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Verification of the Effectiveness of Artificial Intelligence Education for Cultivating AI Literacy skills in Business major students

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Abstract

Purpose: In the era of the Fourth Industrial Revolution, individuals equipped with fundamental understanding and practical skills in artificial intelligence (AI) are essential. This study aimed to validate the effectiveness of AI education for enhancing AI literacy among business major student. **Research design, data and methodology:** Data for analyzing the effectiveness of the AI Fundamental Education Program for business major students were collected through surveys conducted at the beginning and end of the semester. Structural equation modeling was employed to perform basic statistical analyses regarding gender, grade, and prior software (SW) education duration. To validate the effectiveness of AI education, seven variables - AI interest, AI perception, data analysis/utilization, AI projects, AI literacy, AI self-efficacy, and AI learning persistence - were defined and derived. **Results:** All seven operationally defined variables showed statistically significant positive changes. The average differences were observed as follows: 0.47 for AI interest, 0.32 for AI perception, 0.37 for data analysis/utilization, 0.27 for AI projects, 0.25 for AI literacy, 0.39 for AI self-efficacy, and 0.41 for AI learning persistence. Statistically, AI interest exhibited the most substantial average difference. **Conclusions:** Through this study, the applied AI education was confirmed to enhance learners' overall competencies in AI, proving its utility and effectiveness in AI literacy education for business major students. Future research endeavors should build upon these results, focusing on ongoing studies related to AI education programs tailored to learners from diverse academic backgrounds and conducting continuous efficacy evaluations.

Keywords : AI Literacy, Effectiveness of AI Education, AI Education for business major, AI Self-Efficacy, Data Analysis for AI

JEL Classification Code: A22, I21, I25, M10

1. Introduction

Mccarthy et al. (1955) first mentioned the term artificial intelligence at a conference held at Dartmouth University. Maccarthy et al. (1955) were defined as “the science and engineering of making intelligent machines”. In other words, artificial intelligence (AI) means giving computers the ability to perform intelligent activities such as thinking, learning, and decision-making that humans possess. With the 4th Industrial Revolution, AI is not only changing jobs through automation and maximizing productivity in various industries, but is already being used in our daily lives through AI technologies such as ChatGPT (Cho et al., 2023). The 2020 Davos World Economic Forum (WEF) stated that individuals must prepare for changes in the labor market due to AI development over the next 10 years through education to secure individual competitiveness and

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provide economic opportunities (WEF, 2020). In addition, the WEF announced the 'Top 10 Emerging Technologies of 2023' report, selecting generative AI as one of the top 10 technologies that will have a significant impact around the world, and AI will affect not only our lives but also jobs, education, and society as a whole. It is said that it is bringing about a huge paradigm change (WEF, 2023).

In light of these developments, major countries worldwide consider AI as a critical technology to shape the future society. They emphasize policy formulation and talent cultivation in this field (JGD, 2019). The ability to understand and use AI technology effectively to solve problems is regarded as a fundamental skill for living in the future society (Long & Magerko, 2020). Research on customized AI education in various fields is actively conducted to fulfill these demands (Kim, 2019). The United States, through the 'American AI Initiative,' has announced strategies to enhance AI competence by strengthening STEAM education for all citizens and enhancing AI-related education in K-12 and university education (Chiu, 2021; WH, 2020). They also identified AI as one of the core five promising technologies to protect from foreign threats, emphasizing the strengthening of national AI capabilities (NCSC, 2021). In the case of China, they developed the world's first AI textbooks and presented a framework for AI education through the 'Beijing Consensus on AI and Education,' promoting talent cultivation at the government level (Zhao, 2019). Japan introduced step-by-step customized education for AI specialists and plans to make SW subjects mandatory for university entrance exams starting from 2025 (KOFAC, 2019). In Korea, efforts are being made to promote AI education, starting with the announcement of the ‘AI National Strategy’ with the vision of ‘Toward AI World Leader beyond IT’ (MSIT, 2019). In elementary and middle schools, a various of AI education programs are being implemented, led by AI research-designated schools, and in universities, AI basic education is provided to all students, led by schools selected as SW-centric universities (Kim et al., 2020; Song & Rim, 2021).

