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Abstract

This research aims to investigate the impact of peer-evaluated internship activities centered on artificial intelligence on engineering students, specifically focusing on their virtual learning competencies, attitudes towards artificial intelligence, and ascertain student perspectives. For this purpose, mixed-methods research has been used. In this study, which used a sequential explanatory design, a preliminary experimental design was employed in the quantitative part and basic qualitative research methods were used in the qualitative part. The study group consists of 34 engineering students. Data were collected using the Project-Based Virtual Learning Competencies Scale, the General Attitude Towards Artificial Intelligence Scale, and semi-structured interview forms. The research demonstrated that internship activities centered on peer evaluation related to artificial intelligence in virtual learning environments considerably improved the virtual learning competencies of engineering students. However, these activities did not significantly influence their attitudes towards artificial intelligence, whether positive or negative. The tasks during the internship program are thought to have improved students' collaboration, problem-solving, communication, creative thinking, technical knowledge, project writing skills, and research skills. Furthermore, it has been determined that students have acquired experience and enhanced their skills in process management, leadership, and tolerance.

Introduction

The rapid developments in artificial intelligence (AI) and the intensifying use of modern information and communication technologies among younger generations indicate a noticeable shift in educational methodologies. AI tools have made it much easier and faster to access structured knowledge (Daher et al., 2024). This is expected to change the way in which traditional teaching methods, which focus on structured learning and competency development, are used. It is essential to remember that, nowadays, students who perceive information and Communication Technologies (ICTs) as fundamental to their daily lives exhibit significant technological proficiency (Quinde et al., 2024). This allows them to seamlessly integrate AI tools into their learning processes, converting information into practical skills and competencies. However, the gaps related to the use of AI tools need to be addressed, as the impact of virtual learning competencies and attitudes towards AI on students may not be sufficiently covered in the literature (Bai, 2024). This study aims to investigate the effects of AI-focused peer-assessed internship activities on computer and software engineering students' skills in this area. In particular, it focuses on how using AI tools with peer assessment in learning environments shapes these skills. Recent research highlights the growing integration of AI tools in education, particularly for student assessment and skill development. AI-driven assessment methods are being explored for evaluating student behaviours, sentiments, and achievements (Sánchez-Prieto et al., 2020). Studies indicate that digital literacy, AI tool usage, and peer-supported collaborative learning positively influence students' perceptions of AI-assisted learning (Joseph et al., 2024).

Virtual learning environments (VLEs) are acknowledged as valuable platforms for improving knowledge and interdisciplinary skills required for Industry 4.0 (Moncada et al., 2020). Digital peer assessment is emerging as a scalable approach for providing feedback in higher education (van Helden et al., 2023). While students generally show favourable perceptions towards AI tools for autonomous learning (Quinde et al., 2024), challenges remain in effectively integrating these technologies. Researchers are exploring diverse statistical and qualitative instruments to evaluate the impact of ICT on competency development in remote education (López et al., 2023), focusing on improving assessment strategies and addressing the gap between theoretical and practical understanding of competency evaluation.

AI-focused, peer evaluation-based internship activities provide significant contributions to both the personal and professional development of students within the context of engineering education. The implementation of these internship activities in a project-based and collaborative structure supports engineering students in developing the multidisciplinary working skills required by Industry 5.0. (Broo et al., 2022). Additionally, such activities showcase students' innovative thinking and application capacities, while also enhancing the contribution of engineering education to society (Hamdan et al., 2023; Siegfried et al., 2020). Such an internship model goes beyond traditional educational approaches, preparing students to solve real-world problems and accelerating the integration of AI-focused technologies into industries.

Aligning education with these advancements is crucial for enhancing pedagogical outcomes, especially for generations proficient in computer and AI literacy. Moreover, understanding how technology and AI-based educational methods improve engineering students' skills will provide significant findings on how such technologies can be used in education. Also, virtual learning competencies and attitudes towards AI can be essential indicators for future engineering practices and educational models (Mosly, 2024; Mishra et al., 2024). Recent research explores the integration of AI tools in peer assessment and project-based learning contexts. AI techniques can support rubric design and enhance the trustworthiness of peer assessments by improving feedback quality and grading accuracy (Mendoza et al., 2020; Darvishi et al., 2022). AI-assisted peer evaluation can help develop critical thinking skills and automate feedback quality assessment (Prats & García, 2024; Rizqa et al., 2022). Studies indicate that digital literacy, AI tool usage, and peer collaboration positively influence students' perceptions of AI-assisted learning (Joseph et al., 2024). Generative AI tools can enhance experiential learning and authentic assessment, moving beyond traditional uses to support higher-order skill development (Salinas-Navarro et al., 2024). Case studies in game development demonstrate the creative integration of AI tools in curricula (French et al., 2023). Co-design approaches with students reveal diverse scenarios for AI usage in project-based learning and highlight the potential of AI usage data for assessment (Zheng et al., 2024).

