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Integration of Artificial Intelligence in Completing Final Projects as a Form of Student Independence and Creativity

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Abstract

This research explores the role of artificial intelligence (AI) integration in increasing student independence and creativity while completing the final project in higher education. This research is based on technological advances in artificial intelligence used by students in their final projects as a form of creativity and student independence. This study uses a qualitative approach with a multi-case case study design in two Islamic religious universities. Data was collected through in-depth interviews with several lecturers and students and *top management* as informants, observations, and documentation analysis, which were then analyzed using data reduction techniques and inductive conclusions drawn. The main findings of this study reveal that the application of AI in final projects not only speeds up the completion process but also stimulates students' creativity through advanced analytical tools that allow them to explore innovative solutions to complex problems. In addition, AI will enable students to develop research independence and encourage them to think critically and adaptively to technological changes in an academic context. The research findings as a practical contribution show that integrating AI in the curriculum and final projects can enrich the learning process, broaden academic horizons, and improve students' readiness to face rapidly evolving industry challenges.

Keywords: AI Integration, Student Creativity, Student Independence.

Abstrak

Penelitian ini bertujuan untuk mengeksplorasi peran integrasi kecerdasan buatan (AI) dalam meningkatkan kemandirian dan kreativitas mahasiswa selama proses penyelesaian tugas akhir di perguruan tinggi. Penelitian ini didasari pada kemajuan teknologi berbentuk kecerdasan buatan yang digunakan mahasiswa dalam tugas akhir sebagai bentuk kreatifitas dan kemandirian mahasiswa. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus multikasus di dua perguruan tinggi agama Islam. Data dikumpulkan melalui wawancara mendalam dengan beberapa dosen dan mahasiswa serta *top manajemen* sebagai informan, observasi, dan analisis dokumentasi, yang kemudian dianalisis menggunakan teknik reduksi data dan penarikan kesimpulan induktif. Temuan utama dari penelitian ini mengungkapkan bahwa penerapan AI dalam tugas akhir tidak hanya mempercepat proses penyelesaian, tetapi juga merangsang kreativitas mahasiswa melalui alat analitis canggih yang memungkinkan mereka untuk menjelajahi solusi inovatif terhadap permasalahan yang kompleks. Selain itu, AI memberikan mahasiswa peluang untuk mengembangkan kemandirian dalam penelitian dan mendorong mereka untuk berpikir kritis serta adaptif terhadap perubahan teknologi dalam konteks akademik. Temuan penelitian sebagai kontribusi praktis menunjukkan bahwa pengintegrasian AI dalam kurikulum

dan tugas akhir dapat memperkaya proses pembelajaran, memperluas wawasan akademik, dan meningkatkan kesiapan mahasiswa dalam menghadapi tantangan industri yang berkembang pesat.

Kata Kunci: Integrasi AI, Kemandirian Mahasiswa, Kreativitas Mahasiswa.

Introduction

Increasing student independence and creativity is one of the priorities in developing higher education, especially amid increasingly rapid technological developments.[1] One of the innovations that can support this effort is integrating artificial intelligence (AI) into the learning process and the completion of final projects. AI among STAI Syubbanul Wathon Magelang and IAI An Nawawi Purworejo students is a technical tool and a medium that encourages students to think more critically, innovatively, and independently. AI technology allows students to access information efficiently, structure research in a more structured way, and find creative solutions to various academic challenges.[2] By optimizing AI, higher education is expected to be able to create a learning ecosystem that is adaptive and relevant to global needs.

Previous research has observed how integrating artificial intelligence (AI) can significantly build student independence and creativity. Several studies show that the use of AI in education has positively impacted the learning process and the completion of academic assignments. According to Agarwal, AI students can better analyze data and solve complex problems.[3] Additionally, Alshadoodee's research found that AI technology can help reduce student stress levels, especially in academic challenges that require critical thinking and innovation.[4] On the other hand, Giotis & Papadionysiou revealed that effective AI integration can increase collaboration between students and lecturers, thereby creating a more inclusive and productive learning environment.[5] However, using AI also requires proper management strategies to avoid over-reliance

[1] Erasmo Purificato dkk., "The Use of Responsible Artificial Intelligence Techniques in the Context of Loan Approval Processes," *International Journal of Human-Computer Interaction* 39, no. 7 (2023): 1543–62, https://doi.org/10.1080/10447318.2022.2081284.