To foster talents with AI literacy competencies required by the era of the 4th Industrial Revolution, universities also need to provide a deep understanding and education in AI technology, theory, applications, and utilization etc. based on their majors (Dai et al., 2023; Park, 2023). Moreover, there is an urgent need for research on effective SW/AI education methods and verification for learners with different interests and experiences in AI education among non-SW majors. In particular, the research on AI education, considering major-specific characteristics and its effectiveness, is insufficient at the moment (Park, 2019; Hong et al., 2021).

Accordingly, this research aims to verify the effectiveness of the SW and AI education program designed for students majoring in social sciences at University A. We plan to apply this program to the liberal arts required course "AI Utilization by Major (Social Sciences)" and examine its impact on students' SW and AI education.

2. Research Background

2.1. AI Literacy and Education

As generative AI technology is being put into service at a rapid pace, a full-fledged era of AI is beginning. Accordingly, all members of society must be aware of these technologies and possess the capability to use them safely and effectively. Therefore, understanding AI can be considered the "language" that the new generation must acquire.

AI literacy refers to the ability to understand what artificial intelligence technologies, which are changing our lives, and to utilize them appropriately (Long & Magerko, 2020). Education for such AI literacy is emerging as an extension of existing software education, encompassing computational thinking, digital literacy, and data literacy (MSIT, 2019). In this way, AI literacy education, which is spreading worldwide, aims not only to provide essential foundational skills demanded in the AI era but also to lay the groundwork for advanced AI talent development (Greenwald, 2021).

In Korea, too, has established various government policies and educational strategies for AI literacy education. In addition to fostering advanced AI talent, a nationwide AI education system is being established to enhance AI adoption across society (JGD, 2020). In 2022, the Ministry of Education held the "AI Education Activation Forum for 100 Participants" to emphasize the systematic introduction and necessity of AI education as a core and essential component of future education. It also decided to train and support teachers for AI education (MOE, 2022). This expansion of the AI education base leads to the strengthening of basic competencies, an increase in practical capabilities for active application and integration of AI technology within one's job field, and the enhancement of national competitiveness by increasing the ability to develop and implement new technologies in the AI field (Koh & Kim, 2023).

To acquire AI literacy skills, prerequisites in data science, programming, problem-solving abilities, and critical thinking are necessary. Therefore, universities need to provide educational programs that allow students to learn AI literacy and AI skills progressively, building on their foundational software competencies (Park & Lee, 2021). In other words, university-level AI literacy education should serve as a cornerstone that connects fundamental software

competencies with advanced AI skills without being biased toward either technical or humanistic competencies.

2.2. SW·AI Education for Business major students

AI research has traditionally been prominent in computer science education, but in recent years, there has been an expansion of AI education research within the realm of liberal arts education. Particularly, policies initiated to enhance university software capabilities through the SW-Centric University Project since 2015 have extended to encompass AI and SW education (IITP, 2015).

AI education at the university level should not be limited to SW-related majors but should also cater to non-SW major students, including those with diverse academic backgrounds (Kim, 2022). Accordingly, to activate SW education and convergence education for non-SW majors, foundational SW education courses have been established. These courses are offered, and freshmen in all fields are required to take them as liberal arts subjects (Park, 2019). In addition to foundational SW education, AI basic and application courses are being introduced and expanded. Moreover, universities are establishing new curricula to cultivate professional artificial intelligence personnel, such as AI undergraduate courses, AI graduate courses, and AI convergence-linked major tracks.