There is limited information in the literature on how AI tools are integrated into students' learning processes and internship experiences based on peer assessment. While existing research generally examines the effects of AI tools on individual learning, this study aims to fill a gap in the context of group interactions and peer assessment. By investigating the impact of these tools, this research provides valuable insights into the potential of AI-based educational strategies to enhance engineering education outcomes. Moreover, this research addresses the critical connection between theoretical knowledge and its practical application. By analyzing both the pros and cons of AI integration in peer assessment, the study aims to contribute to the design of future engineering education models that are responsive to the demands of industry 5.0 requirements. The primary objective of this study is to examine the effects of AI-focused, peer-assessed internship activities on engineering students' virtual learning competencies and attitudes towards AI. Specifically, the research aims to answer the following questions:

1. In what ways might AI-centric peer-assessed internship activities enhance engineering students' virtual learning competencies and influence their attitudes towards AI, both positively and negatively?
2. From the student's perspective, what factors make AI-focused, peer-assessed internship activities effective?
3. What factors prevent implementing AI-centric peer-assessed internship activities from the student's viewpoint?
4. What benefits do students derive from AI-centric, peer-evaluated internship experiences?
5. From the student's perspective, what are AI's positive and negative aspects?

Method

Research Methodology

This study employed a mixed-methods approach. Mixed methods research integrates qualitative and quantitative methodologies to comprehensively explore a subject and provide mutual reinforcement (Creswell, 2020). Specifically, a sequential explanatory design was used, in which quantitative analysis was followed by qualitative analysis, and the results were integrated in the discussion and conclusion sections. The quantitative phase of the investigation was conducted using a limited quasi-experimental approach. A basic qualitative research approach was employed in the study’s phase. Basic qualitative research concerns how participants understand their experiences, make sense of their surroundings, and assign meaning to their experiences (Merriam, 2009).

Study Group

The study group comprises computer and software engineering students enrolled at the Faculty of Engineering for the 2023-2024 academic year. The students were chosen for the study group using a convenience selection procedure. The convenience sampling method is characterized by the researcher selecting the most suitable sample to conserve time, resources, and effort (Büyüköztürk et al., 2018). The study launched with 40 participants; then, six students withdrew, resulting in a final total of 34 participants. The final distribution of participants by department and gender is illustrated in Table 1.

Table 1. Distribution of Participants by Department and Gender

Department	Gender	Participant Number	Total Participate
Computer Engineering	Male	8	15
	Female	7	
Software Engineering	Male	13	19
	Female	6	

As presented in Table 1, 15 participants were computer engineering students and 19 were software engineering students. In addition, 19 of the participants were male and 15 were female.

Experimental Process

This study aims to analyze a new approach to developing competencies that computer and software engineering students need to possess but have not yet acquired. For this purpose, a 20-working-day internship activity was conducted, involving project-based peer learning and the effective use of AI tools. Initially, they received three-day educational training sessions to become familiar with the basic processes. Subsequently, they were asked to conduct a literature review to develop a project topic of their choice. Following the fundamental software engineering processes, project requirements were identified, the analysis and design stages were completed, and smaller sub-groups were formed to work on specific work packages. Throughout this process, students worked collaboratively, dividing tasks among themselves and applying agile project management techniques. By the end of the 20 working days, the groups had successfully developed two different projects. Following this process, pre- and post-tests were conducted to analyze how the use of AI tools during the project-based peer learning activities affected the outcomes and effectiveness of the pedagogical approach followed by the students.

