

The domino effect of artificial intelligence on students' scientific writing quality



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Abstract The Indonesian government is pushing for increased publications with the argument that the benchmark for the productivity of an educational institution is seen from scientific publication data that researchers and research organizing institutions must disseminate. The educational strata level is needed to disseminate the scientific work of students through various media that interested parties can access. Educational tools related to research and publications can be used free of charge or paid to make it easier to produce work. To determine the domino effect of using Artificial Intelligence of Writing Academic (AIWA) on final semester students' scientific work quality, this study used a survey method with the research sample being Masters students who were carrying out and completing writing scientific papers as a fulfillment of graduation requirements with a total of 30 respondents. The sample respondents' criteria were that they could share their experiences in writing their scientific papers. The findings of this assessment proved that the domino effect for completing assignments and making scientific work students utilized and advised colleagues to use it with the assumption of efficiency and effectiveness so that tasks given by lecturers were assisted in their work by AI.

Keywords: artificial intelligence, academic service, domino's effect, scientific writing

1. Introduction

The Indonesian Ministry of Education has defined research into a clear roadmap by mapping the research process from upstream to downstream. The roadmap starts from basic, applied, and development research, all of which must produce research outputs as achievement indicators. Furthermore, these outputs must be disseminated so that their benefits can be used for the welfare of society. This policy is contained in Law no. 11 of 2019, in which Article 21 states that researchers and research organizing institutions must disseminate research and development results. This obligation emphasizes that through dissemination, it is hoped that science and technology can develop rapidly in Indonesia. Therefore, this instruction applies to institutions or research institutions within the Ministry of Education, including educational institutions and research institutions, which are needed to comply with this law.

In 2018, Indonesia was below neighboring countries regarding the number of publications. However, in 2021, exponential scientific publications by Indonesian scholars succeeded in occupying the 21st position, while the previous year was in the 56th position in the world. The government's goal is to encourage publication to be increased with the argument that the benchmark for the productivity of an educational institution is seen from scientific publication data. Andriyansah & Fatimah (2021) say that all levels of educational strata are needed to disseminate the scientific work of their students through various media that interested parties can access.

The success of increasing the number of scientific publications, according to Michalska-Smith and Allesina (2017), is different from quality improvement. According to him, several causes exist, including internal and external authors. The system is the author's external factor that causes low-quality publications. An example of a case that occurs is the consequences of research funds that require the publication of outputs within a period of one year, which is deemed impossible according to the publication system of a reputable journal. On the other hand, from the inner side of the authors, many are more oriented toward achieving publication rewards in the form of incentives from research outcomes. Of course, these two case examples focus more on circumventing administrative and financial laws than on research objectives. Therefore, Berbegal-Mirabent (2021) confirms that there is often a conflict of interest between routine work as a worker and research as an expert scholar. This conflict also occurred with final semester students completing their final assignment as a thesis, thesis, or dissertation at each level of education. Students are needed to disseminate their research results. This factor raises many problems related to the importance of study completion time. If there is no publication at a specific time that has been determined, it will further add to the tuition fees, publication guidance, and publication fees charged to students.



Andriyansah (2014) states that technological support for the education sector is developing rapidly, so it can save time in completing work. Cumming (1998) explains that educational applications or tools related to research and publication can be used free or paid to make it easier to produce work. Currently, an artificial intelligence writing assistant (AIWA) has been developed, which has the ability and facilitates the production of written works (Nazari et al., 2021). However, research conducted by (Challen et al., 2019; Köbis & Mossink, 2021) states that products produced using AI have a meaning bias, so personal control is needed to suit their goals. This opinion is in line with (Baki Kocaballi et al., 2020) that the work's creator should be careful to maintain the authenticity or security of the job because they do not show a strong preference. The following research is not in line with the evidence that using AI can save time Mendizabal-Ruiz et al. (2020). According to Wu et al. (2021), AI can predict what things can be written, making it easier for writers to find writing ideas.