In response to the swiftly changing times, there is a demand to cultivate capabilities rooted in creativity and logic, fostering an intelligent approach to utilize AI for addressing challenges in both everyday life and specialized fields. However, due to the diverse the backgrounds, contexts, technologies, and expected effects that require AI are different for each major field, there are limits to developing the capabilities required by current era with a uniform AI curriculum (Kim et al., 2023). Specifically, considering the significant differences in the demand for SW and AI-related competencies based on the characteristics of each academic field, it is crucial to differentiate education across five major academic disciplines: humanities, social sciences, natural sciences, arts, and software. Also, providing distinct curricula and programming languages tailored to each discipline is essential (Park & Suh, 2021). Completing foundational AI literacy education before delving into specialized AI learning within a major would enhance the effectiveness of education and facilitate seamless integration and application across diverse fields (Woo et al., 2020). Additionally, when providing SW and AI education for non-majors, effectiveness verification is required to determine whether AI literacy elements are balanced and use within the curriculum.

3. Research Methods

3.1. Research Subjects and Basic Statistical Analysis

In the context of this study, the analysis data were collected from undergraduate students majoring in business administration at University A, located in Gyeonggi Province. The survey targeted students who took the course "Utilization of AI by Major," specifically those majoring in business administration. The data were gathered through two rounds of online surveys, with the first pre-survey conducted in the first week of the 2022 fall semester and the second post-survey conducted after the completion of the 15th week. A total of 119 valid responses were collected after excluding unreliable responses.

For the analysis, this study employed a structural equation model (SEM) based on partial least squares (PLS). While conventional SEM studies typically require larger sample sizes for robust results (Kline, 2016), the current research chose to use Partial Least Squares Structural Equation Modeling (PLS-SEM), which is known to provide stable results even with a smaller sample size (Hair et al., 2014). Some studies have successfully conducted analyses with sample sizes of fewer than 100 (Almoy et al., 2015). Therefore, the sample size in this study, utilizing PLS-SEM, is deemed adequate without compromising the validity of the results (Lee & Kim, 2023).

Looking at the demographic characteristics of the survey respondents, 31.9% of the sample was male and 68.1% were female. By grade, 95.0% were 2nd graders and 5.0% were 4th graders. This course is designed to be taken by 2nd year students, so 2nd year students make up the majority, and 5% of 4th year students are expected to retake the course. Regarding the question about the SW training period, 37.8% answered less than 6 months, 55.5% said 6 months to less than 1 year, 3.4% said 1 year to less than 2 years, and 3.4% said more than 2 years. The subject of analysis may differ depending on the individual's level of interest, but it is designed to take SW-related classes as prerequisites every semester in the first year, so it is expected to be widely distributed over 6 months to less than a year, and the specific details of the sample is as shown in Table 1.

Table 1: Basic Statistical Analysis

Independent Variable	Item	Frequency	%
Gender	Male	38	31.9
	Fmale	81	68.1
Grade	2	113	95
	4	6	5
Period of learning SW	Less than 6 months	45	37.8
	6 months to less than 1 year	66	55.5
	1 year to less than 2 year	4	3.4
	2 years or more	4	3.4

3.2. Educational Curriculum

The educational curriculum implemented in this study is tailored for students in the social sciences, aiming to foster fundamental AI literacy. The curriculum is structured into four broad domains, spanning a total of 15 sessions (Park & Suh, 2021). As illustrated in Table 2, these domains cover a comprehensive range, including foundational comprehension of AI and machine learning, Python-based data analysis, practical application of AI and machine learning through data analytics, and hands-on problem-solving and idea generation in projects.

The initial two sessions serve as an introduction to common elements of AI literacy, providing an overview of AI and machine learning. In the third session, participants delve into deep learning through diverse examples. Sessions four to nine prioritize hands-on learning with a focus on Python-based data analysis. Utilizing the Pandas library for data manipulation and Matplotlib, Seaborn, and other libraries for visualization, students acquire essential data analysis skills and cultivate insights for effective problem-solving.

