Exploring Korean University Students' Perceptions of Artificial Intelligence (AI) Education

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국내 대학생의 인공지능 교육에 대한 인식 연구

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Abstract In today's world, having knowledge and skills related to Artificial Intelligence (AI) is essential for diverse university students. As a result, many Korean universities offer AI-related courses as part of their mandatory curriculum. However, designing an AI curriculum that caters to university students requires considering the previous experiences and perspectives of AI convergence education. Thus, navigating the perceptions of AI convergence education among Korean university students not majoring in computers is important. To achieve this goal, an online survey was conducted during the 2023 summer from various departments at C University in Korea (n=177). Survey results indicate that Korean universities showed an awareness of the personal implications of AI concerning their academic discipline and careers. Also, they recognize the importance of AI education regardless of their current majors at the university. In addition, survey results also revealed the presence or absence of prior AI educational experiences significantly affected the perceived importance of AI convergence education. However, students without prior AI exposure could struggle to take AI courses in liberal arts because they are not well equipped and prepared to take those mandatory courses. The study has the novelty and uniqueness in that future studies will receive valuable insights for constructing AI convergence education that caters to diverse university students in higher education.

요 약 현재 인공지능(AI) 및 관련 지식과 기술을 보유하는 것은 국가적으로 매우 중요한 과제이다. 이러한 상황에 맞게, 국내의 많은 대학은 인공지능 관련 과정을 교양과정의 필수 수업으로 제공하고 있다. 국내 대학생들을 대상으로 적합한 인공지능 교육과정을 설계하려면, 대학생들의 인공지능 관련 사전 학습경험과 관점을 미리 고려해야 한다. 특히, 전공이 컴퓨터가 아닌 대학생들의 인공지능 교육에 대한 인식을 이해하는 것이 매우 중요하다. 이를 위해 본 연구는 한국의 C 대학의 교양과목을 수강하는 다양한 전공의 대학생들을 대상으로, 2023년 여름에 온라인 조사(n=177)를 시행하였다. 연구결과를 살펴보면 다음과 같다. 첫째, 대학생들은 인공지능교육이 본인의 학과전공과 미래의 직업에 미치는 영향에 대해서 높은 인식을 나타냈다. 둘째, 다양한 전공의 대학생들은 대체로 인공지능 교육의 중요성과 필요성을 인식하고 있다. 셋째, 초중고 시절의 소프트웨어 교육이나 인공지능의 학습 경험 여부가, 현재 대학에서 진행되는 인공지능 교육에 매우 뚜렷한 영향을 미치는 것으로 나타났다. 구체적으로, 이전에 인공지능 관련 교육을 접하지 않은 대학생들은, 대학의 인공지능 교육과 수업에 참여할 때, 많은 어려움을 나타내는 것으로 나타났다. 본 연구는 한국의 대학교육에서, 다양한 전공을 한 대학생을 대상으로 하는 인공지능 교육을 효율적으로 제공하는 데 중요한 시사점을 제공할 것으로 기대한다.

Keywords : Artificial Intelligence(AI), AI Convergence Education, Liberal Arts Courses, University Students, Korean University

1. Introduction

The generation of Artificial Intelligence (AI) needs application skills that can value, utilize, and converge fields[1]. As such, many countries worldwide interested in AI education and technology development introduced national policies to prepare for the AI era and established detailed policies for each Ministry of Education to foster AI talents[2,3]. As such, the Korean Ministry of Education announced an AI national strategy under the Beyond IT Power to AI Power[4,5]. This policy emphasizes education to cultivate the ability of AI to meet economic, academic, social, and personal needs, including specialized areas[6].

In line with this trend, Korean higher education institutions are at the forefront of this transformation, embracing AI convergence education. AI convergence education in higher education is an interdisciplinary approach with various academic disciplines, fostering a holistic AI learning environment. AI convergence education is pivotal in preparing university students for the AI-driven future, and Korean higher education institutions are actively contributing to this paradigm shift.