According to Schwendicke et al. (2020), using AI to produce scientific work is a writer's choice who always has the opportunity to answer system needs and conflicts of interest. However, this does not mean that its use has no problems. The challenge to guarantee self-quality and the quality of scientific work also needs to be the author's concern. Therefore, this study aims to determine the domino effect of using AIWAs on final-semester students' quality of scientific work.

2. Literature Review

This session consists of some literature reviews supporting the current study. It presents artificial intelligence, academic service, domino effects, and scientific writing. More detail is as follows:

2.1. Artificial Intelligence

This session describes three essential points about artificial intelligence, including the nature of artificial intelligence, artificial intelligence in education, and the advantages and challenges of artificial intelligence.

2.1.1. The Nature of Artificial Intelligence

Artificial intelligence (AI) is a fact of everyday life in our modern high-tech societies. It has become a buzzword in the twenty-first century and has numerous implications for daily life (Ng et al., (2022). Researchers have claimed several definitions of AI, and each has been revised over time. According to Goralski and Tan (2020), AI currently resolves to challenge cognitive issues connected to human intelligence. AI identifies issues and develops answers that advance humankind, technology, and society as a whole. Nevertheless, creating machines that can think as humans have always been the central idea of AI (Marr, 2018).

Ignoring 'A,' Wang (2019, p. 17) concentrates on 'I': "Intelligence is the capacity of an information-processing system to adapt to its environment while operating with insufficient knowledge and resources." AI is a subfield of computer science concerned with the intelligent behavior of machines. It also refers to the software and hardware that comprise an artificial entity's brain (Dong et al., 2020). Most people believe that artificial intelligence will replace natural intelligence shortly thereafter, but there are still many unresolved issues concerning AI. For instance, the creation of intelligent machines still raises ethical concerns. Therefore, it is crucial to comprehend how AI will possibly alter the world before it becomes too difficult to anticipate challenges in its use.

AI is used in many areas, including the military, healthcare, education, etc. (Srivastava & Waghmare, 2020; Aggarwal et al., 2022). In the military, AI software can assist human soldiers during wars by helping them with their jobs. For instance, an AI system could scan thousands of documents daily to help soldiers research new ideas for military strategies. Healthcare applications use AI to aid doctors in diagnosis and treatment, freeing medical professionals to spend more time with their patients. Finally, educational apps use AI to help students with their assignments by identifying plagiarized material and grammatical errors. As a result, AI has become a hot topic in schools and universities.

2.1.2. Artificial Intelligence in Education

In the last decade, research and development have accelerated in AI in education (Hwang et al., 2020), especially in academic writing. Acquiring academic writing skills is essential in higher education. Across disciplines, it is evident that students have a high demand for inductive and support services for methods of scientific work (Schmohl et al., 2020). Numerous universities now offer specialized academic writing courses in which students learn to write essays using artificial intelligence. This is primarily due to the current need for qualified academic writers. AI is needed for translation, paraphrasing, grammar correction, and obtaining ideas to increase academic writing quality (Alonso, 2022).

In addition, numerous universities now offer contracts to qualified applicants so they can begin writing college or university essays. Universities dare to pay higher salaries to improve the quality of their institutional scientific writing because that will increase their ratings. Therefore, before becoming an academic writer, one must master several AI tools to help them work quickly to meet customers' satisfaction.

Some individuals find it difficult to believe that computers can write better than people. However, many academic writers are now self-taught and embracing this challenge. These individuals devote their time to inexpensively teaching

computers how to write essays. It benefits individuals with busy schedules who want to earn money writing essays online. Instead of receiving payment for their services, contributors to these apps receive helpful information about essay writing. Thus, they can improve their abilities while earning a living through online writing jobs.

AI is expanding rapidly in academic and nonacademic fields due to its potential applications in human life. For example, numerous new applications are currently available for learning how to write with artificial intelligence. It includes self-taught authors and trained university personnel who assist students with their homework. Eventually, the ability of AIs to efficiently produce written materials will revolutionize the future of human communication.