Within the scope of this pilot study, two groups of 20 students worked for 20 working days. The first group of 20 students was divided into groups of 10, each working on two projects within their own 10-member team. The second group of 20 students worked on a single project. Students were expected to work in groups according to the principles of project-based peer education. Within the scope of this study, they were asked to utilize artificial intelligence tools in every process, such as accessing and using information, and as a first step, to conduct a literature review on the field in which they would conduct a project study. Artificial intelligence tools were used in the literature review and project development processes. Creating and realizing project requirements, applying software project phases, analyzing and designing software, forming project subgroups, and conducting studies all adhere to the principles of peer learning. Project activities were completed in 20 working days by applying agile project management and scrum methodology . Students completed their projects, filled out application forms for national support programs related to the project, and created national congress papers.

Lastly, the students succeed in publishing their work at the end of the internship program. For example, the first team of multiple groups of students developed **"Brain Detective"**, an advanced application utilizing deep learning models like U-Net and SGANet for accurate MRI-based brain tumour detection, achieving up to 99% accuracy and their paper already accepted in the 10th International Congress on Information and Communication

Technology in concurrent with ICT Excellence Awards (ICICT 2025) will be held at London, United Kingdom 18th - 21st February, 2025. The second group of teams designed and implemented "MelanoTech," a mobile app for melanoma cancer diagnosis, integrating StyleGAN for data augmentation and Vision Transformer models for classification, resulting in a 92% diagnostic accuracy rate (Tokatlı et al., 2024). These projects were made possible through rigorous preparation by the students, who took advantage of a wide range of AI tools and group collaboration and extensively trained on AI methodologies, data preprocessing techniques, and the integration of cutting-edge technologies.

Data Collection Tools

Within the scope of this research, quantitative data were collected using two scales. The "Project-Based Virtual Learning Competencies (PBVLC) Scale", developed by Tuncer and Yılmaz (2013), was used to measure students' Project-Based Virtual Learning Competencies, and the "General Attitude Towards Artificial Intelligence Scale", developed by Kaya et al. (2022), was used to measure students' general attitude towards Artificial Intelligence. A semi-structured interview form was used to collect qualitative data.

Project-Based Virtual Learning Competencies (PBVLSC) Scale

The "Project-Based Virtual Learning Competencies (PBVLSC) Scale" developed by Tuncer and Yılmaz (2013) was created as a 5-point Likert scale. The scale consists of 22 items and five factors. The first factor, "Working with the group," consists of six items; the second factor, "Execution," consists of five items; the third factor, "Finalization," consists of four items; the fourth factor, "Introduction," consists of four items; and the last factor, "Self-Control," consists of three items. The percentage of the total variance of the scale explained was determined as 55.153%. The scale's Cronbach Alpha internal consistency coefficient was found to be 0.864.

General Attitude Towards Artificial Intelligence (GAAIS) Scale

There are 20 items in the General Attitude Towards Artificial Intelligence Scale, which Kaya et al. (2022) translated into Turkish. This five-point Likert-type scale consists of two factors: positive general attitudes toward artificial intelligence (PGAAIS) and negative general attitudes toward artificial intelligence (NGAAIS). The scale's Cronbach's alpha internal consistency coefficient was found to be 0.89.

Semi Structured Interview Form

Within the scope of the research, semi-structured interviews were conducted with engineering students. In such interviews, although the questions are prepared, it is possible to collect additional data by asking participants new questions during the interview in line with the research's objectives (Ekiz, 2015). The interview questions have been prepared in accordance with the research questions and the activities conducted within the scope of the study. The prepared questions have been revised based on feedback from three field experts. As a result, a semi-structured interview form consisting of 10 open-ended questions has been created.

Incredibility

Lincoln and Guba's (1988) guidelines have been followed to ensure the reliability of the qualitative data. In this context, to ensure the reliability of qualitative data, the researcher must conduct long-term studies in the relevant field, have expert evaluations, and obtain participant approval. The researchers have conducted studies in computer engineering and in computer and instructional technologies education, and have actively participated in projects related to these fields. The researcher's competence in the relevant field can be demonstrated in this context. One of the methodologies employed in this research is the expert evaluation (peer debriefing) technique. During the data analysis process, researchers may encounter obstacles that can impact the results of their investigation. Specialist assessment is utilized to avoid such problems, and the data analysis is performed comprehensively (Lietz et al., 2006; Lincoln and Guba, 1988). In this context, two experts have independently assessed almost 20% of the qualitative data. One of the professionals holds a PhD in Computer and Instructional Technologies and has expertise in artificial intelligence and qualitative research. The preliminary analysis results produced by the specialists were compared and discussed until a consensus was achieved in the evaluations. The remaining data were independently coded by specialists and subsequently consolidated to compare the analytical outcomes and reach an agreement. The member check method is another strategy employed in this research to augment the trustworthiness of qualitative data. The principal aim of member checking is to verify the alignment between the statements of the interviewed individuals and the documented texts (Shenton, 2004). The semi-structured interviews were transcribed into written documents and then given to the students for their evaluation. The students evaluated the written documents and granted their approval. These methods have maintained the reliability and validity standards of the research.