Sessions ten to thirteen extend the curriculum to practical machine learning applications, grounded in web crawling and data analysis. The final two sessions (14-15 weeks) adopt a project-based approach, encouraging students to define and explore problems relevant to their majors, analyze pertinent public data, and apply machine learning techniques to formulate and solidify innovative solutions. This holistic curriculum is designed to empower students with a robust foundation in AI literacy and problem-solving skills.

Table 2: The Curriculum for the Business Major

No	Area	Contents		Session
1	Introduction of AI & Machine Learning	AI Overview (Definition, Concepts, History, Examples)		1~2
		Deep Learning Overview (Definition, fundamental, Examples)		3
2	Python-based Data Analysis	Data Analysis	Python Basics (Data Type, File Processing, Function, Method)	4
		Data Analysis using Python	Pandas (Data Type, Generation, Selection, Manipulation, Hierarchical Index, Analysis)	5~7
			Data Visualization (Matplotlib, Seaborn, Folium)	8~9
3	Utilizing AI/machine Learning using Data Analysis	AI Understanding with Data	File Processing and Web Scraping (Open API)	10
			Web Crawling	11
			Data Analysis (Using Public Data)	12
			Machine Learning (Examples of Project)	13
4	Project-based Problem Solving and Idea Propose	Project Presentation (Data Analysis, Discovering Insights, Suggesting Ideas for Using Machine Learning)		14~15

3.3. Operational Definition of Variables

This study derived variables, including AI Interest, AI Perception, Data Analysis/Utilization, AI Projects, AI Literacy, AI Self-Efficacy, and AI Learning Persistence, to verify the effectiveness of AI education in cultivating AI literacy skills for non-SW majors. In Table 3, AI Interest represents the degree of interest that influences the process and outcomes of learning (Park & Yi, 2021), while AI Perception indicates the extent of awareness regarding the value of AI for social development (Kim et al., 2021). Data Analysis & Utilization refers to the ability to represent, classify, correlate, analyze patterns in data, and utilize data for problem-solving (Lee, 2022). AI Projects encompasses the ability for problem identification, implementation, proficiency in AI cases, and project execution (Lee, 2020). AI Literacy includes the cultivation of foundational skills in AI, including AI ethics and the ability to utilize AI technology (Baek & Park, 2021). AI Self-Efficacy signifies the belief in one's ability to discover problems solvable by AI and successfully perform given tasks (Oh & Jang, 2021). AI Learning Persistence reflects the motivation and intentions of learners to sustain their engagement and continue learning in AI education programs (Lee & Han, 2020). Students with high AI Learning Persistence tend to show an inclination to continue learning related topics even after completing AI education programs (Lee, 2011).

Table 3: Operational Definition of Variables

Variable	Operational Definition	Number of Questions	Reference
AI Interest	The Level of Interest in AI	3	Park & Yi, 2021
AI Perception	The Perception Level of AI Values	7	Kim et al., 2021
Data Analysis & Utilization	Data Analysis & Utilization Skills for Problem Solving	9	Lee, 2022
AI Project	Problem Identification, Implementation Skills, and AI Project Execution Abilities	6	Lee, 2020
AI Literacy	AI Ethics, Cultivation of AI Fundamentals, and Proficiency in AI Technology Utilization	8	Baek & Park, 2021
AI Self-Efficacy	Conviction in AI Problem-Solving Proficiency	5	Oh & Jang, 2021
AI Learning Persistence	Motivation and Intentions to Sustain AI Learning	4	Lee & Han, 2020

4. Results

4.1. AI Interest

To analyze the effectiveness of the AI basic education program for business majors, we first examined changes in interest in artificial intelligence based on survey responses

administered at the beginning and end of the semester. The results are shown in Table 4, and it was confirmed that there was a statistically significant difference (mean = 2.64 (pre), 3.11 (post)). Looking at the sub-questions about interest in AI, Q1 'I want to find out about new AI-related products as soon as they come out.' Q2 'I am interested in AI.' and Q3 'I want to know more about AI.' The questions are pre-test and post-test statistical. There was a significant change. It was confirmed that the change in interest in AI increased after the training course, and it was confirmed that students wanted to know more about AI in the future.