However, most of the curriculum to foster AI talent is organized for elementary and secondary schools. In the case of universities that need to be used in the economic and social fields, the development of the AI curriculum relies on each university's needs and development[7]. As such, there is a strong need for AI convergence education for all general Korean university students targeting general education courses[8]. Therefore, this paper explores Korean university students' perceptions of AI convergence education as a basic liberal arts subject so that non-computer majors can understand and seek ways to utilize AI applications in their major fields[9]. This study has the novelty and uniqueness in that future studies will receive valuable insights for constructing AI convergence education that caters to diverse university students in higher education.

2. Literature Review

The wave of AI predicts changes in the future occupation. As such, designing an AI curriculum for non-computer university students who face challenges is necessary to be prepared for the job market. For diverse university students, understanding and utilizing AI is becoming required to be equipped for a decent job[10]. In preparation for this current trend, many universities worldwide aim to respond to environmental changes by expanding AI convergence education and computing skills[11,12]. For example, according to Kang and Lee's research in 2022[14], the AI liberal arts curriculum in the United States and Germany is open for university students who do not have prior knowledge of AI and computing skills. In terms of Japan, the government formed a standard curriculum for AI literacy in universities consisting of essential items and choices of AI literacy. In the case of China, many universities provide diverse education for university students regardless of their majors and specific fields[11,13]. In Korea, undergraduate courses have been established and operated to train AI experts. To respond to changes in society due to the rapid spread of AI technology, university students worldwide in various fields must receive basic knowledge for AI convergence education[8].

Only a few studies have been conducted concerning research on AI convergence education for Korean university students. According to Kyun et al. research in 2018[9], the authors investigated university students' perception of AI convergence education. Study results showed that 89.6% of students responded that AI is a convenient technology that can co-exist with humans. Also, more than half of students (51.9%) responded positively to the universities' introduction of AI convergence education. In applying AI technology,

students responded in the order of academic information guidance (50.1%) and personalized learning support (24%).

Park and Yi (2021) argued that an AI convergence education model is needed at the liberal arts courses. Based on the results from the study, the authors propose a model for AI convergence education in the liberal arts for university students. The proposed model includes convergence education to experience AI and literacy in the humanities[8]. Kang and Lee (2022) examined an AI basic liberal arts class for non-computer majors. The authors identified several issues to improve the AI convergence education course. The proposed curriculum comprises AI concept learning, AI experiential learning, AI program learning, and AI applied learning[14].

Concerning AI education for Korean pre-service teachers, Seo and Kim (2021) are trying to cultivate the improvement of computational thinking through AI convergence education[5]. As a result of the analysis, it was found that computational thinking, a core competency in the future, can be improved through AI convergence education.

Although previous studies have yet to be conducted to create the AI curriculum for university students, there needs to be more empirical research to investigate Korean university students' perceptions of AI convergence education[15]. This study aims to fill the gap in the pre-existing literature. The following research question was designed.

RQ: What are the Korean university students' perceptions of AI convergence education who have not majored in computer fields?

3. Research Method

3.1 Study participants

This study was conducted at C University in Korea. The study participants are Korean university students in different majors. The research consent forms are distributed via the first page of an online survey, and researchers receive a study participation agreement. During the 2023 summer semester, the online survey was distributed and collected. Table 1 shows detailed information about online survey participants. Concerning demographic information of survey participants, most of the participants are in their second year at the university. Over half have prior experience with AI learning. Of these, 30 began their AI studies in high school, while 65 started during university. They have been exposed to text-based coding (N=74) and block-based coding (N=39).

Table 1. Demographic data of survey participants

Spec.		Frequency (N=177)	Percent (%)
Gender	Male	58	32.8
	Female	119	67.2
Major	Humanities	8	4.5
	Social studies	4	2.3
	Science	64	35.6
	Arts	101	57.1
Grade	Freshman	35	19.8
	Sophomore	80	45.2
	Junior	33	18.6
	Senior	29	16.4
Experience of learning AI	Yes	121	68.4
	No	56	31.6
When you start learning AI	None	56	31.6
	Elementary school	8	4.5
	Middle school	18	10.2
	High school	30	16.9
	University	65	36.8
Types of Prior AI Learning	Block-based coding	39	22.0
	Text-based coding	74	41.8
	None	69	39.0

3.2 Data Collection and Analysis

The online survey questions were adopted from previous research to examine Korean university students' perceptions of AI convergence education. The researchers extracted questions from the previous studies and modified them to fit into

this research context[14]. The survey was organized about their understanding of AI, its social influence, self-influence, and the need for AI education. The survey instrument employed a 5-point Likert scale for each item. As indicated by Cronbach's α, the scale's reliability ranged from .588 to .711. Regarding the validity of the survey, researchers consulted questions with educational experts via several meetings and discussions to confirm these questions are appropriate for this study, which aims to understand Korean university students' perceptions of AI convergence education.

