Artificial Intelligence Software in the Context of Educational Process

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Abstract
Artificial intelligence is a popular technology that affects many fields today. Its impact is noticeable daily, especially in education, design, and other essential areas. This technology, which stands out with the convenience it creates for users and its help in organizing the workflow, will play a critical role in our lives in the future. This study is aimed to touch upon the innovations provided by artificial intelligence in the field of education and some of its basic features. Some software, especially ChatGPT, is included based on the potential of language models and their essential usage areas. In addition, in the study, it is mentioned how artificial intelligence can be evaluated as a material in text and visual form, the essential functions of artificial intelligence technologies, which are rapidly changing today, are explained in this article, and stimulating points about the current situation are mentioned for those who will work in the field.

Introduction
Artificial intelligence, as an essential sub-branch of computer science, is a concept that has been frequently studied since the second half of the 20th century. This technology has allowed machines to imitate and develop human-specific abilities. Thanks to this feature, it has become a frequently preferred technology in different areas where it can create advantages (Russell & Norvig, 2009). Due to the diversity of areas it affects, it is possible to come across many definitions of artificial intelligence in the literature (Doğan, 2002). Artificial intelligence, which has broken new ground in many fields today, has also begun to attract attention with its pioneering work in the field of education. However, when we look at the history of artificial intelligence, the use of this technology and systems is not very new. It is known that artificial intelligence is a technology that emerged because of many studies conducted by Turing and his contemporaries in the early 1950s. With the developing technology and the exponential increase in the processing power of computers, artificial intelligence has shown itself in significant developments in many fields (LeCun et al., 2015).

Many different definitions have been made about artificial intelligence. However, in general terms, it can be expressed as the skills that require intelligence specific to humans that machines can also perform. This expression includes artificial intelligence collecting information, interpreting it, expressing it with data, performing new learning in the light of this data, and successfully fulfilling the assigned tasks. It has been emphasized that machines can be learning devices as they can independently complete the tasks assigned to them without any help. In another definition, artificial intelligence is machine learning (Blumenthal, 2017). It is seen that the expression machine learning is used as a synonym for artificial intelligence in many sources. However, machine learning is just one component of artificial intelligence. Machine learning generally drives learning by recognizing patterns in data sets, making predictions, and making decisions. These processes it is considered a complementary element of artificial intelligence technology. Machine learning and deep learning concepts are used as artificial intelligence tools in many areas of our daily lives. For example, in autonomous vehicle driving, machine learning sees the surrounding data through cameras and sensors, analyzes it, makes decisions, and autonomous driving takes place. Search engines and recommendation systems that analyze users' past behavior and offer helpful content are also within the scope of machine learning.

Today, artificial intelligence manifests itself in almost every field and can be used usefully with field-specific tools. One of the best areas that should be examined in this regard and where the effects of the current situation can be seen is the field of education. The field of education is experiencing a radical transformation with the emergence of artificial intelligence. This transformation is expected to change and propose new alternatives to educational goals, processes, learning materials, methods, assessment, and evaluation.

Technology has progressed by solving the problems experienced in the most essential elements in every field it affects. For example, in the field of education, technology has managed to show itself with the monitoring and management of the student's current status, the spread of digital content, and the introduction of smart devices into the educational environment. However, it is known that using these technologies in the classroom is considered insufficient, as technology at this stage cannot respond to the needs of individuals in the school in an individualized

manner (Linn et al., 2023; Zhai, 2021). The contributions of these essential technological tools and systems for students cannot be ignored. However, compared to the opportunities offered by artificial intelligence, these technologies remain at the initial level.

Artificial intelligence has a comprehensive potential, especially in education, due to its working mechanism. Because artificial intelligence has the opportunity to analyze human language, structure, and images, with these features alone, artificial intelligence will lead to many advances in the field of education.

ChatGPT is the output of artificial intelligence that has reached the most comprehensive end-user base today. ChatGPT broke new ground as the only artificial intelligence and technology application to get its first million users on the fifth day of its publication. Looking at current data, this language processing model developed by OpenAI was used approximately 1.6 billion times monthly. This represents a 160% increase from 1 billion in February 2023 and is about seven times higher than the 266 million visits in December 2022 (Duarte, 2023). In light of these data, the ChatGPT language model is the most preferred in the world. For this reason, in this study, education and artificial intelligence are associated in the context of ChatGPT.