Table 4: Paired T-test results of AI interest

Factor	Average Difference	Std. Dev. Difference	t value	p value
Interest1	-0.454	0.831	-5.957	0.000***
Interest2	-0.479	0.946	-5.521	0.000***
Interest3	-0.487	1.049	-5.071	0.000***

4.2. AI Awareness

To analyze the effectiveness of the AI basic education program for business majors, we looked at changes in awareness of AI based on survey responses conducted before and after the education. The results are shown in Table 5, and it was confirmed that there was a statistically significant difference (mean = 3.76 (pre), 4.08 (post)). Looking at the sub-questions on AI awareness, Q1 'I know what AI is.' Q2 'AI plays an important role in developing our society.', Q4 'AI plays an important role in communication and collaboration among members of society.' ', Q5 'Any job in the future will need AI-related abilities.', Q6 'I think there is a need to learn AI as a liberal arts subject.', Q7 'I think AI education is helpful in learning my major. I think it is possible.' There was a statistically significant change in the questions between pre-test and post-test. Meanwhile, the pre- and post-averages for question Q3 'I think AI makes our lives more convenient' showed no significant difference. It was found that although they were fully aware of the need for artificial intelligence, they did not directly feel a change in their lives.

Table 5: Paired T-test results of AI awareness

Factor	Average Difference	Std. Dev. Difference	t value	p value
Aware1	-0.378	0.974	-4.235	0.000***
Aware2	-0.403	0.717	-6.138	0.000***
Aware3	-0.017	0.596	-0.307	0.759
Aware4	-0.252	0.985	-2.793	0.006***
Aware5	-0.311	0.909	-3.731	0.000***
Aware6	-0.420	1.021	-4.490	0.000***
Aware7	-0.521	1.080	-5.261	0.000***

4.3. Ability to Analyze and Utilize Data

To analyze the effectiveness of the AI basic education program for business major students through project-based data analysis, we first examined changes in data analysis and utilization abilities based on survey responses conducted before and after the training. The results are as shown in Table 6, and it was confirmed that there was a statistically significant difference (mean = 3.29 (pre), 3.66 (post)). Looking at the data analysis and utilization ability sub-questions, Q1 'I understand the meaning of data.', Q2 'I know what types of data are and can understand their characteristics.' Q3 'I can choose how to collect data depending on the problem situation.' You can choose.', Q4 'You can find keywords to solve problems.', Q5 'You can classify data with the same properties.' Q6 'I can understand relationships or patterns between classified data', Q7 'I can understand what the analyzed data means', Q8 'I can understand the characteristics and pros and cons of various methods of expressing data. ', Q9 'Data can be expressed using a variety of expression tools' Except for question 4, all questions had statistically significant changes within the 1% significance probability as a result of the pre- and post-test. It was confirmed that finding keywords to solve problems within the curriculum was insufficient.

Table 6: Paired T-test results of Ability to analyze and utilize data

Factor	Average Difference	Std. Dev. Difference	t value	p value
Analysis1	-0.336	0.740	-4.958	0.000***
Analysis2	-0.420	0.786	-5.828	0.000***
Analysis3	-0.387	0.884	-4.770	0.000***
Analysis4	-0.185	0.802	-2.514	0.013**
Analysis5	-0.496	0.882	-6.134	0.000***
Analysis6	-0.378	0.883	-4.672	0.000***
Analysis7	-0.336	0.805	-4.552	0.000***
Analysis8	-0.378	0.939	-4.394	0.000***
Analysis9	-0.378	0.920	-4.481	0.000***