Table 2. Reliability of analysis results

Category	Number of questions	Cronbach's α
Awareness of AI	2	.662
Awareness of the social impact of AI	8	.588
Awareness of the self-impact of AI	2	.711
Awareness of the need for education in AI	2	.614

Data were analyzed using the SPSS 26 program. Descriptive statistics were initially utilized to examine the perceptions of AI convergence education among Korean students. Subsequently, an independent samples t-test was conducted to examine if previous AI educational experiences influenced university students' perceptions of AI convergence education.

4. Survey Results

4.1 Awareness of AI

This survey examined four dimensions of AI awareness: the conceptual understanding of AI, the societal impact of AI, individual perception of AI, and the pedagogical significance of AI education. The survey results can be found in Table 4 and Table 5. First, the survey data indicated a discrepancy between their fundamental understanding and recognition of AI (2.70±.834)

compared to their AI's practical applications (3.34±.922). Firstly, as shown in Table 3, examining the responses about students' ability of AI applications in their academic disciplines, 85 students could explain 1 to 2 instances, whereas

Table 3. Descriptive statistics of Korean university students' awareness of AI convergence education

Category	Question	M	SD
Awareness of AI	1. I can understand how AI is applied to our lives.	3.34	.922
	2. Do you know enough about AI?	2.70	.843
Awareness of the social impact of AI	1. In the future, AI will surpass human capabilities.	3.62	1.113
	2. Due to AI, the job market could be impacted personally/societally.	4.21	.823
	3. AI can raise ethical issues in society.	3.86	.991
	4. Humans must control AI.	4.12	.949
	5. Humans can control AI.	3.47	.923
	6. AI is applied in various fields, improving the quality of life.	4.25	.670
	7. AI contributes to national development.	4.16	.737
	8. The benefits of AI outweigh the losses.	3.58	1.015
Awareness of the self-impact of AI	1. AI is related to my major or future.	3.93	1.045
	2. Due to AI, I might need help finding a job.	3.03	1.155
Awareness of the need for education in AI	1. I want to learn about AI.	3.89	.901
	2. Even non-specialists should generally receive education on AI.	3.86	.932

Table 4. Awareness of AI convergence education

Awareness of AI convergence education		Frequency (N=177)	Percent (%)
I can mention examples of AI used in my field of study.	None	17	9.6
	1-2	85	48.0
	3-4	49	27.7
	5-9	19	10.7
	More than 10	7	4.0
At what age should we start teaching AI?	Kindergarten	45	25.4
	Elementary school	100	56.5
	Middle school	15	8.5
	High school	12	6.8
	University	3	1.7
	Not necessary	2	1.1

85 could explain 3 to 4 instances. A smaller number of 49 students could provide examples beyond this range. Over 75% of the students could identify four or fewer applications, while a mere 14% exhibited the capability to mention five or more.

Secondly, Korean university students recognized AI's adverse and favorable societal impact. Additionally, AI should remain under human supervision was salient (4.12±.949). A robust belief existed regarding positive perceptions that AI would enhance the quality of life (4.25±.670). While the consensus that humans should oversee AI was emphatic (4.25±.670), confidence in humanity's ability to control AI was subdued (3.47±.923).

Thirdly, Korean university students showed an awareness of the personal implications of AI, particularly concerning their academic discipline, prospects (3.93±1.045), and career trajectories (3.03±1.155). Finally, university students recognize the importance of AI education. This result was not limited to those specializing in AI, as even non-computer majors were inclined toward the necessity of AI education (3.86±.932) and a desire to expand their knowledge about AI (3.89±.901).

