancient language". Like in this field, other social humanities fields were also using these tools.

Let us look at some social fields like sociology, History, and Linguistics. The use of AI such as ChatGPT, Google Forms, translator, etc has been done by some researchers since the internet era flourished around the 21 centuries. Before that, processing some data from the field is hard work that can take a lot of time. AI acted as an assistant researcher by processing many data from real-time interactions with netizens on the internet. Another possibility could be using AI as a real time actor in social experiments to characterise and background search of a subject [16]. Most researchers use search engines like Google that already have a lot of information in their databases. Nowadays, sources such as journals, E-books, and other scientific articles are also accessed on Google. So, its use is already common among academics. The arrival of ChatGPT does cause debate among them, but it does not rule out the possibility that its services will become commonplace.

3.3 The Use of Artificial Intelligence Among Undip Students

Based on the problems of social phenomena that occur, we must review more deeply and describe more about the correlations (relationships) that

will be affected (cause) and things that will have an impact (effect). This cause and effect are the core of the depth study of the main problems in this study. That what must be known in the education process is not just to find a solution to a problem or just something ritual education. However, by understanding deeply the importance of education, that is where the point opens for the purpose of processing oneself to become a person. Therefore, in the academic world (Education) will be trained and educated to become a scientist. Thus, from the end point that must be achieved there must be a process that is faced, especially on ethical values and morals, thinking values, transformation of spiritual values and values of critical thinking [17].
In education, you will face problems such as the process of transferring knowledge, this is because the transfer of knowledge in one direction is nothing. Students are not just objects of receiving knowledge, because teachers must be able to become companions to stimulate critical thinking. Achieving this there is two-way communication and reciprocity. In honing critical thinking, they must be educated in a stimulating learning system called HOTS (High Order Thinking Skills), this also influences the emergence of creative and analytical thinking [17]. This is related to the values contained in the Diponegoro University regulations for achieving graduate grades, namely COMPLETE. These abbreviations are from Communicator (ability to communicate), Professional (work according to principles, develop basic achievements and uphold a code of ethics), Leader (adaptive, responsive, proactive), Thinker (critical thinking, researcher, life learning), Entrepreneur (high work ethic, innovative, skills) and Educator (Teaching agent of change) [18].

According to a survey conducted by study.com to 100 teachers and 1,000 students under 18 years old, at least among college professors, 72% of them are worried about students using ChatGPT to cheat and requested that this application be banned on the campus network [19]. This lecturer worried AI or more specifically ChatGPT can affect students' ability to learn independently, solve problems creatively, and think critically [20]. On the other hand, some scientists consider AI as a collaborative partner in their research because of the ability to collect and generate data in real time. The AI in Education (AIEd) community pushes some educators to increasingly explore the effectiveness of AI in education. But the importance of this movement is to examine student-instructor impact on AI as this machine had a positive and negative impact on it [20].

Interaction between instructors and students can determine the usefulness of AI to counter the negative effects.

We conduct a questionnaire to Undip students about AI's role in their studies. About 76.5% of students admit they used AI in their education. Most of them used it as a data finder, translating language, and learning for doing assignments and tests. ChatGPT became the number 1 AI machine they used.

Fig. 1. Do you use AI in lectures? Shows the using of AI in lectures

Fig. 2. Shows first the using AI in Semester

Students who used it are majority from class of 2021, the exact year that ChatGPT became booming. The Covid-19 pandemic has forced students to take courses from their domicile. If we see it in instructors and students' interaction frame, lack of interaction encourages students to find other ways to learn and receive lecturer material. The lecturer/instructor who does not understand online learning mostly gives them many tasks, rather than educating them. ChatGPT can easily search learning material

and data for task and lecture material. Unfortunately, these students mostly used it for searching data rather than making tasks. Efficiency and time saving become a reason they do it.

4 Conclusion

Artificial intelligence is a new breakthrough in the scientific world. Its emergence has been debated among academics regarding its use in the academic environment. Since 1940, the development of AI has been very rapid, culminating after the internet came into the world. Almost all people use it because it can simplify their work, including academics who are facilitated by their research. In the beginning, there was no problem in using AI. In 2020, a new AI emerged called ChatGPT. This application can create an essay/chat box and search for data practically and effectively. Users can create a scientific article by simply writing what they want. For academics, this can affect the academic world because all research/work can be completed by AI. Based on a questionnaire among Undip students, not a few students use AI to do their assignments. The majority use it to find data or improve their writing. The reason they use this application is because of its effectiveness and efficiency in helping them with their assignments. Uniquely, ChatGPT and other AIs have a positive impact on students rather than a negative impact.

References

1. B.J. Copeland, artificial intelligence. Encyclopedia Britannica, https://www.britannica.com/technology/artificial-intelligence. (July 2023).
2. S. Cave, K. Dihal, Imagining AI: How the World Sees Intelligent Machines, (Oxford University Press, 2023), 2.
3. R. Descartes, Discourse on the method, (Yale University Press, 1996), 34-35.
4. S. B. Copper, J. V. Leeuwen, Alan Turing: His Works and Impacts, (Elsivier, 2013) 580-581.
5. Undang-undang (UU) Nomor 3 Tahun 2014 tentang Perindustrian.
6. Working Group on the National Strategy for Artificial Intelligence, Strategi Nasional Kecerdasan Artifisial Indonesia, (Badan Pengkajian dan Penerapan Teknologi, 2021) 15-19.
7. K. Goode, H. M. Kim, Indonesia's AI Promise in Perspective, (Center for Security and Emerging Technology, 2021), 4-5.

8. Stranas Kecerdasan Artifisial Untuk Jawab Tantangan Industri 4.0 (Media Indonesia, 2021)
9. A. Selin, Peranan Teknologi Artificial Intelligence di Era Revolsui Industri 4.0, (UBD,2022) 5-7.
10. R.S.Y. Zebua, Khairunnisa, D.P. Wahyuningtyas, Fenomena Artificial Intelligence, (PT. Sonpedia Publishing Indonesia, 2023) 10.
11. A. Balmer, A Sociological Conversation with ChatGPT about AI Ethics, Affect and Reflexivity. Sociology, 0(0),1-9 (2023).
12. R. Zulkarnaen, Artificial Intelligence (AI) Dalam Kaca Mata Sosiologi, (Kompasiana, February 19, 2023).
13. M. Syawaludin, Alasan Talcott Parsons Tentang Pentingnya Pendidikan Kultur, Ijtimaiyya, 7, 1, (2014)
14. A. K. Munk, A. G. Olesen, M. Jacomy, The Thick Machine: Anthropological AI between explanation and explication. Big Data & Society, 9(1), 1-2 (2022).
15. M. Artz, Ten Predictions for AI and the Future of Anthropology, (Anthropology News website, 2023)
16. I. Grossman, Beyond the hype: How AI could change the game for social science research, (The Conversation, 2023).
17. S. I. Wijayanti, Ketika Critical Thinking Diuji Chat GPT, (Fisip UI, January 25, 2023).
18. Ketentuan Umum, Peraturan Universitas Diponegoro
19. A. Setiawan, U. Luthfiyani, Penggunaan ChatGPT Untuk Pendidikan di Era Education 4.0: Usulan Inovasi Meningkatkan Keterampilan Menulis. jurnalpetisi, 4(1), 51, (2023)
20. K. Seo, J. Tang, I. Roll, et al. The impact of artificial intelligence on learner–instructor interaction in online learning. Int J Educ Technol High Educ 18(54), 2 (2021).