4.4. Awareness of AI-Related Projects

In order to analyze the effectiveness of the AI basic education program for business majors through project-based data analysis, we examined changes in awareness of AI-related projects based on survey responses conducted before and after the education. The results are as shown in Table 7, and it was confirmed that there were some statistically significant differences (mean = 3.25 (pre), 3.52 (post)). Looking at the Awareness of AI-related projects sub-questions, Q1 'It was good to learn about cases where AI can be used.' Q4 'It was good to be able to implement the problem I thought of with AI.', Q5 'I liked AI programs created by other friends. It was good to be able to see it.', Q6 'I want to carry out various AI projects in the future.' There was a statistically significant difference between the pre- and post-test questions within the 1% probability of significance. Meanwhile, the pre- and post-averages for the questions Q2 'It was good to actually practice an AI project.' and Q3 'It was good to be able to think of my own problems that could be solved with AI.' showed no significant

difference. As a result of the analysis, there was a lack of practicality in the AI project and in solving my own problems based on artificial intelligence.

Table 7: Paired T-test results of Awareness of AI-related projects

Factor	Average Difference	Std. Dev. Difference	t value	p value
Project1	-0.328	0.865	-4.135	0.000***
Project2	-0.101	0.906	-1.215	0.227
Project3	-0.143	1.052	-1.481	0.141
Project4	-0.311	0.937	-3.622	0.000***
Project5	-0.387	1.136	-3.713	0.000***
Project6	-0.361	1.064	-3.706	0.000***

4.5. AI Literacy Capability

To examine changes in learners' AI literacy skills, which are important in the AI basic education program, related sub-questions were created and their effectiveness was analyzed as shown in Table 8. A pre- and post-comparison was conducted using a paired-samples t-test, and as a result, it was confirmed that there was a statistically significant difference in most questions (mean = 3.62 (pre), 3.87 (post)).

Analysis results of sub-factors corresponding to AI literacy ability Q1 'I can collect information to utilize AI', Q2 'I can interpret and interpret the results obtained through data analysis', Q3 'I can 'I can understand and use AI.', Q5 'I can imagine the changes in future society that will change due to AI technology.', Q6 'I tend to take appropriate measures to protect personal information.', Q7 'I am. 'I tend to use AI in a sound way in line with Internet ethics.', Q8 'I understand that AI is a copyrighted work and must be used without violating copyright.' There was a significant difference in the questions. On the other hand, there was no statistically significant difference in the question Q4 'I understand the impact of AI on changes in society, culture, etc.'. When summarizing the results, there was a significant change in AI literacy competency only in the area of being able to interpret and understand data analysis results through the AI education program, and other areas related to the impact of AI on changes in society, culture, etc. There was no significant effect difference.

Table 8: Paired T-test results of Awareness of AI literacy

Factor	Average Difference	Std. Dev. Difference	t value	p value
Literacy1	-0.210	0.891	-2.571	0.011**
Literacy2	-0.210	0.862	-2.658	0.009***
Literacy3	-0.218	0.885	-2.695	0.008***
Literacy4	-0.034	0.853	-0.430	0.668
Literacy5	-0.496	0.919	-5.883	0.000***
Literacy6	-0.185	0.883	-2.285	0.024**
Literacy7	-0.303	0.658	-5.014	0.000***
Literacy8	-0.311	0.767	-4.420	0.000***

4.6. AI Self-Efficacy

Through AI basic education, we examined AI self-efficacy, as well as data analysis and utilization skills and AI literacy skills, as well as changes in learners' attitudes toward AI. The analysis results for the subfactors corresponding to AI self-efficacy are shown in the table 9, and it can be seen that there is a statistically significant difference (mean = 3.22 (pre), 3.61 (post)). Q1 'I can understand how AI is applied to our lives.', Q2 'I can understand the principles of how AI operates.'. Q3 'I can discover problems in our lives that can be solved with AI.', Q4 'I am confident in solving simple problems using AI.' The items were answered by students after taking the course, with a probability of significance of 1%. There was a difference. On the other hand, there was no significant difference in effect for Q5 'I am confident in analyzing and managing collected information.'