As shown in Table 3, a majority, constituting over 56.5% opined that such education should be initiated as early as the elementary school level. This perspective is further reinforced by the fact

Table 5. Differences in perception of AI convergence education based on previous AI learning experience

Category	Question	Experience	M	SD	t	p
Awareness of AI	1. I can understand how AI is applied to our lives.	O	3.47	.904	3.827	.000***
		X	3.05	.903		
	2. Do you know enough about AI?	O	2.86	.799	2.858	.005**
		X	2.36	.841		
Awareness of the social impact of AI	1. In the future, AI will surpass human capabilities.	O	3.57	1.132	-.800	.425
		X	3.71	1.074		
	2. Due to AI, the job market could be impacted personally/societally.	O	4.28	.893	1.719	.087
		X	4.05	.773		
	3. AI can raise ethical issues in society.	O	3.93	1.014	1.375	.171
		X	3.71	.929		
	4. Humans must control AI.	O	4.15	.955	.620	.536
		X	4.05	.942		
	5. Humans can control AI.	O	3.52	.993	1.096	.274
		X	3.36	.749		
	6. AI is applied in various fields, improving the quality of life.	O	4.35	.602	2.936	.004**
		X	4.04	.762		
	7. AI contributes to national development.	O	4.23	.716	1.959	.052
		X	4.00	.763		
	8. The benefits of AI outweigh the losses.	O	3.63	1.026	.000	.319
		X	3.46	.990		
Awareness of the self-impact of AI	1. AI is related to my major or future.	O	4.02	1.049	1.693	.092
		X	3.73	1.018		
	2. Due to AI, I might need help finding a job.	O	2.98	1.190	-.757	.450
		X	3.12	1.090		
Awareness of the need for education in AI	1. I want to learn about AI.	O	4.03	.889	2.928	.004**
		X	3.60	.867		
	2. Even non-specialists should generally receive education on AI.	O	3.98	.940	2.538	.012*
		X	3.61	.867		

*p<.05, **p<.01, ***p<.001

that over 95% of respondents advocated for introducing AI education spanning the continuum of elementary through high school.

4.2 Differences in perception of AI depending on AI learning experience

The survey revealed that prior experience with AI education influences Korean university students' comprehension of AI's applicability to contexts and their foundational understanding of AI. Specifically, university students without AI learning experiences reported a mean score of 3.05, unlike their counterparts with prior AI educational backgrounds, who exhibited a higher mean score of 3.67. This difference was statistically significant (t=3.827, p<.001). Furthermore, when evaluating the students' self-assessed knowledge of AI on their educational exposure, those without AI learning exposure reported an average of 2.36. Conversely, students with AI learning experience as statistically significant (t=2.858, p<.01).

Secondly, prior AI exposure influences Korean university students' recognition. Among the positive perceptions, the statement positing that "AI finds application across diverse sectors, thereby elevating the quality of life" showed a significant difference. Students with AI educational experiences reported a higher mean value than their counterparts without such experiences (t=2.936, p<.01).

Thirdly, a salient impact of AI educational exposure on Korean university students' recognition of the necessity for AI pedagogy. Concerning the degree to which they desired knowledge about AI, students without prior AI instructional experiences reported an average score of 3.60. In contrast, their counterparts with AI educational backgrounds yielded a notably higher mean of 4.03, showing a statistically significant variance (t=2.928, p<.01).

Building upon the findings concerning the impact of AI learning experience on the perceptions of AI among Korean university students, the study seeks to delve into the influence of various AI learning types on their perceptions. The results revealed a noteworthy connection between the type of prior AI learning and the awareness of AI among Korean university students. Specifically, those students who had received instruction in text-based coding exhibited a more favorable perception of the application of AI in daily life compared to their counterparts without AI learning experience, demonstrating a statistically significant difference (F=6.774, p<.01). Moreover, in assessing students' self-perceived knowledge of AI in relation to their educational exposure, individuals with a background in text-based coding reported a greater understanding of AI compared to those without AI learning experience, with a statistically significant difference noted (F=3.550, p<.05).

Secondly, the study identified that the various types of prior AI learning exerted a discernible impact on the self-awareness of AI implications among Korean university students. Specifically, Korean university students generally hold a positive perception that AI is relevant to their major or future. However, those students who have undergone text-based coding education exhibit a more positive inclination towards this perception compared to their counterparts without AI learning experience, revealing a statistically significant difference (F=6.726, p<.01).