[2] Yang Wang dkk., "An improved entity recognition approach to cyber-social knowledge provision of intellectual property using a CRF-LSTM model," *Pattern Recognition Letters* 163 (2022): 145–51, https://doi.org/10.1016/j.patrec.2022.10.001.

[3] Sucheta Agarwal dkk., "Prioritizing the barriers of green smart manufacturing using AHP in implementing Industry 4.0: a case from Indian automotive industry," *TQM Journal* 36, no. 1 (2024): 71–89, https://doi.org/10.1108/TQM-07-2022-0229.

[4] Hasanain Abdalridha Abed Alshadoodee dkk., "The role of artificial intelligence in enhancing administrative decision support systems by depend on knowledge management," *Bulletin of Electrical Engineering and Informatics* 11, no. 6 (2022): 3577–89, https://doi.org/10.11591/eei.v11i6.4243.

[5] Georgios Giotis dan Evangelia Papadionysiou, "The Role of Managerial and Technological Innovations in the Tourism Industry: A Review of the Empirical Literature," *Sustainability (Switzerland)*, 2022, https://doi.org/10.3390/su14095182.

on technology, as Aldulaimi warned. Thus, the application of AI in education presents new opportunities and challenges that require a holistic approach.[6]

The research gap based on the literature in this paper lies in the in-depth exploration of the impact of the integration of artificial intelligence (AI) in building student independence and creativity, especially in completing the final project. First, most previous studies focused more on the use of AI in general learning without specifically highlighting its contribution in the final stages of education, namely the preparation of final projects or theses.[7] Second, although research by Iandolo et al. reveals that AI can improve learning efficiency, the study has not addressed how AI affects students' ability to develop original ideas in the context of academic research.[8] Planned AI integration can create a learning ecosystem that is more adaptive,[9] inclusive, and relevant to global needs[10] while reducing the ability gap among students.[11] This paper offers a new perspective by analyzing how AI serves as a technical tool and a driver of the formation of creative and independent mindsets in college students, which has rarely been the focus of previous literature. Thus, this paper makes not only a theoretical but also practical contribution to the development of AI integration strategies in the higher education environment.

This research aims to analyze the integration of artificial intelligence (AI) as a strategy to increase student independence and innovation as well as creativity, especially in the process of completing student final projects at STAI Syubbanul Wathon Magelang and IAI An Nawawi Purworejo. This research argues that using AI accelerates the completion of academic tasks and encourages students to develop a

[6] Saeed Hameed Aldulaimi dkk., "Experimental perspective of artificial intelligence technology in human resources management," *Studies in Computational Intelligence* 954 (2021): 487–511, https://doi.org/10.1007/978-3-030-72080-3_26.
[7] Yaguang Lin dkk., "An Efficient Approach to Sharing Edge Knowledge in 5G-Enabled Industrial Internet of Things," *IEEE Transactions on Industrial Informatics* 19, no. 1 (2023): 930–39, https://doi.org/10.1109/TII.2022.3170470.
[8] Francesca Iandolo dkk., "Combining Big Data and Artificial Intelligence for Managing Collective Knowledge in Unpredictable Environment—Insights from the Chinese Case in Facing COVID-19," *Journal of the Knowledge Economy* 12, no. 4 (2021): 1982–96, https://doi.org/10.1007/s13132-020-00703-8.
[9] Samuel Fosso Wamba dkk., "Are both generative AI and ChatGPT game changers for 21st-Century operations and supply chain excellence?," *International Journal of Production Economics* 265 (2023), https://doi.org/10.1016/j.ijpe.2023.109015.
[10] Antonio Comi dan Francesco Russo, "Emerging Information and Communication Technologies: the Challenges for the Dynamic Freight Management in City Logistics," *Frontiers in Future Transportation* 3 (2022), https://doi.org/10.3389/ffutr.2022.887307.
[11] Peng Yen Liew dkk., "Smart energy management and recovery towards Sustainable Energy System Optimisation with bio-based renewable energy," *Renewable and Sustainable Energy Reviews*, 2021, https://doi.org/10.1016/j.rser.2020.110385.