 ChatGPT is a sophisticated pre-trained natural language processing model released by the US-based company OpenAI on November 30, 2022. This model reveals human-like behaviors in comprehending the texture and sequence of language, producing text, and answering questions. Some studies have shown that this language model exhibits a high level of performance in question generation, academic writing, and other academic skills. This performance is, of course, directly proportional to how well the user at the computer manages this language model. Because this language model is pre-trained and uses an existing database, individuals who control it must be able to direct it correctly to benefit from it to the highest degree.

The powerful functions that ChatGPT offers, such as interaction, reasoning, questioning, and feedback, provide new opportunities for educational transformation. The emergence of artificial intelligence, such as ChatGPT, can improve the effectiveness and quality of learning and advance the distribution of educational resources and the supervision of academic quality. Considering that education has achievements such as improving individuals' careers, ensuring that they adapt to society and become valuable people, and prioritizing social needs, it is possible to use language models for these purposes. Because language models can enable individuals to reinforce certain behaviors related to these acquisitions, it will be inevitable for individuals who are familiar with artificial intelligence technologies and can use them beneficially to focus on the social gains of this system and produce solutions.

Considering the social needs that may be required in the future, artificial intelligence and similar systems can provide high benefits in achievements such as learning knowledge, fundamental skills, and writing, which are the center of traditional education. The transfer of knowledge, skills, and methods in conventional education takes place between teacher and student under the guidance of various approaches. Language models, as a tool, can be beneficial in managing this process more effectively. Today, although artificial intelligence has just met the end user, it can produce high-quality content even in its current form. These contents may only meet the needs at some levels in all areas. However, considering that language models are a clear road map for development, it is clear that they can be a tool that will help people with many problems in the future.

With ChatGPT, technical questions can be answered, software codes can be created, and satisfactory texts can be produced. These texts are answer-oriented and can be used as an educational road map. Today, any user can gain basic knowledge about any field or learn the solution to a problem using ChatGPT. However, it should be remembered that since artificial intelligence is a language model trained by users, the accuracy of the answers received from this language model may not always be satisfactory. Because, like similar language models, ChatGPT carries out the process by analyzing the content on the internet base and creating meaningful sentences or operations. Moreover, only the content produced on these platforms can be made functional in the education process by being verified by the authorities.

When the literature is scanned, research on artificial intelligence has revealed that artificial intelligence technology can increase working and learning efficiency but cannot wholly replace human creative thinking skills (Zhai, 2022). Another finding generally expressed in research is that the ability to make decisions using experience, emotion, and knowledge has yet to develop in artificial intelligence models.

Language models such as ChatGPT can support the educational process followed by traditional methods and encourage project-based learning. Formal education defines the educational process in which the teacher guides and directly transfers information. However, it is also known that different individuals at the same level in learning environments may have different needs or learning levels. From today's perspective, it is predicted that future education will be a project-based, more individual, and open-to-interpretation process in which knowledge and skills are used for production. Thanks to the language models to be developed, students can learn information faster and in a way that suits their needs and can use it as a tool to support their learning. There are better approaches to adapting the ChatGPT language model to the future in its current form. As mentioned before, the data obtained using artificial intelligence currently needs verification. However, when a language model is asked a question on a particular subject, it quickly and effectively scans the relevant literature, providing a possible prediction of what potential these language models can reach.

In the Context of Teacher and Student
Emerging language models such as ChatGPT can enable the discovery of new methods in conventional educational processes. These language models can perform beyond expectations by understanding the skills acquired through experience, such as understanding the language, communicating effectively, mastering the field, and quality content. Artificial intelligence technologies and applications allow students to create learning plans and methods appropriate to their learning styles and levels. This way, individualized programs can be implemented, or projects can be carried out based on the student's readiness levels. Students can use ChatGPT to answer their questions about the course or learn more about the learning material. This technology can also guide on issues such as resource research for projects. For example, students can get help from a language model by stating their needs on how to proceed with their projects or studies.