Thirdly, the study revealed that different types of prior AI learning significantly influenced the awareness of the need for AI education among Korean university students. Specifically, when gauging the extent of their desire for AI knowledge, students without prior AI instructional experiences reported an average score of 3.64. In contrast, Korean university students with experience in text-based coding achieved a substantially higher mean of 4.04, indicating a statistically significant difference (F=4.752, p<.05).

Finally, the study established a significant impact of different types of prior AI learning on the perceived importance of AI education for

Table 6. Differences in perception of AI convergence education based on types of prior AI learning

Category	Question	Type of AI learning Experience	M	SD	F	p	Scheffe
Awareness of AI	1. I can understand how AI is applied to our lives.	Block-based coding (a)	3.41	.957	6.774	.001**	b>c
		Text-based coding (b)	3.51	.925			
		None (c)	3.12	.867			
	2. Do you know enough about AI?	Block-based coding (a)	2.82	.834	3.550	.031*	b>c
		Text-based coding (b)	2.91	.863			
		None (c)	2.42	.755			
Awareness of the social impact of AI	1. In the future, AI will surpass human capabilities.	Block-based coding (a)	3.38	1.129	.987	.375	-
		Text-based coding (b)	3.70	1.202			
		None (c)	3.64	1.000			
	2. Due to AI, the job market could be impacted personally/societally.	Block-based coding (a)	4.24	.654	.348	.706	-
		Text-based coding (b)	4.26	.922			
		None (c)	4.14	.791			
	3. AI can raise ethical issues in society.	Block-based coding (a)	3.82	.999	1.564	.212	-
		Text-based coding (b)	4.01	1.066			
		None (c)	3.72	.889			
	4. Humans must control AI.	Block-based coding (a)	4.03	.937	1.646	.196	-
		Text-based coding (b)	4.27	.955			
		None (c)	4.00	.939			
	5. Humans can control AI.	Block-based coding (a)	3.76	.855	2.192	.115	-
		Text-based coding (b)	3.41	1.046			
		None (c)	3.39	.790			
	6. AI is applied in various fields, improving the quality of life.	Block-based coding (a)	4.29	.760	2.334	.100	-
		Text-based coding (b)	4.35	.535			
		None (c)	4.12	.738			
	7. AI contributes to national development.	Block-based coding (a)	4.24	.741	.786	.457	-
		Text-based coding (b)	4.20	.721			
		None (c)	4.07	.754			
	8. The benefits of AI outweigh the losses.	Block-based coding (a)	3.35	1.152	2.260	.107	-
		Text-based coding (b)	3.76	.962			
		None (c)	3.49	.980			
Awareness of the self-impact of AI	1. AI is related to my major or future.	Block-based coding (a)	4.09	.753	6.726	.002**	b>c
		Text-based coding (b)	4.18	1.077			
		None (c)	3.58	1.049			
	2. Due to AI, I might need help finding a job.	Block-based coding (a)	3.09	1.026	.067	.935	-
		Text-based coding (b)	3.00	1.261			
		None (c)	3.03	1.111			
Awareness of the need for education in AI	1. I want to learn about AI.	Block-based coding (a)	4.09	.793	4.752	.010*	b>c
		Text-based coding (b)	4.04	.913			
		None (c)	3.64	.891			
	2. Even non-specialists should generally receive education on AI.	Block-based coding (a)	4.18	.797	7.889	.000***	a, b>c
		Text-based coding (b)	4.03	.936			
		None (c)	3.54	.901			

*p<.05, **p<.01, ***p<.001

non-computer majors among Korean university students. Specifically, Korean university students lacking AI learning experience demonstrated an awareness that even non-majors should universally receive AI education, scoring an average of 3.54. In contrast, those with experience in text-based coding exhibited a higher awareness, registering at 4.03. Furthermore, Korean university students with experience in block-based coding asserted that it is highly necessary for even non-majors to undergo AI education, revealing a score of 4.18. These differences were found to be statistically significant (F=7.889, p<.001).