Data Analysis

A paired sample t-test was conducted to address the following research question: "Do internship activities based on peer assessment focused on artificial intelligence contribute to engineering students' virtual learning competencies and their positive and negative attitudes towards artificial intelligence?". For the paired sample t-test to be applicable, the sample size must be at least 20, and the data should follow a normal distribution (Büyüköztürk, 2018). With a sample size of 34 and skewness and kurtosis values ranging between -1.5 and +1.5, the assumptions for conducting the paired sample t-test were considered satisfied (Tabachnick & Fidell, 2007). The skewness and kurtosis values of the data are presented in Table 2.

Table 2. Skewness and Kurtosis Values of the Scales

Scale	Skewness	*Kurtosis*
PBVCL pre	-536	.271
PBVCL post	-.685	.394
PGAAIS_pre	.118	-1.001
PGAAIS_post	-.151	-.780
NGAAIS_pre	-.128	-.253
NGAAIS_post	-.077	-1.099

As shown in Table 2, we can conclude that the data are normally distributed, as all scales' pre-test and post-test scores fall between -1.5 and +1.5.

Findings

Quantitative Findings

The arithmetic means and standard deviations of the pre-test and post-test scores of the Project-Based Virtual Learning Competencies (PBVCL) Scale, and the positive and negative attitudes toward the artificial intelligence scale are shown in Table 3.

Table 3. Mean and Standard Deviation Values of the Scales

Scale Name	Test	n	$\bar{X}$	ss
PBVCL	Pre_test	34	4.008	.554
	Post_test	34	4.092	.577
PGAAIS	Pre_test	34	4.198	.427
	Post_test	34	4.230	.432
NGAAIS	Pre_test	34	2.889	.666
	Post_test	34	2.860	.795

When the results for determining the students' project-based virtual learning competency levels were examined in line with the information in Table 3, it was observed that the mean was 4.008 before the training and 4.092 at the end of the training. Project-based virtual learning competency levels increased after the training. Similarly, while the mean scores of the students' positive attitudes towards artificial intelligence were 4.198 before the training, their mean scores were 4.230 after the training. At the end of the training, there is an improvement in the positive attitudes of students towards artificial intelligence. The mean scores of students' negative attitudes towards artificial intelligence were 2.889 before training and 2.860 after training, respectively. In this case, students' negative attitudes towards artificial intelligence decreased. A dependent sample T-test was conducted to examine whether there was a significant difference between the pre-test and post-test scores of engineering students' virtual learning competencies and their positive and negative attitudes towards artificial intelligence. The results of the analysis are presented in Table 4.

Table 4. Dependent Group T-Test Analysis Results

Scale	N	$\bar{X}$	Ss	df	t	p
PBVCL _pre- PBVCL _post	34	-0842	.229	33	-2.144	.040
PGAAIS _pre - PGAAIS _post	34	-0318	.206	33	-.901	.374
NGAAIS_pre - NGAAIS_post	34	.0294	.404	33	.424	.675

Table 4 shows a significant difference between the pre-test and post-test scores of engineering students' virtual learning competencies for the internship activities, based on peer assessment focused on artificial intelligence ($t(33) = -2.144$; $p = 0.040$). There was a significant difference between the pre-test and post-test scores of engineering students' competencies in virtual learning related to artificial intelligence. No significant difference was found between positive attitudes ($t(33) = -0.901$; $p = 0.374$) and negative attitudes ($t(33) = 0.424$; $p = 0.675$)..

Qualitative Findings

Qualitative findings were obtained through semi-structured interviews with the participants. The findings are presented in five categories: facilitating factors, complicating factors, results/outcomes, positive views, and negative views towards artificial intelligence. The first of these categories is results/outcomes/gains. Table 5 displays the gains made by the students based on their opinions.