At this point, students' ability to specify their personal needs and obtain a personalized road map accordingly can increase their performance. As mentioned, artificial intelligence can provide surprising results in creating meaningful content. Students can make their course schedule based on focus time, specify their specific needs, and be guided by artificial intelligence to achieve better performance. This process is directly focused on the student's self-awareness. The language model can create a helpful road map by starting the process with a pre-test that determines the students' deficiencies, focusing on where the weaknesses are. Various evaluation scales can be used within this road map to create a more effective process management. At this point, teachers may need to be guided so students can use this system better.

It should be remembered that language models can be considered as guides and assistants not only for students but also for teachers. Automation that will ease teachers' workload by checking students' homework, evaluation processes, and question solution suggestions can be provided with artificial intelligence. By assisting teachers in student management and analysis, artificial intelligence can help teachers carry out a more practical education process. In addition, course materials can be created for students with language models. Especially for students who are learning a language, it is possible to produce fast and high-quality content with the ChatGPT tool. In this way, students can improve their language skills with a language model. With a class-specific artificial intelligence pool, individualized plans can be created according to the class's average level, progress information, and readiness levels. It is estimated that many processes will run faster and easier with this technology, intended to increase teachers' focus. Conversely, teachers may be motivated to use artificial intelligence as a tool that allows them to carry out the process more comfortably.

Artificial intelligence software, designed to increase the motivation of its users and improve their performance, is preferred by teachers and the students they guide, who follow the technology and want to benefit from it. To talk about these artificial intelligence tools;

Gradescope
Gradescope is an artificial intelligence tool developed by Turnitin company, which is known to be used only under license by the Middle East Technical University in our country. This tool offers AI-assisted grading for educators at the higher education level. Gradescope software helps users seamlessly manage and grade exams, assignments, and all assessments from instructors online or in the classroom. Gradescope offers many different features to accomplish variable-length tasks (problem sets and projects) and fixed-template assignments (worksheets, tests, optical answer sheets, and exams) (Middle East Technical University, 2023). According to the example taken from the software's website and shown in Figure 1, teachers who scan students' exam papers and use the software can automatically grade the correct answers, errors, and alternative solutions to the exam questions. Gradescope stands out, especially in science, mathematics, chemistry, biology, and economics.
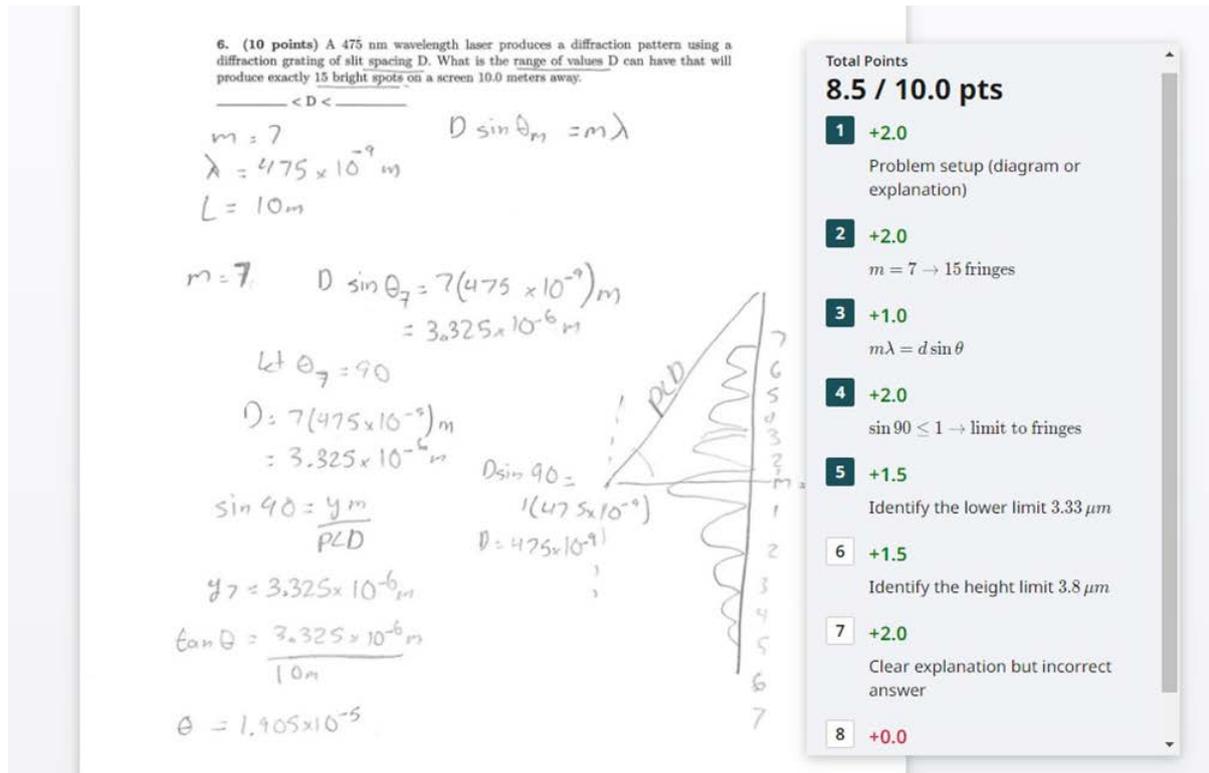
Figure 1. An exam paper analyzed by GradeScope.