5. Discussion

This research delves into the perceptions of AI convergence education among Korean university students without computer majors. The survey results are as follows. Firstly, Korean university students exhibit positive perceptions and attitudes toward AI convergence education, with nearly all students able to cite at least one example of AI applications within their academic disciplines.

Secondly, these students demonstrate a nuanced understanding of AI's societal impact, acknowledging both its positive and adverse effects. They also display awareness of the personal implications of AI, particularly in relation to their academic disciplines, future prospects, and career trajectories.

Thirdly, there is a notable recognition of the importance of AI education, transcending current majors at the university. This acknowledgment extends beyond students specializing in AI, as even those pursuing non-computer majors express a strong inclination towards the necessity of AI education and a desire to enhance their knowledge about AI.

As a result, students not only possess a comprehensive awareness of AI convergence education but also express a robust willingness to engage with it. Moreover, they recognize that acquiring knowledge and skills in AI convergence education can significantly benefit their future careers and job hunting.

These findings align with previous studies on the perception of AI convergence education among Korean university students [7,9,14]. For example, Kyun et al. (2018) concluded that a majority of Korean universities view AI as a beneficial technology that can coexist harmoniously with humans [9]. Additionally, more than half of the students responded positively to the introduction of AI technology by their universities, prioritizing its application in academic information guidance.

The survey results further illuminate distinctions in the perception of AI convergence education based on students' previous AI learning experiences and the types of AI learning they have undertaken. Firstly, Korean university students with prior AI learning experience exhibit a more positive comprehension of AI's applicability to various contexts, foundational understanding of AI, awareness of the social impact of AI, and recognition of the need for education in AI. Notably, this group of students displays statistically higher levels of awareness compared to those without prior AI learning experience.

Secondly, particularly noteworthy are Korean university students who have experience learning text-based coding. They demonstrate a distinctly positive attitude and perception concerning their awareness of AI, understanding of the self-impact of AI, and recognition of the need for education in AI.

Thirdly, the experience of learning both block-based coding and text-based coding significantly influences the perception of Korean university students, leading them to believe that even non-majors should receive universal AI education.

Consequently, university students with prior exposure to AI education are likely to perform

better in university coursework, possessing foundational knowledge of computer coding and AI technology skills acquired during their K-12 experiences. On the contrary, students without prior AI exposure may encounter challenges in AI courses within liberal arts due to a lack of preparedness. These findings align with previous studies suggesting that prior AI exposure is a key factor influencing university students' confidence in AI convergence education [5,7,14]. The results underscore that students with a basic foundation in AI tend to excel in university coursework. Kang and Lee (2022) have also argued for the global trend of providing AI education to general university students, regardless of their major [14]. Consequently, future studies should delve deeper into the key differences between students with AI convergence education and those without AI experiences.

6. Conclusion and Suggestions

In recent years, the ascendance of AI has marked a transformative period, particularly in South Korea, where the integration of AI in education signifies a shift in pedagogical strategies and educational paradigms. This union of technology and learning necessitates an exploration of Korean university students' perceptions of AI convergence education, providing invaluable insights into evolving educational strategies.

While previous studies have primarily focused on the pedagogical transformations induced by AI, there exists a notable gap in the literature regarding Korean university students' firsthand experiences and perceptions. This research aims to bridge this gap by delving into students' voices, thereby contributing a nuanced understanding of the integration of AI education in Korean universities.

The findings of this study underscore the need for diverse strategies to enhance AI convergence education, encompassing AI curriculum development, faculty enhancement, and expanded research opportunities. Firstly, a comprehensive and flexible AI curriculum is proposed, covering fundamental AI theories, the latest technologies, and practical experiences. Ethical considerations, societal impacts, and responsible use of AI should be integral components of this curriculum. The suggested AI convergence education model emphasizes experiential learning and literacy.

Secondly, to bolster AI education, Korean universities must recruit more qualified professors, especially experts in AI and related fields. Concurrently, training programs should be implemented for existing faculty members to keep them abreast of the latest AI advancements.

Thirdly, there is a call for expanding research opportunities to foster AI convergence in education. Facilitating collaborations among students, faculty, and industry is deemed crucial, with potential avenues including conferences and workshops. These recommendations collectively aim to enhance higher education, ensuring effective AI education for liberal arts subjects in the Korean higher education landscape.

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