Table 9: Paired T-test results of AI Self-efficacy

Factor	Average Difference	Std. Dev. Difference	t value	p value
Efficacy1	-0.336	0.866	-4.233	0.000***
Efficacy2	-0.496	0.901	-6.004	0.000***
Efficacy3	-0.529	0.872	-6.626	0.000***
Efficacy4	-0.588	0.848	-7.568	0.000***
Efficacy5	-0.042	0.877	-0.523	0.602

4.7. Willingness to Continue AI Learning

In order to analyze the intention to continue learning about the AI basic education program for business major students, we looked at responses to a survey administered before and after the education. The results are as shown in the table 10, and it was confirmed that there was a statistically significant difference (mean = 3.09 (pre), 3.50 (post)). Looking at the sub-questions of the willingness to continue learning AI, Q1 'I have become more interested in AI through AI classes.' Q2 'I am confident in logically explaining the solution to a given problem.', Q3 'I will discuss the principles of AI in the future.' 'I want to learn in depth about implementation methods.', Q4 'I want to challenge complex and difficult AI problems in the future.' There was a statistically significant change between the pre- and post-test questions. It was confirmed that there was a significant positive difference in the change in intention to continue learning about artificial intelligence.

Table 10: Paired T-test results of Willingness to continue AI learning

Factor	Average Difference	Std. Dev. Difference	t value	p value
Continuity1	-0.353	1.046	-3.680	0.000***
Continuity2	-0.370	1.016	-3.971	0.000***
Continuity3	-0.429	1.266	-3.693	0.000***
Continuity4	-0.479	0.955	-5.469	0.000***

5. Conclusions

Major countries worldwide are formulating and implementing various policies at the national level to foster

AI talent. Additionally, there is a widespread dissemination of AI education, including foundational AI education, to support activities addressing the demand in the AI industry and the competencies required for future societies.

AI education is an extended form of digital literacy and computational thinking education that has traditionally been part of software engineering education. There is a growing demand for educational programs that strengthen AI literacy skills in alignment with the requirements of the Fourth Industrial Revolution. However, there is a lack of research focusing on tailored skill development for non-computer science majors in terms of technical education and AI education.

In this context, our study aimed to enhance the technological problem-solving competencies based on AI literacy for students in non-computer science majors who currently experience relatively low AI technology utilization and accessibility in their job situations. We applied an "AI Fundamental Education Course for Business-related Majors" designed for this purpose. The course was designed to explore the effects of variables related to AI competencies, such as interest in AI, perception, data analysis and utilization skills, projects, AI literacy, self-efficacy, and willingness to continue learning, on AI-related competencies. We examined changes in these variables based on survey responses administered before and after the AI basic education program. Statistically significant positive changes were observed in all these areas.

Through this study, we confirmed the utility and effectiveness of the applied AI education program in enhancing the overall competencies of learners in AI, specifically among business major students. However, it is important to note that the applied AI education program did not comprehensively cover all areas of AI literacy skills, and certain aspects, such as privacy protection and internet ethics, were not verified.

The academic significance of this study lies in the analysis of the effectiveness of the AI basic education program. Through surveys conducted before and after the education, significant positive changes were statistically observed in various AI-related variables. This research confirms the utility and effectiveness of the applied AI education in enhancing learners' overall capabilities in AI among students majoring in business administration. However, it should be noted that the applied AI education program might not comprehensively cover all aspects of AI literacy, and validation in areas such as personal information protection and internet ethics remains unverified.

The practical implications of this study are as follows. It provides insights into designing AI foundational SW education courses for university students majoring in business administration, outlining considerations for aspects like AI interest, AI awareness, data analysis and utilization skills, and perceptions regarding AI projects. These findings underscore the importance of considering these factors in curriculum design to foster AI learning persistence among students.

Therefore, based on the results of this study, future efforts should focus on improving the AI literacy competencies of business major students in AI education. This includes expanding and reviewing the curriculum to incorporate education on topics such as privacy protection and ethics. Additionally, research should continue to explore and validate AI education programs for learners from diverse academic backgrounds, ensuring the expansion of AI applications in everyday life by defining and solving problems through project-based approaches.

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