Lessonplans.ai

LessonPlans.ai is an AI-powered lesson plan generator developed by teachers specifically for teachers. It is designed to make lesson planning more efficient and accessible for educators. This software offers various tools that may be useful to the teacher while producing material on the relevant subject. It aims to add exciting activities to the lesson plan that will enable students to understand better the issue to be covered. What is expected at this point is that the teacher defines the profiles of the students to the artificial intelligence. This way, it is possible to produce appropriate content for each student.

TeacherMatic

Teachermatic is an artificial intelligence-supported platform specially designed for educators to reduce their workload and focus more on the educational process. It uses GPT-3 technology in teaching, learning, and evaluation. Teachermatic offers a variety of AI-generated tools to ease the burden on educators, including lesson planning help, multiple choice question generators, study plan generators, rubric generators, and classroom question generators. With AI support, it makes it easy to create high-quality resources for the classroom, such as worksheets, lesson plans, and activities, using advanced language processing algorithms. Teachers can easily create various learning objectives based on the six cognitive learning domains of Bloom's taxonomy and develop engaging and relevant questions for their students using the classroom question generator. Many educators have provided positive feedback on Teachermatic after using it, stating that it can improve staff well-being, reduce workload, and simplify tasks while encouraging teachers to be more creative in their classrooms (Wileman, 2022).

Juji

Juji is a cognitive AI learning assistant and is used as a chatbot. The main difference between this cognitive artificial intelligence bot and other bots is that it is strengthened with human social skills. Like a psychologist, Juji cognitive AI assistants extract the user's unique characteristics, such as their needs, interests, and personality, from a real-time conversation and establish an empathetic relationship with the user. According to the information in Juji's promotional content, students' online success is directly related to their class participation and personality traits. This software can serve as students' learning assistant as a chatbot with human social skills. Thus, it offers counseling at an individualized level for each student.

New artificial intelligence software is released almost daily, but these are generally artificial intelligence-supported software with features that facilitate operation. It will take a little while for new software to be produced that will surpass the mentioned software in terms of performance and effectiveness, thus, for users to improve themselves.

In the Context of Educational Material

The number of digital content used in learning environments is increasing daily. It is known that the main reason for this situation is the developing and widespread technology. However, although the number of materials used is growing, it is seen that the integration of technology into the classroom education environment is low, especially in foreign language education (Başal, 2016). This situation is expected to be better considering the potential of digital materials in language learning-teaching fields. It is known that the use of technology in the classroom is more important when comparing language education with other areas of social sciences (Kartal, 2005). So much so that teachers, especially those teaching foreign languages, have assumed the role of a content producer in this field. Because teachers who provide language education prepare or develop content for their students according to their needs and levels (Başal, 2016). At this point, language models such as ChatGPT have become one of the prominent language models, especially for preparing materials in language education.