2.1.3. *The advantages and challenges of artificial intelligence*

The following advantages of AI exposed by Khanzode and Sarode (2020) are that AI can finish tasks faster than a human, stressful and complex work can be completed efficiently, difficult work can be done in a short period, various functions can be done in a time, the success ratio is high, fewer errors in task and defects also occur, more efficiency in a short time, less space, and less size with the calculation of long-term and complex situations. However, AI also has some negative impacts when it is misused, leading to mass-scale destruction, program mismatch sometimes done opposite to the command, and human jobs affected. AI results in an increased unemployment problem, creativity is dependent upon programmers, human touch is lacking, the younger generation becomes lazy, considerable time and money are needed, and technological dependency increases. Therefore, it is suggested to use AI based on necessity and needs.

2.2. *Academic Service*

One of the influencing factors in producing quality graduates is the service that is applied to serve customers in the faculty environment, customers, in this case, our students. To achieve quality service that guarantees student satisfaction, as the main actor, educational service organizations must pay attention to academic service satisfaction. Regarding the primary needs of students to obtain academic services, staff and lecturers must provide excellent service to students professionally (Yusa et al., 2021).

Higher education is an industry that has direct interaction between service providers and service users. Several factors determine the quality of higher education based on their relative importance in customer perceptions, namely, reliability, responsiveness, and security. According to Anastasia D. and Ciptono (Marthalina, 2018), academic services are educational services that deal directly with major customers (students) with tertiary institutions, including curriculum, syllabus, lecture quality plans, presentation material units, material presentations, assessments, practices, and mentoring.

Quality services in educational institutions can provide several benefits, including (Harahap et al., 2019):

1. Extending the essential life of an educational institution by providing good service, educational institutions can attract the attention of students and maintain their continuity
2. Appealing to students, good service can increase student satisfaction and increase their loyalty to educational institutions.
3. Make students feel valued. With quality service, students can feel comfortable and cared for by educational institutions.
4. Improving the image of tertiary institutions in the eyes of the public and good service can make tertiary institutions consider quality and professional educational institutions.

More specifically, regarding the dimensions of service quality in tertiary institutions, Kotler & Fox (1995:414) suggest that there are six main dimensions of service quality in tertiary institutions, namely, quality of instruction, academic advising, library resources, extracurricular activity, opportunities to talk with faculty members, and job placement services. First, the dimension of quality of instruction (quality of learning) is related to the ability of the lecturer/instructor to master the material, convey the material, his friend, objective in giving grades, and so on. Second, the dimension of academic advising (academic guidance) is related to lecturers who become academic advisors in terms of continuity, patience, thoroughness, availability of time in providing academic guidance, and so on. Third, the dimension of library resources (supporting resources) includes the availability of laboratories, libraries, and lecture halls. Fourth, the extracurricular activity dimension includes the number and attractiveness of various extracurricular activities and university support for student activities. Fifth, the dimension of opportunities to talk with faculty members (aspects of communication with university leaders/staff) relates to the aspect of ease of contacting leaders/staff at the university, faculty, department, or study program level. Finally, the dimension of job placement services (aspects of administrative services) includes the ability and speed of administration staff at the university, faculty, department, or study program levels in providing services (Sukatin et al., 2022).

2.3. *Domino's Effect*

Domino is the consistency of a road map that is given to provide opportunities for the next step by paying attention to codes, signals, or keys so that if something happens to a behavior, it will trigger reactions to the following behavior as well (Pollock, 2016). According to Kamil et al. (2019), the domino effect can be defined as something that triggers an initial trigger

that starts a series of dominoes that collapse. There are two roles for the primary unit acting as an initiating event, which triggers the involvement of the secondary unit. Furthermore, Kamil et al. (2019) stated that system failures could directly/indirectly affect the associated equipment, causing unexpected process deviations, unscheduled work stoppages, and threats to the environment.