critical and innovative mindset when facing academic and professional challenges. Thus, the purpose of this research is to explore the role of artificial intelligence (AI) integration in increasing student independence and creativity during the process of completing the final project at STAI Syubbanul Wathon Magelang and IAI An Nawawi Purworejo, as well as to offer a theoretical contribution to the concept of AI technology-based learning in higher education.

Method

This study uses a qualitative approach with a case study type to analyze the impact of artificial intelligence (AI) integration in increasing student independence and creativity in completing the final project. The qualitative approach was chosen to gain an in-depth understanding of the experiences and views of students and lecturers related to the use of AI in the learning process and the preparation of final projects. This research was conducted in two universities with different characteristics: STAI Syubbanul Wathon Magelang and IAI An Nawawi Purworejo. These two colleges were chosen because of the variation in the institution's size, academic culture, and the application of technology, which provides a comprehensive perspective on how AI is applied to support student creativity and independence.

The two universities that are the location of this research were chosen because each has unique characteristics relevant to applying AI in increasing student independence and creativity. STAI Syubbanul Wathon Magelang, one of the universities focusing on religious education, is committed to developing technology to support innovative and independent learning. IAI An Nawawi Purworejo, with a more flexible and technology-based approach to education, offers an opportunity to analyze how AI can be integrated into the academic process, especially in the completion of final projects. These two universities provide diverse insights into how AI technology is applied to support the development of student creativity and independence in different contexts and the challenges faced in its implementation.

Participants in this study were selected using a purposive sampling technique, taking into account specific criteria so that the data obtained is relevant and provides an in-depth understanding of the application of AI in supporting student independence and creativity. This technique ensures that the information collected comes from individuals

with first-hand knowledge or experience using AI in higher education.[12] This study involved 16 participants, as shown in Table 1, consisting of leaders (top management), lecturers, students, and support staff at both universities. The selection of participants is based on the criteria of experience in using AI in the learning process, research, or preparation of final projects.

Table 1. Research Informant

Participant	Education			Informant code
	Sarjana	Magister	Doctor	
Higher Education Leaders (TM)			2	STAI Syubbanul Wathon (P1), IAI An Nawawi (M1)
Lecturer (L)			4	STAI Syubbanul Wathon (P1), IAI An Nawawi (M1)
Administrative Staff (AS)		2		STAI Syubbanul Wathon (P1), IAI An Nawawi (M1)
Student (S)	6	2		STAI Syubbanul Wathon (P1), IAI An Nawawi (M1)

The interview with participants was conducted to explore their understanding of the application of artificial intelligence (AI) integration in supporting student independence and creativity in completing the final project.[13] During the interview, the researcher used a recording device to record conversations with the participants, which ensured that all the information provided was recorded. Each interview is conducted with an average time of 30 minutes per individual. After the interview, the entire recording is followed by an accurate transcription process, where each conversation revealed by the participant is copied into a document for further analysis. Each participant is given a special identification code to maintain the confidentiality and ethics of research, such as STAI-P1 for Higher Education Leaders at STAI Syubbanul Wathon or IAI-M1 for Students at IAI An Nawawi. This is done so that the real names of the participants are kept confidential so that the data obtained can be analyzed objectively and validly.