Table 5. Student Opinions on the Outcomes

Theme/Category	Concept/Code	Frequency
Gains/Results/Outcomes	Collaborative Work	8
	Problem-Solving Skills	6
	Experience Gained	5
	Communication Skills	3
	Technical Knowledge and Skill Development	3
	Creative Thinking Skills	2
	Project Writing Skills	2
	Research Skills	1
	Leadership	1
	Process Management	1
	Tolerance	1

According to the qualitative findings, the results are the skills contributing to the student's development. The concept that the participants emphasized gaining or developing the most was collaborative work. In addition, students reported improvements in problem-solving, communication, creative thinking, technical knowledge, project writing, and research skills. In addition, students stated that they gained experience at the end of the activities and enhanced their skills in process management, leadership, and tolerance. The views of some of the participants in the study on the theme of gains, results, or outcomes are given below:

> *K2: "How to divide a project into a large group, how to distribute work, how to produce results based on person analysis, analysis-based result generation, the importance of research demos within the project, how projects can be developed using VR technologies, how to write reports in TUSEB, TUBITAK formats, how projects are accepted to such programs, how to write papers, how to manage a team, how to write APIs and how integrations are useful to me at many points."*
>
> *K4: "I also had the chance to improve my project management and teamwork skills during the project."*
>
> *K5: "It significantly improved my technical knowledge and skills. Thanks to this project, I had the opportunity to use new programming languages and tools. This helped me gain valuable experience. I also had the chance to improve my project management and teamwork skills during the project."*
>
> *K12: "I learned that I can tolerate to a level that allows me to do my work efficiently, our teammates'*

personal lives and situations where they cannot control their mood swings."

K14: "Working on the room's design in the virtual audiometer project during my internship significantly improved my technical knowledge and application skills. The experience I gained in project planning and design increased my problem-solving and creative thinking skills."

Based on student feedback, the second category consists of elements that facilitate program implementation. These facilitators are factors that contribute to the effectiveness of the educational program and enhance participants' motivation. The codes related to these facilitators are presented in Table 6.

Table 6. Facilitating Factors for Implementation Based on Student Feedback

Theme/Category	Concept/Code	Frequency
	Problem Solving with AI	2
	Use of AI in Technical Problem Solving	2
	Providing Feedback	2
Facilitating Factors	Interest in AI	1
	Utilization of AI	1
	Support in Problem Solving	1
	Establishing Communication	1
	Enjoyable	1

Furthermore, considering student feedback, problem-solving with artificial intelligence is the first facilitating factor of the activities. Additionally, identifying elements that facilitate the implementation of activities involves an interest in AI, its use, and its application in solving technical problems. giving feedback, providing problem-solving support, and communicating are other facilitating factors, along with making the activities fun. The views of some of the participants in the study on the theme of facilitating factors are given below.

K5: By using AI tools such as ChatGPT, I was especially able to find quick solutions to coding and technical problems." The suggestions I received from AI tools during project planning and problem solving processes helped me develop alternative approaches and strategies"

K7: "There were occasional misunderstandings in team communication. To resolve such situations, I made communication within the team clearer and more open. Regular meetings and feedback sessions helped everyone better understand their role in the project."

K8: "Artificial intelligence tools and design suggestions during the environmental design process were highly beneficial in addressing the challenges we encountered."

K13:"It was a very useful internship for me. Although I was prejudiced against Unity, I gained a lot of knowledge and enjoyed the process."

Moreover, the third category, based on student opinions, includes factors that make the implementation difficult. Typically, participants require assistance with challenging elements, which complicates executing the activities. We present the codes for the complicating factors in Table 7.

Table 7. Factors Making Implementation Difficult According to Student Opinions

Theme/Category	Concept/Code	Frequency
	Inability to Communicate	4
	Individual Differences	4
	Inefficient Use of Time	3
	Inability to Adapt to Teamwork	2
	Long education duration	2
Challenging Factors	Adaptation	2
	Lack of Planning	1
	Insufficient Knowledge of Mentors	1
	Lack of Feedback	1
	Differences of opinions	1
	Disagreements	1

As seen in Table 7, the main factors that make the activities difficult are the need for communication and individual differences. Other factors that make the activities difficult are inefficient use of time, inability to adapt to teamwork, length of training, lack of planning, lack of knowledge of mentors, lack of feedback, and disagreements. Some participants' views on the theme of complicating factors are given below.