Fogg (2022) emphasized that sophisticated technology will encourage better individual behavior or vice versa. The output that shows success, then the tendency to use technology in completing tasks, will continue. Individuals take advantage of the road map to use the technology without regard to rules. The domino effect has the consequence of a long series of events that can produce positive or negative things because of the chain nature and can cause changes in related behavior (Wunderling et al., 2021).

3. Research Methods

This research starts with a literature review to justify the variables used and ascertain the theoretical intersection between education, technology, and management related to research. The researchers decided to use the survey method. The research sample was Master's students who were doing and finishing writing scientific papers as a final assignment in their program. The researchers expected respondents to share their experiences in writing their scientific papers. Therefore, the number of participants should be limited. To obtain answers from the responses, this research used e-questionnaires that were distributed through colleagues from various tertiary institutions, in which the technique used was consecutive and incidental sampling (Andriyansah, 2023).

4. Results and Discussion

Artificial intelligence is, of course, closely related to technological developments driven by high needs. Technological developments owned by artificial intelligence can carry out human activities. Artificial intelligence was created to support human operations and work, which can also be imitated by artificial intelligence. A state of mind such as humans can communicate words.

4.1. The Term Artificial Intelligence is familiar

The survey conducted using the e-questionnaire obtained 35 data points, but only 15 data points could be used because 20 data points did not meet the requirements as a sample. For this reason, this research will use a sample of 15 corresponding data points from the survey results.

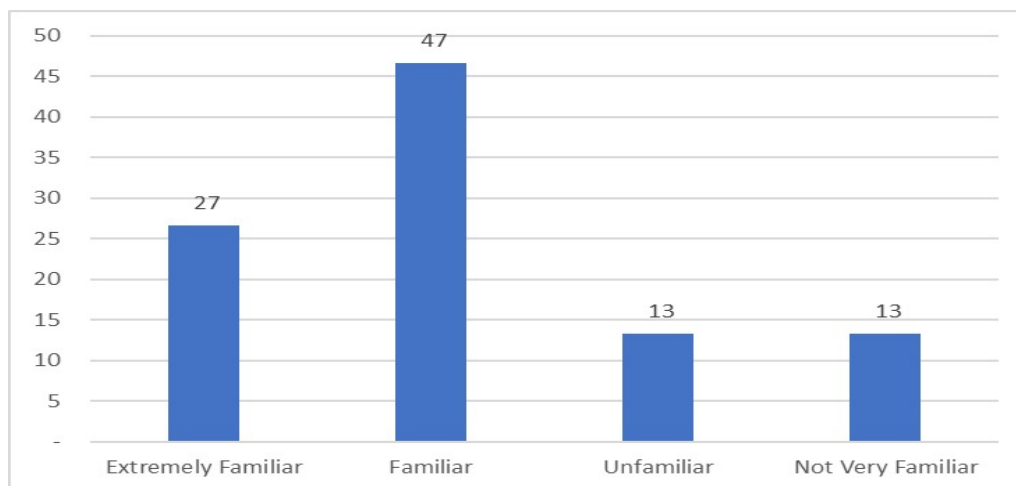


Figure 1 Familiarization with AI.

Figure 1 explains that the respondents who responded to the questionnaire stated that the majority of correspondents confirmed that 47% did not agree if students were deemed not or did not know about AI. Most believe AI can easily support studies with work patterns such as having a frame of mind and reasoning according to human commands. AI is indeed a more advanced artificial intelligence superior in terms of speed and accuracy, which is, of course, essential to help translate ideas. Its speed at translating search commands beats the human way of thinking, so there is no doubt about the speed and intelligence of artificial intelligence. The data above prove that the first hypothesis is not fulfilled because it is proven that students refuse to be considered as not understanding AI.