After the interviews, the researcher identified and grouped the main themes related to the application of AI integration in increasing student independence and creativity in completing the final project. This process is carried out by reviewing and

[12] Mohamad Anwar Thalib, "Cultural Accounting Research Design Training Using Qualitative Methods," *Komunal Journal of Community Service* 1, no. 1 (2022): 7–14, https://doi.org/10.55657/kjpm.v1i1.17.
[13] Marinu Waruwu, "Educational Research Approaches: Qualitative Research Methods, Quantitative Research Methods and Mixed Research Methods," *Tambusai Education Journal* 7, no. 1 (2023): 2896–2910.

analyzing the interview transcript thoroughly to find patterns and relationships between the views of each informant.[14] The interview protocol used in this study is designed to be flexible yet still structured, allowing the researcher to delve into specific topics relevant to the research while keeping the interview flow directed and not deviating. The researcher also ensures that the information obtained from the participants is kept confidential and only used for this research.

Data analysis was carried out using an interactive model developed by Miles, Huberman, and Saldana (1994), which was described in the journal Assyakurrohim where it was explained that it consisted of four main steps in data analysis: data collection, data reduction, data presentation, and conclusion drawn. The first step is the collection of data obtained through in-depth interviews with participants from the two universities involved in this study.[15] Once the data is collected, the second stage is data reduction, where the researcher summarizes and identifies key interview elements relevant to the research focus regarding the integration of AI in the final project process. The next step is the presentation of data, where the researcher compiles a narrative of the interview results to provide a more comprehensive picture of the participants' views and experiences. Finally, at the conclusion drawing stage, the researcher interprets the compiled data and compiles a synthesis to gain a deeper understanding of the impact of AI integration on student independence and creativity. The data triangulation process was carried out to ensure the validity and consistency of the findings in this study.

Results and Discussion

Independence in Access to Information

This study's first findings reveal that using artificial intelligence (AI) significantly increases students' independence in accessing information.[16] Students now have broader and faster access to various sources of information needed for their research, such as scientific journals, electronic books, and research data that can be further processed. One of the students revealed, "With AI tools, I can access international journals and references that I previously had difficulty getting. This is very helpful in my final

[14] J. R RACO, *Qualitative Research: Qualitative Research Methods*, *EQUILIBRIUM Journal*, vol. 5 (Bandung: Remaja Rosdakarya, 2010).
[15] Dimas Assyakurrohim et al., "Case Study Methods in Qualitative Research," *Journal of Science and Computer Education* 3, no. 01 (2023): 1–9.
[16] Maulidatul Hasanah, "Empowering Educators: A Comprehensive Human Resources: Framework for Improving Islamic-based Schools," *Journal of Islamic Education Research* 5, no. 1 (2024): 31–44.

project research."[17] A lecturer conveyed the same thing: "Students are now more independent in finding the information they need for their final project, without having to rely entirely on the lecturer."[18] With the help of AI, students can find and utilize more diverse and quality references, which are not limited to limited physical libraries or databases, thus giving them the freedom to dig deeper into information.

Through AI, student independence in accessing information becomes more efficient and effective.[19] Students are no longer limited in time or space when looking for references, which allows them to focus more on developing ideas and research to complete the final project. The sophistication of AI technology provides opportunities for students to enrich their research materials, as well as allow them to access various relevant information more quickly. Therefore, the application of AI in higher education not only accelerates the research process but also improves the academic quality of students by providing them with more advanced tools to delve into their research topics more independently.[20]

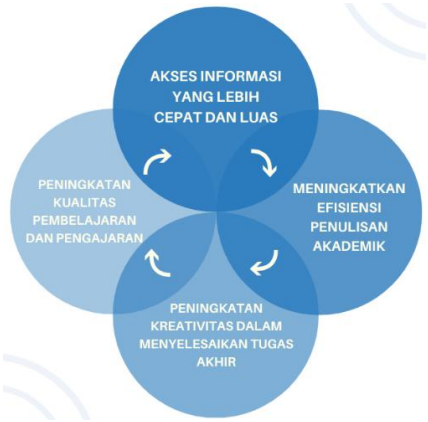

Figure 1. Independence in Access to Information

The application of artificial intelligence (AI) in higher education brings various significant benefits, especially in improving access to information, academic writing efficiency, student creativity, and the quality of learning and teaching. Students can now access information faster and more widely through an AI platform that allows searching for journals, articles, and e-books in seconds, speeding up the research process and final