Thanks to artificial intelligence, teachers can prepare needed materials for their students. These contents, which will meet the different needs of students throughout their learning process, can be produced effectively in a very short time. The method the teacher will use when making these contents may be exams or educational adventure content that they can develop independently. Language teachers and teachers in different fields can create interesting stories, poems, or other types of literary works with language models. Fill-in-the-blank, multiple-choice, or matching-style leveling tools can be customized for each student using artificial intelligence. Nowadays, this process requires a long and challenging preparation that requires teachers to prepare different content for each student individually. Teachers can reduce the time needed to create compelling material and increase the diversity of educational activities with artificial intelligence tools.

When a mathematics teacher wants to develop material on any subject, he can create many different contents using ChatGPT. For example, for a ten-person multiple-choice exam to be given in a class of ten students, each student can organize an exam with a total of one hundred questions, with different numbers on their paper. This can be done by providing the artificial intelligence with specific keywords and sample questions that indicate the difficulty level of the question. It is known that ChatGPT is one of the most preferred tools for language modeling today. However, ChatGPT is an open-source project, and different applications can use this artificial intelligence model. For example, Notion is an application that can be preferred, especially by users who perform numerical operations and require tabulation. Thanks to Notion, large data sets can be analyzed, and the basic inferences made by commonly used statistical programs can be output as tables and graphs. The Notion is just one of dozens of applications that use artificial intelligence infrastructure in this field. Since it is impossible to use the potential of language models in a single application in today's technology, artificial intelligence-supported applications are being developed for almost every field. Language models and artificial intelligence tools are designed explicitly for areas such as mathematics, social sciences, literature, and linguistics.

Textbooks are among the most frequently used materials in education. These textbooks can be supported with artificial intelligence-supported games, platforms, and software. In this way, some materials can be obtained to motivate students to learn. Many language models, such as ChatGPT, can provide learning material ideas based on their personalized needs. The process of students using these materials and the experience of creating them with artificial intelligence-supported software can trigger their learning motivation. This material creation process can target any topic or outcome the teacher covered in class that day. Within the framework of these achievements, students can diversify different contents thanks to language models. Students and teachers can also use creative processes or explore other tools for these achievements.

Artificial intelligence software can provide students and teachers with materials on every subject. However, satisfactory results may still need to be obtained regarding the level of materials provided by this software. When examining the field, many software programs do not go beyond producing information cards that claim to provide adequate work. However, this may open the door to making predictions about artificial intelligence materials that will be shaped in the future. Students and teachers can obtain basic instructional materials using software such as Retinello, Yippity, Study Squeeze, and To Teach AI. This software can use people's lecture notes or texts on websites to create content and information cards that summarize these texts. In this way, students can develop materials such as exercises and worksheets to test themselves and teachers to evaluate students.

As it is known, materials contain written content and visual elements. Visual materials are common, and artificial intelligence has made significant progress in this regard recently. With the development of technology, the visual content production process has completely changed. First, traditional methods were replaced by digital tools; today, digital tools have begun to evolve to a different point. Today, thanks to artificial intelligence and deep learning technologies, it has become possible for the browser to create the image and process an existing image by writing a text that describes the desired image. Midjourney and Dall-E are the most up-to-date software examples on this subject. With these software, which can be used through the browser, users can convert the text into an image by writing a text that describes the image they want to create.

Software that works with artificial intelligence, such as Midjourney and Dall-E, do not produce these images by combining images available on the internet but are made using image processing technology called diffusion. Users do not need drawing skills for this process, which takes about a minute. The desired composition can be

produced with the desired technique. This is directly related to the level of education at which the material to be developed will be applied. Artificial intelligence visual processing software may not always produce the desired results. However, creating content close to the selected graphic with effective commands is possible. For example, for visuals to be used in a material to be developed for the primary education level, visuals can be created using keywords such as "children's book, small age group, or suitable for ages 7" in addition to the text. In addition to the text, these keywords can be changed for older age groups. The results can be tested with different techniques, and keywords and visuals can be produced until the desired level is reached.