4.2. Utilizing AI to Write Scientific Papers

The next question is whether students use Ai to write scientific papers. The hypothesis proposed is that the more you understand the use of AI, the easier it will be to write scientific papers. The development of computers from time to time is increasingly sophisticated, with indications of increasing memory capacity, speed, and accuracy of the resulting data. AI is also controlled by how deep and sophisticated the software is on a computer, which supplies the operating system, programming language, and tools needed to create a program. The more sophisticated the computer is, the better the resulting program will be so that the intelligence level of AI will increase. Artificial intelligence makes it easy for humans if their presence is maximized for positive things.

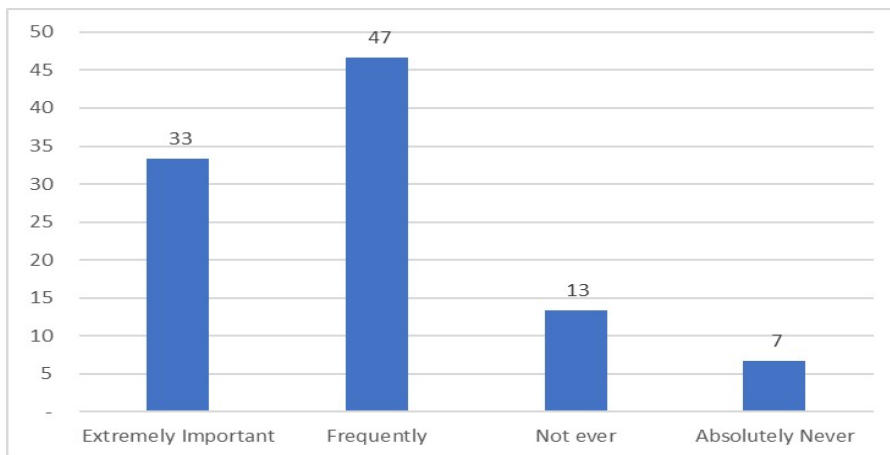


Figure 2 Utilization of AI to Write Scientific Papers.

This research proves that students have used AI to write assignments and even scientific papers. A total of 47% of students did not hesitate to respond that the scientific work they produced resulted from using AI. In addition, 33% stated very often, meaning that 80% of students used this robotic to write scientific papers. The data show clear evidence that today's students very easily complete assignments by utilizing technology.

4.3. Feeling comfortable using AI to complete tasks

The next question is whether students feel comfortable using AI. Whatever the proposed hypothesis is. The more tasks there are, the more comfortable using AI.

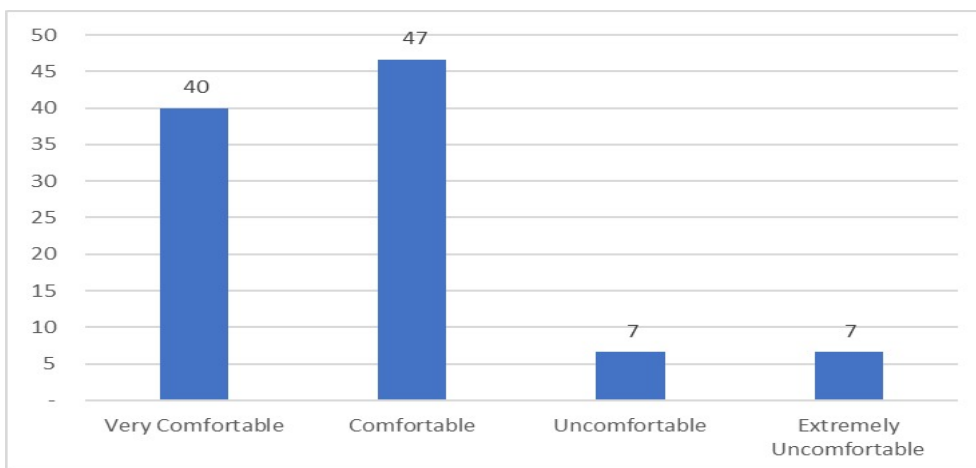


Figure 3 Convenience of Using AI to Complete Tasks.

The next question concerns student behavior after using AI: whether they feel comfortable using AI. The result is that 14% of students feel uncomfortable and uncomfortable using AI.