[17] Interview, P1-S
[18] Interview, P1-L
[19] Maulidiyah Junnatul Azizah Heru dan Muhammad Mushf El Iq Bali, "Crafting Leaders in the Digital Age: How Adaptive Management Strategies Revolutionize Leadership Development in Islamic Schools," *Communautaire: Journal of Community Service* 3, no. 1 (2024): 79–92, https://doi.org/10.61987/communautaire.v3i1.458.
[20] Febrianti, "The Implementation of Augmented Reality in Science Education in Secondary Schools" 02, no. 01 (2023): 34–45.

projects.[21] AI-based tools also improve academic writing efficiency by helping students draft drafts, improve grammar, and ensure their work is plagiarism-free. In addition, AI stimulates student creativity by providing a variety of applications that allow for more innovative exploration of ideas, designs, and data analysis. In the context of learning, AI enables learning tailored to individual needs, improves interactivity, and provides real-time feedback, improving teaching quality and learning outcomes.[22] Thus, AI not only supports the technical aspects of completing the final project but also encourages the development of creativity and effectiveness in the learning process in higher education.

The results of observations and interviews show that the application of AI in higher education focuses on improving access to information and academic efficiency. Students can use AI to find references and information more quickly and accurately, making it easier to work on their final project. Lecturers also use AI platforms to provide direct feedback and optimize the learning process, making teaching more responsive to students' individual needs.[23] Additionally, AI supports students' creativity by offering a variety of tools for data analysis and idea development, enriching their academic experience. In this context, using AI creates space for students to develop more independently and innovatively, without being limited by time and place, and helps create a more efficient, inclusive, and adaptive education system to the ever-evolving development of technology.

Innovative Thinking Power of Students

Encouraging innovation through simulation and prototyping in higher education is one way to improve students' creativity and skills in solving complex problems. Universities provide opportunities for students to learn to use the latest software and technology that can support the innovation process in engineering, design, and social

[21] Quan Zhou dkk., "Transferable representation modelling for real-time energy management of the plug-in hybrid vehicle based on k-fold fuzzy learning and Gaussian process regression," *Applied Energy* 305 (2022), https://doi.org/10.1016/j.apenergy.2021.117853.

[22] Dmitry Ivanov, "Conceptualisation of a 7-element digital twin framework in supply chain and operations management," *International Journal of Production Research* 62, no. 6 (2024): 2220–32, https://doi.org/10.1080/00207543.2023.2217291; A Jauhar Fuad dkk., "AI Hybrid Based Plagiarism Detection System Creation," dalam *2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)*, 2024, 1495–1500, https://doi.org/10.1109/ICACITE60783.2024.10616945.

[23] Shagun Singh Dasawat dan Sachin Sharma, "Cyber Security Integration with Smart New Age Sustainable Startup Business, Risk Management, Automation and Scaling System for Entrepreneurs: An Artificial Intelligence Approach," *Proceedings of the 7th International Conference on Intelligent Computing and Control Systems, ICICCS 2023*, 2023, https://doi.org/10.1109/ICICCS56967.2023.10142779.

sciences.[24] Simulation and prototyping help students to test new concepts and see practical applications of the theories they learn in class. It enriches academic learning and fosters students' confidence in implementing their ideas in real-world contexts. This approach strongly supports the creation of graduates who are ready to face challenges in industry and society and contribute to the advancement of innovation in various fields. The following research results show Encouraging Innovation through Simulation and Prototyping:

Table 2. Interview Data Encourages Innovation through Simulation and Prototyping

Report	Statement	Aspects
University Leadership	We encourage innovation in higher education by applying simulations and prototyping that allow students to develop their creative ideas.	Application of Simulation and Prototyping
Lecturer	In teaching, I use simulations to provide practical experience to students so that they better understand the application of theory in the real world.	Use of Simulation in Teaching
Administrative Staff	We support innovative activities undertaken by students by providing them with the resources they need to develop their prototypes.	Prototyping Support
Student	Using simulation and prototyping helped me understand how the concepts taught could be implemented in practice in the field.	Benefits of Simulation for Students

Table 2 illustrates that the application of innovation through simulation and prototyping in higher education significantly impacts student creativity and the quality of more applied learning. The simulation and prototyping learning process allows students to test the concepts learned in real-life situations and will enable them to design and develop innovative solutions.[25] Applying these methods not only strengthens students' technical skills but also equips them with a deeper understanding of the practical application of the theory taught. Through simulation testing and prototyping, students can gain hands-on experience that encourages innovation development, which will later benefit the development of industry and society.

Implementing innovation through simulation and prototyping in higher education significantly contributes to the development of student competencies. Using simulations allows students to test the theories they have learned in practical and relevant scenarios,

[24] Oladapo Oyebode dkk., "Machine Learning Techniques in Adaptive and Personalized Systems for Health and Wellness," *International Journal of Human-Computer Interaction* 39, no. 9 (2023): 1938–62, https://doi.org/10.1080/10447318.2022.2089085.

[25] Kathrin Cresswell dkk., "Investigating the use of data-driven artificial intelligence in computerised decision support systems for health and social care: A systematic review," *Health Informatics Journal* 26, no. 3 (2020): 2138–47, https://doi.org/10.1177/1460458219900452.

thereby improving their understanding of the application of science in the real world.[26] In addition, students can design prototypes that represent abstract concepts in an applicative and testable form, thus encouraging students' creativity and technical skills.[27] Developing ideas is also an important part, where students are trained to think more innovatively and creatively, preparing them to face the challenges of the world of work with practical skills that suit the needs of the industry.[28] Collaboration with a wide range of stakeholders, including industry, in simulation and prototyping provides students with hands-on experience relevant to the job market's needs.[29] This approach is strengthened by applying problem-based learning methods that encourage students to solve complex problems practically and applicatively, making them more adaptive to various sectors, especially technology and engineering.[30]

Simulation and prototyping in higher education improve the quality of learning, innovation, and student readiness to face professional challenges. Applying this innovative method strengthens the relationship between theory and practice, provides space for students to develop practical skills, and prepares them to innovate and contribute more to industry and society. Through this approach, universities create a more dynamic academic environment and help create a more creative workforce ready to face rapid technological developments.

Creativity through Data Analytics

Creativity through data analysis has become essential in creating a learning approach that is more applicable and relevant to the needs of the professional world in higher education [31]. Students are allowed to develop data analysis skills through various study programs and training that focus on the use of data in decision-making. As stated

[26] Dakir dkk., "Design Seamless Learning Environment in Higher Education with Mobile Device," *Journal of Physics: Conference Series* 1899, no. 1 (2021), https://doi.org/10.1088/1742-6596/1899/1/012175.
[27] Maman dkk., "Google Classroom as a Distance Learning Tool during a Pandemic," *Journal of Physics: Conference Series* 1899, no. 1 (2021), https://doi.org/10.1088/1742-6596/1899/1/012176.
[28] Dinda Febrianti Putri, "HUMAN RESOURCE MANAGEMENT (HRM) IN IMPROVING CUSTOMER BEHAVIOR THROUGH EMOTIONAL ATTACHMENT (EA)," dalam *PROCEEDING OF INTERNATIONAL CONFERENCE ON EDUCATION, SOCIETY AND HUMANITY*, vol. 2, 2024, 850–59.
[29] Faridy dan Rhini Fatmasari, "National assessment management based on information and communication technology and its effect on emotional intelligence learners," *Journal of Physics: Conference Series* 1175, no. 1 (2019): 9–13, https://doi.org/10.1088/1742-6596/1175/1/012225.
[30] Kholilur Rahman dkk., "Effectiveness of Android-Based Mathematics Learning Media Application on Student Learning Achievement," *Journal of Physics: Conference Series* 1594, no. 1 (2020), https://doi.org/10.1088/1742-6596/1594/1/012047.
[31] Dorota Stadnicka dkk., "Industrial Needs in the Fields of Artificial Intelligence, Internet of Things and Edge Computing," *Sensors*, 2022, https://doi.org/10.3390/s22124501.