K1: "The training period in the first week was too long. I think more progress could have been made in the project if less time had been wasted on non-essential activities."

K2: "There may be differences in how some teammates work, how experienced they are, and how they use technology. Work packages were adjusted by taking these factors into account, thereby providing a solution during the task allocation process."

K5: "Regular feedback sessions should be held, and technical training should be enhanced."

K6: "At first, I did not know anyone. I had difficulty at first because I could not get used to it. However, we became accustomed to it over the following days, allowing I to act more comfortably."

K12: "Mentors being well-equipped and having previous project experience keep the process and team mentality fresh."

Furthermore, positive views towards artificial intelligence constitute the fourth category when examining the participants. This category of positive views towards artificial intelligence generally refers to how the participants benefited from artificial intelligence during the activities. Table 8 presents the codes that belong to the category of positive views towards artificial intelligence.

As seen in Table 8, the code most emphasized by the participants was quick access to information. The participants also emphasized the speed of artificial intelligence and concepts such as fast learning, fast error detection, and fast feedback. In addition, the desire of the participants to turn to the field of artificial intelligence, and the fact that artificial intelligence provides technical support while producing innovative solutions, are other concepts mentioned by the students.

Table 8. Positive Perspectives on Artificial Intelligence

Theme/Category	Concept/Code	Frequency
Positive Perspectives on Artificial Intelligence	Quick Access to Information	11
	Desire to Focus on the Field of AI	6
	Fast Learning	5
	Fast Error Detection with AI	5
	Quick Problem Solving	2
	Problem Solving with AI	1
	Rapid Feedback	1
	AI Providing Technical Support	1
	Generating Innovative Solutions	1

Some of the participants' views towards artificial intelligence are given below.

K1: "Artificial intelligence technologies are fields that interest me. I want to improve myself in this field."

K5: "These tools accelerated my learning process by providing fast and accessible information about complex topics. It also helped me keep up to date by providing suggestions on problem-solving and new techniques."

K7: "I produced more efficient and innovative solutions using AI tools, especially in design, analysis, and optimization processes."

K11: "Artificial intelligence enables faster research and solution-oriented learning."

K13: "I believe it contributes significantly. Instead of spending hours on code issues caused by minor attention errors, we can detect them in a much shorter time."

The fifth and final category pertains to negative views towards artificial intelligence, as students perceive. The category of negative views towards artificial intelligence typically conveys the challenges participants face when using artificial intelligence, as well as their concerns about it. Table 9 presents the codes that belong to the category of negative views towards artificial intelligence.

Table 9. Negative Perspectives on Artificial Intelligence

Theme/Category	Concept/Code	Frequency
Negative Perspectives on AI	Inability to Write Effective Prompts	3
	Use of Complex and Unfamiliar Terms by AI	2
	Limited Solution Generation by AI	2
	Providing Incorrect Answers	1

The concept most emphasized by the participants was the inability to write effective prompts. Additionally, participants highlighted the use of complex and unfamiliar terms by AI, its limited capacity to generate solutions, and its tendency to provide incorrect answers. Below, are some of the participants' views regarding the theme of negative perspectives on artificial intelligence.

K1: "It did not provide effective solutions to our problems, particularly those related to Unity. We had to look for these solutions in other sources."

K3: "Sometimes, when AI answered with terms that I was not familiar with, I had to do a lot of research to understand. I managed it by being calm and aware that it was artificial intelligence."

K8: "Detailed writing is necessary for artificial intelligence. We paid attention to this".

K13: "AI contributed significantly, however, its contributions were insufficient because it gave wrong answers, especially in the code part."

As a result, according to the views of the participants, concepts such as artificial intelligence in problem-solving, feedback, interest, usage, support, communication, and being fun are identified as facilitating the application. Some factors make implementation difficult. These are inability to communicate, individual differences, inefficient use of time, inability to adapt to teamwork, lack of planning, lack of knowledge of mentors, lack of feedback, and disagreements. According to the qualitative findings, the participants' positive views on artificial intelligence are: fast access to information, a desire to focus on artificial intelligence, fast learning, rapid error detection, efficient problem solving, prompt feedback, technical support, and innovation in solutions. In contrast to these, there are some negative opinions. Examples of these issues include being unable to write effective prompts, artificial intelligence using complex and unknown terms, its producing limited solutions, and incorrect answers. As a result of the activities, participants reported improvements in their collaboration, problem-solving, communication, creative thinking, project writing, and research skills. Participants also stated that they gained experience, developed technical knowledge and skills, and improved their leadership, process management and tolerance.