4.4. Inviting Friends to Use AI

The next question concerns student behavior after using AI, namely, whether to suggest friends use AI. The hypothesis proposed is that the more comfortable students use AI, the more they recommend it to their friends.



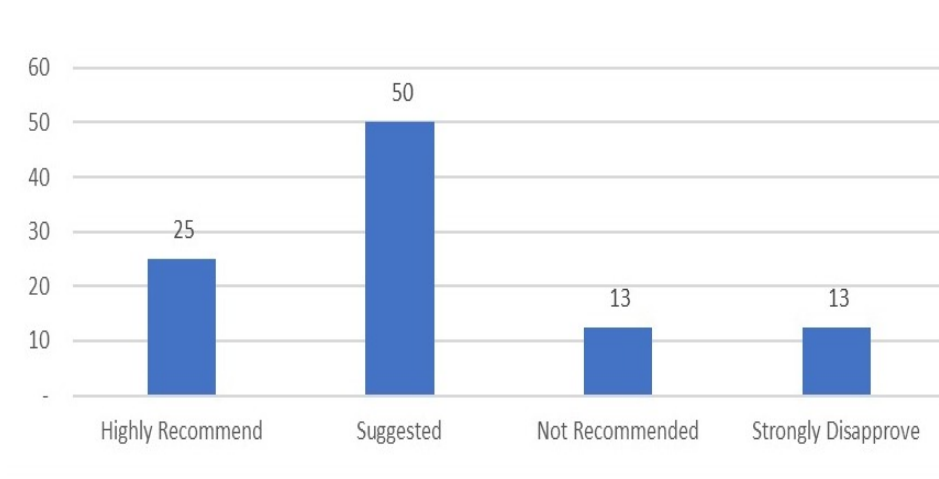


Figure 4 Inviting Friends to Use AI.

The data prove that the majority of students will suggest using AI to carry out the task of writing scientific papers. Fifty percent expressed an attitude of advising their friends, supported by 25% strongly suggesting using AI.

5. Final Considerations

The development of artificial intelligence technology plays an extraordinary role in various fields, including the field of education. The self-learning function of distance education students provides features to act as initiatives with efficient information space from Internet users. Students can find and collect the information they need about their studies. The discussion above found that AI is very familiar among students, not only empirically proving the domino effect for completing assignments and making scientific work students utilize and advising colleagues to use it with the assumption of efficiency and effectiveness so that assignments given by lecturers are assisted in carrying out by AI. Educators must make regulations so that the use of AI is not to complete tasks but only to find inspiration. If everyone has to use AI, the learning process by encouraging thinking and critical thinking will become dull. This research is in line with the findings of previous studies that conventional and distance education have no difference in quality regarding the development of AI. At present, the behavior of students who use AI in carrying out assignments cannot be controlled only by checking similarities to limit plagiarism behavior. This study's findings supported previous theories and phenomena, which proved that the domino effect for completing assignments and making scientific work students utilized and advised colleagues to use it with the assumption of efficiency and effectiveness so that tasks given by lecturers were assisted in their work by AI.

The crime of deception requires that falsifying be supported by external manifestations that promote it and lead others to believe its validity. In the crime of fraud in goods, it is sufficient to have even one false act, statement or gesture directed toward the contracting buyer. In terms of intent, the perpetrator of the crime of deception aims to seize all or part of the victim's wealth. In the crime of fraud in goods, he aims to make a legitimate profit as a result of the victim's being made to make a mistake in both the nature and the type of the goods (Hafez, 1997).

Despite the difference between the two crimes, there is no objection to a situation of moral plurality between the crime of deception on the one hand and commercial fraud on the other, if a commercial transaction is involved, and the lies of the contracting party are accompanied by acts of deception (Obaid, 1979).

Ethical considerations

The present study followed all ethical policies regarding participants and responsible institutions, with the consent of those involved.

Conflict of Interest

The authors declare no conflicts of interest.

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