In this way, teachers can create visual content for the images and new materials they want to manipulate. At this point, teachers may need to intervene in the visuals produced by artificial intelligence. Because these images are created by writing a text, and their content needs to be verified. The expected behavior here is for teachers to find visuals suitable for the material they will prepare or to change the visuals they see. Teachers can enrich their materials by taking these images produced by artificial intelligence as a reference, or they can get ideas and make their materials using traditional methods. The originality of the material and its orientation towards individual needs can directly affect students' educational motivation.

Artificial intelligence offers unlimited opportunities to evaluate all kinds of possibilities. Using ChatGPT and Midjourney software together can be given as an example of this situation. It may take work to reach the desired content. However, thanks to language models, the visuals to be depicted can be described more qualifiedly. The text created with ChatGPT, which contains many descriptive elements, can produce more effective results in software with visual content, such as Midjourney, because the richness of the graphic's graphic description is directly proportional to the closeness of the image to be produced to the desired one. The visual content obtained here can be converted into evaluation material in a different artificial intelligence software, or the text created with ChatGPT can serve another purpose with additional artificial intelligence software. At this point, any incentive to explore the possibilities of artificial intelligence can play an essential role in improving the quality of education.

In the Context of Quantification and Consideration

Just as there are artificial intelligence tools, there are also many artificial intelligence-supported software that teachers can benefit from for measurement, evaluation, and monitoring. Traditional measurement and evaluation methods are generally based on exams and teacher observations. This may cause individual learning needs to be ignored. To minimize these problems, it is thought that future evaluation tools will be supported by artificial intelligence (Zhai et al., 2023). Artificial intelligence tools can be designed with a process experience that will not only evaluate the relevant exam but also consider the student's performance during the process; thus, students will be able to receive comprehensive and individual-specific feedback.

In addition, as it is known, higher education entrance exams are carried out by the Student Selection and Placement Center (ÖSYM) in our country. Artificial intelligence will be included in the exam process, the questions will be written by artificial intelligence, and the exam evaluation will be carried out by artificial intelligence (Kasap, 2023). As mentioned before, artificial intelligence software, in which data is entered only for a classroom environment, can analyze all the students' data and produce meaningful results or evaluate the variables with millions of different options. In this way, teachers can create an automatic student monitoring and evaluation tool. Artificial intelligence is a tool with many potentials that can be used not only for the benefit of teachers, students, and the education process but also by students effectively. However, this may cause students to prefer artificial intelligence tools to get effortless results in homework and exams and may lead to unethical behavior. For example, ChatGPT can quickly complete writing and open-ended questions, which may lead students to use these AI software to complete assignments (Stokel-Walker, 2022). At this point, using various plagiarism detection software may be possible.

Checking the answers given by teachers, as well as preparing exams or worksheets, is a process that requires intense effort in itself. There are many applications, such as GradeScope, to manage this process, but there are few reliable sources regarding the plagiarism level of the answers given. Today, plagiarism control applications such as Turnitin and iThenticate, frequently used by academics, scan specific libraries and perform the scanning process by assuming that a human wrote all texts. For this reason, these applications may experience problems distinguishing content created with artificial intelligence. According to a study conducted in Canada, CopyLeaks software is the software that provides the most accurate results today in detecting artificial intelligence plagiarism (Storm, 2023). In a period when artificial intelligence language models are used so widely, it may be the right step for teachers to use artificial intelligence-supported plagiarism software for measurement and evaluation. Thus, students will spend less energy and time to obtain more efficient and ethical results.

Conclusion and Recommendations

Artificial intelligence technologies will undoubtedly be an essential tool in training future scientists, engineers, and individuals who will be employed in many professional professions. With a correctly designed artificial intelligence-supported curriculum, students can be equipped with skills such as collecting data, analyzing and conducting experiments with artificial intelligence, and the process of influencing students' academic performance

with innovative scientific developments can be carried out successfully. Students who receive education with this curriculum will be successful in the professions of the future, and states will make this a policy and shape their future education plans in this context.