Discussion and Conclusion

As a result of this research, it has been determined that internship activities based on AI-focused peer evaluation in virtual learning environments significantly contribute to the virtual learning competencies of engineering students. Similarly, Yaman et al. (2023) found an increase in the virtual learning competencies of participants who received applied project writing, and job-integrated training in their study. Moreover, Sinlapaninman et al. (2023), stated that after completing the participants' learning activities, there was a significant increase in their virtual learning competencies, as indicated by the specified criteria. These findings support the current study. Research has shown that virtual platforms and tools can be applied in different fields of knowledge and that users accept and adopt them positively (Guillén-Yparrea et al., 2023). In conclusion, various activities have improved students' virtual learning competencies.

This study revealed that peer-evaluated internship activities focusing on artificial intelligence in virtual learning environments had no significant impact on engineering students' positive or negative views regarding artificial intelligence. This situation suggests that the student's attitudes toward artificial intelligence remained consistent throughout the internship's activities. However, it has been discovered that the activities increased the students' willingness to study artificial intelligence. Furthermore, it has been found that artificial intelligence has advantages such as quick access to knowledge, rapid learning, novel solution development, , rapid error detection, immediate feedback, and efficient problem-solving. Similarly, Lampou (2023) claimed in his study that artificial intelligence engages learners, offers feedback, and integrates into many aspects of our daily lives. According to Ouyang (2022), AI applications in online higher education include resource suggestions, autonomous evaluation, and learning experience optimization. According to Mahala (2024), artificial intelligence provides individualized learning experiences, creates learning pathways tailored to students' needs, allows automated evaluation processes, and saves time. The literature on artificial intelligence supports the current investigation. Artificial intelligence has both positive and negative aspects. These include artificial intelligence's complex and unknown vocabulary usage, limited solutions, incorrect answers, and students' weaknesses in writing prompts. Similarly, Qadir (2023) noted that AI language models are imperfect and may make mistakes or deliver inaccurate information. According to Mahala (2024), students have struggled to adopt artificial intelligence due to a lack of technical understanding and exorbitant expenses. As a result, student perceptions regarding artificial intelligence have remained unchanged. The lack of change in opinions regarding artificial intelligence could be attributed to the activity's insufficient duration. Although students' perceptions of artificial intelligence have not changed, they have emphasized its beneficial attributes more than before.

This research concludes that internship activities centered on peer evaluation in artificial intelligence within virtual learning environments enhance engineering students' collaborative abilities, problem-solving capabilities, communication proficiency, creative thinking, technical expertise, project writing, and research skills. Students acquired experience during the conclusion of the activities, and enhanced their skills in process management, leadership, and tolerance. Nunez and Lantada (2020) indicated that project-based learning and AI-assisted applications improve students' technical abilities and creative problem-solving skills.

Finally, the concepts of problem solving with artificial intelligence, the use of artificial intelligence in technical problem solving, feedback, interest in artificial intelligence, problem-solving support, communication, and having fun are the elements that facilitate the implementation of engineering students' internship activities based on artificial intelligence-oriented peer assessment in virtual learning environments. Menekşe (2023) emphasizes that using artificial intelligence tools in engineering education facilitates students' understanding of complex engineering concepts, offers personalized learning experiences, and enriches learning by providing virtual laboratories and simulations. However, there are some factors that make the application difficult. These are lack of communication, lack of planning, lack of knowledge of mentors, lack of feedback, and disagreements among working groups. Nunez and Lantada (2020) emphasized that ethical challenges, data security, and prejudices should be considered in AI-supported education applications.

Recommendations

- AI-focused peer assessment activities for engineering students can be integrated into educational programs. These activities can be designed to support students' collaboration, problem solving, and project writing skills.
- In this study, the short duration of the activity may have caused no change in students' attitudes. In future research, attitudinal changes towards artificial intelligence can be examined by designing long-term

activities with more participants.

- More in-depth research can be conducted on individual and environmental factors (e.g., ethical concerns, data security) that affect students' negative attitudes towards AI.

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