by the lecturer, "The use of data analysis in learning allows students not only to understand the theory but also to be able to apply it in real situations."[32] That aligns with the leadership's opinion: "We encourage students to use data analysis in their research to produce solutions that are evidence-based and relevant to industry developments."[33] The approach allows students to hone their critical and creative thinking skills and gives them the tools to contribute to data-driven innovation.[34]

So, it can be concluded that applying creativity through data analysis in higher education improves students' technical abilities and encourages them to think more innovatively when facing existing challenges. In addition, using data to design more effective solutions because students are trained to face the dynamics of a professional world that increasingly relies on evidence-based decision-making. This approach enriches the academic experience while contributing to developing competencies needed in this digital era.[35]

Figure 2. Application of Creativity through Data Analysis

As shown in Figure 2, students' creativity in using data analysis in higher education is applied through various activities, ranging from research assignments and projects to practicum activities. Universities provide a variety of facilities and platforms for students to access data that they can use for research and solution development. This approach also recognizes the importance of analytical skills in interpreting data and formulating evidence-based policies, ultimately strengthening the quality of teaching

[32] Interview, M1-L
[33] Interview, M1-TM
[34] Anna Trunk, Hendrik Birkel, dan Evi Hartmann, "On the current state of combining human and artificial intelligence for strategic organizational decision making," *Business Research* 13, no. 3 (2020): 875–919, https://doi.org/10.1007/s40685-020-00133-x.
[35] Tian You Chai, "Development Directions of Industrial Artificial Intelligence," *Zidonghua Xuebao/Acta Automatica Sinica* 46, no. 10 (2020): 2005–12, https://doi.org/10.16383/j.aas.c200796.

and service in higher education.[36] Thus, the creativity generated from data analysis contributes to students' academic progress and increases the relevance of education in higher education with the needs of the industrial world, which is increasingly focused on technology and data.

Makes Writing Easier

Making academic writing easier in college is an essential step in creating an environment that supports the development of practical writing skills among students.[37] Improving the quality of academic writing through technology and a competency-based approach allows students to compile final projects that meet strict academic standards more easily. Colleges provide a variety of writing tools that facilitate students in designing, editing, and verifying the quality of their writing effectively. Using word processing applications equipped with plagiarism checking features and grammar assistance has helped students improve the quality of their writing, thereby making it easier for the writing process in accordance with the scientific rules of the final project. In addition, with the support of lecturers and special training, students can better understand good and correct writing techniques, improving their ability to produce a higher-quality final project.[38] This approach plays a vital role in strengthening the quality of academic services in higher education and supporting students' success in achieving optimal academic achievement. The following research results show the results of informant data for the discussion of Facilitating Academic Writing:

Table 3. Interview Data Makes Writing Easier

Report	Statement	Aspects
University Leadership	"Our university has provided various facilities to make it easier for students to write academically, including plagiarism checking software and adequate writing applications."	Writing Facilities
Lecturer	"We support students by providing training on effective academic writing so that they can write more systematically and follow scientific principles."	Writing Training

[36] Bader Aldughayfiq dan Srinivas Sampalli, "Digital Health in Physicians' and Pharmacists' Office: A Comparative Study of e-Prescription Systems' Architecture and Digital Security in Eight Countries," *OMICS A Journal of Integrative Biology* 25, no. 2 (2021): 102–22, https://doi.org/10.1089/omi.2020.0085.