The widespread inclusion of artificial intelligence in general education processes is not possible soon. Although its advantages are unlimited and the conveniences it brings, today's education processes are not yet ready for artificial intelligence technology in the context of relevant curricula, expert personnel, and technological infrastructure. This is considered the case, at least for our country. Because, as far as is known, work has yet to be developed on an artificial intelligence auditing or verification software or information pool filter related to the field of education. First, it is necessary to train and employ a team of educators who are experts in artificial intelligence in relevant departments and to develop artificial intelligence software by individuals who have gained expertise in this field. Because the content that fills the artificial intelligence information pool used today is information found on the internet and needs to be verified, the content that a teacher or student creates using artificial intelligence must also be checked by software developed for this field. Otherwise, the accuracy of the information obtained should be approached with suspicion. Therefore, when producing content, the person making the content must have mastery of this field. Digital materials built with artificial intelligence must be checked before being presented to the student. At this point, teachers who save time for content production will have to check the accuracy of this content, so there will be a waste of time. This situation is similar to our perspective on the Wikipedia site in the early 2000s.

There are some ethical issues arising from working with and using artificial intelligence. These ethical situations bring with them many professional uncertainties. Therefore, teachers and students need to be informed on specific issues. First, it should be examined that text or visual content produced by artificial intelligence should not be used as is. In particular, students should be enlightened that AI-supported chatbots are developed as a language model, not an interactive encyclopedia resource. To avoid blunting the critical thinking skills of students with artificial intelligence, it should be explained that the first answer on the research subject is insufficient, and the diversity of ideas on this subject should be increased through different research. In particular, students need to be aware that they use artificial intelligence only as a tool. Language models such as ChatGPT should be encouraged to give ideas at the starting point of research, and it should be prioritized that the student's individual and critical thinking structure is more valuable than any artificial intelligence-supported language model.

Artificial intelligence does not always provide accurate information. Due to the working system, content is created based on how much the same information is repeated on the internet and its impact rather than the accuracy of the information. For this reason, although artificial intelligence may seem like a valuable and innocent tool at the first stage, it may produce some stereotypes and biased, non-objective, inaccurate content found on internet resources. To give an example that any user can experience, When chatting with AI and asking it to create a human profile, it tends to come up with stories and scenarios where people in high-paying jobs have white skin tones and people in low-paying jobs have dark skin tones. In short, when language models such as ChatGPT are wanted to be used, teachers and students must have developed a particular perspective.

Language models such as ChatGPT are software that is vulnerable to privacy violations. The information given to this software is no longer private or personal. For example, as soon as the author of this text submits the exact text to ChatGPT as data, the software saves this data in the system and improves the learning behavior. This text's language structure, sentence analysis, and meaningful relationships are data for language models. Suppose a researcher, teacher, or student who wants to work with education and artificial intelligence in the future continues this process using ChatGPT. In that case, he may come across some of the data in this text. Each user is deemed to have accepted the relevant declaration when registering to the system to use this language model. For this reason, researchers must use ChatGPT consciously about the subjects they will study.

There are also fundamental skills that teachers need to acquire in creating visuals with artificial intelligence. The most important of these skills is prompt engineering. Although this term creates the impression of a professional branch of business, such a type of engineering has yet to become widespread today. However, companies that want to get accurate and effective results by using artificial intelligence will soon carry out many recruitment processes for this position because artificial intelligence is not a technology that can yield effective results alone or with inefficient guidance. The quality of the information given to artificial intelligence - the information to be prompted - ensures that the result is accurate and meaningful. Successfully performing this engineering skill will be a challenging process for students. It may be considered to add artificial intelligence training units appropriate to the student's level to the curriculum for students to keep up with future education processes and work efficiently.

Critical thinking and social and emotional development are vital skills that a machine cannot entirely teach. Although artificial intelligence has high development potential, it will never fully replace a teacher. Artificial intelligence, which has shown rapid development in project monitoring, evaluation, and material production, can be an excellent supporting tool. However, teachers must refrain from assuming their role in the classroom and analyzing the cognitive levels and emotional intelligence of students as well as a teacher. Artificial intelligence is an excellent opportunity for efficient and effective learning and will be used more frequently in the future education system. Those who will achieve this best will be teachers who have improved themselves in this field.

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