[37] Sitsofe Kwame Yevu dkk., "Digital twin-enabled prefabrication supply chain for smart construction and carbon emissions evaluation in building projects," *Journal of Building Engineering*, 2023, https://doi.org/10.1016/j.jobe.2023.107598.

[38] Nickolaos Koroniotis dkk., "The SAir-IIoT Cyber Testbed as a Service: A Novel Cybertwins Architecture in IIoT-Based Smart Airports," *IEEE Transactions on Intelligent Transportation Systems* 24, no. 2 (2023): 2368–81, https://doi.org/10.1109/TITS.2021.3106378.

Report	Statement	Aspects
Administrative Staff	"Administrative staff are also involved in managing the system that assists students in submitting scientific papers, speeding up the administrative flow for publication."	Administrative Support
Student	"With various platforms and writing training, I find it easier to compile scientific papers following academic standards."	Student Experience

The results of interviews by Tabel 3, with various informants, show that the university has made it easier for students to write academics through multiple facilities and support provided. University leaders emphasized the importance of writing tools and software that can help students produce quality final projects.[39] In addition, lecturers actively offer training to improve students' academic writing skills so that they can master writing techniques following strict scientific standards.[40] Administrative staff also support the smooth running of administrative processes, such as plagiarism checking and publication management, allowing students to focus on developing ideas and writing.[41] Students admit that the existing facilities and training are beneficial in improving their ability to write final assignments.[42] Overall, the college created a system that supports students in the academic writing aspect, focusing not only on the quality of the writing but also on the smooth administration that comes with it.

Both universities have integrated technology and training to make academic writing more straightforward for students. Facilities such as plagiarism-checking software and adequate writing applications are available to assist students in producing quality scientific papers. In addition, lecturers routinely provide training and guidance regarding academic writing, focusing on writing techniques and developing students' analytical abilities in drafting solid arguments. Administrative staff plays a vital role in facilitating administrative processes related to academic writing, such as submitting scientific papers, checking the completeness of documents, and managing

[39] Femi Olan dkk., "Artificial intelligence and knowledge sharing: Contributing factors to organizational performance," *Journal of Business Research* 145 (2022): 605–15, https://doi.org/10.1016/j.jbusres.2022.03.008.
[40] Sanjani, M. Aqil Fahmi, Robitotul Islamiah, and Linda Maulidiah. "Building Strong Foundations, Educational Management's Contribution to Character Education and Graduate Quality Enhancement." *Ar-Rosikhun: Jurnal Manajemen Pendidikan Islam* 3.3 (2024): 244-257.
[41] Zuhdi, Zuhdi, et al. "Enhancing Learning Quality through Management Support in Crafting Self-Assessment Questions at School." *Communautaire: Journal of Community Service* 3.1 (2024): 1-12.
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publications.[43] This approach shows that the university is committed to improving the quality of students' academic writing through the integration of technological facilities, lecturer training, and efficient administrative support, which ultimately contributes to students' success.

Conclusion

This study found that the integration of artificial intelligence (AI) in the learning process at STAI Syubbanul Wathon Magelang and IAI An Nawawi Purworejo significantly contributed to increasing student independence in accessing academic information, strengthening innovative thinking and increasing creativity through data analysis. AI also makes writing a final project easier, especially when structuring research and finding relevant references. Students at both universities demonstrated better abilities in understanding and applying theory practically through simulation and prototyping supported by AI technology. The integration improves learning efficiency and creates an academic environment that is adaptive to global demands.

Apart from the findings of this study, it has several limitations, especially related to the variation in the level of AI utilization in both locations, which are still influenced by lecturers' and students' access to technological infrastructure and AI mastery skills. In addition, this study has not explored the influence of AI integration on forming Islamic character values in the context of learning. Further research is recommended to examine how AI optimization can be applied evenly, especially considering technical limitations in different educational institutions. Additionally, future research may focus on the long-term impact of AI integration on students' academic achievement and personality development.

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