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The Employment And Effect Of Ai Applications On The E-Learning Environments -University Students As A Model

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Abstract:

Education is vital for the individual and the community, as it is the cornerstone of advance and good future. Therefore, the educational system had witnessed radical changes thanks to the digital transformation and the integration of technology. In this regard, the electronic education has increased and requires technological tools and human capacities that can adopt and use sophisticated computing systems, including AI applications that help develop the educational level and promote the learning methods and strategies.

Keywords: AI applications. E-learning environments. the educational system. the electronic education

Introduction:

Recently, the digital transformations witnessed a considerable development in the technical and technological fields thanks to AI that brought about many changes in education, work, communication, etc. Therefore, AI turned into a necessity in various fields. In this regard, it penetrated education and positively influenced the learning environment and teaching methods in the universities to achieve the good communication and interaction between the student and the teacher, and promote the exchange of ideas that develops the cognitive and linguistic skills and the scientific research.

Based on what was said, this study aims at answering the problematic that says, “What is the effect of employing AI applications in the e-learning environments?” From this question, sub-questions arise as follows:

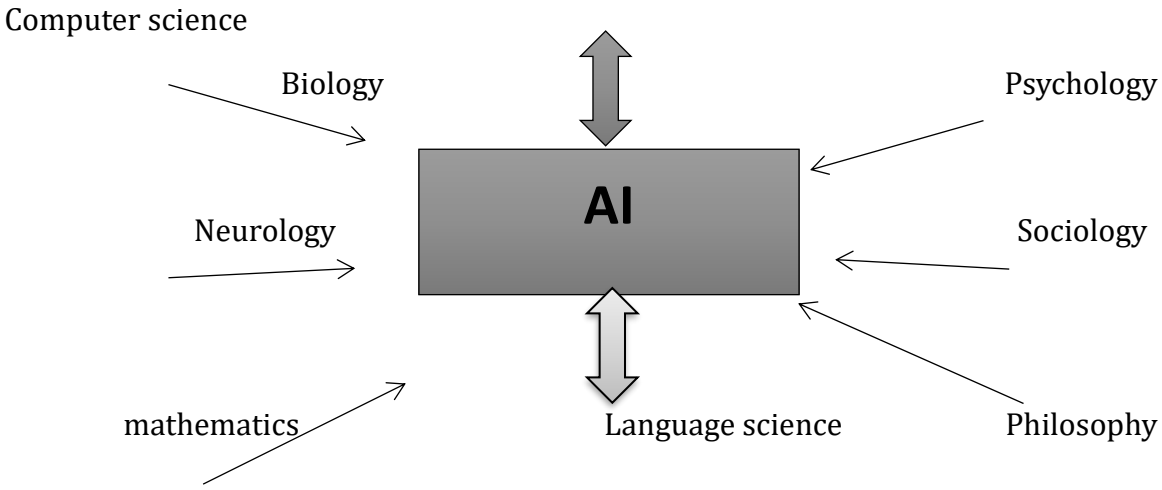
- What is the concept of AI applications in education?
- What is the status-quo of using AI applications in the e-learning environments?
- How do AI applications help the academic achievement?

Identification of the study terms:

1. The concept of AI in education:

The current educational environment alone cannot achieve the aims of the educational process, and needs AI techniques to identify the gaps in the educational content and increase the learners' achievement. AI in education can be defined as educational systems that rely on the computer and independent databases (that identify what is being taught). Moreover, it is a set of scientific rules of the educational content (that determines the teaching methods) that try to use deductions about the ability of the learner to understand the subjects and identify the weaknesses and strengths to dynamically adjust the educational process. Besides, it is the use of the electronic educational environment, including the neural system mimicry strategies and the systems of extracting the data related to the electronic learner behavior according to his needs (Muslim, 2013, p. 13).

The use of AI in the educational institutions aims at finding modern tools that facilitate learning in the educational environments and at coping with the educational developments. Based on this, AI affected all the sciences, including the computer science, biology, psychology, mathematics, linguistics, etc (Afifi Jihad, 2015, p. 25). The following chart shows the effect on different fields:



2. The concept of electronic education:

The electronic education is vital, mainly with the rapid technological and scientific advance in all the educational fields. It can be defined as an interactive educational system that uses the information and communication technologies and relies on a complementary electronic environment that presents the educational curricula via electronic nets, provides guidance and direction, organizes exams, and manages and asseses the sources and processes (Abbas, 2022, p. 89). In addition, it is one of the tools that support the educational process and shift it from memorization to creativity, interaction, and skills development. It gathers all the electronic aspects of learning and

teaching and uses the most modern methods in teaching, publication, and leisure using the computer and nets (Abbas, 2022, p. 89).

Thus, the electronic education provides an electronic educational content using multimedia in a way that allows the learner to interact with the content in time and place at a suitable pace with the teacher and peers. Furthermore, this education can be managed with these media (Abbas, 2022, p. 88). From these definitions, we find out that the electronic education:

- Depends on the digital environment to present the educational programs.
- Is a tool of communication between the educational process parties to exchange information at low costs in a brief time.
- Uses the modern techniques to cope with the technological development, and improve and facilitate learning.
- Increases the education efficiency and the integration of the active learning and the modern techniques used in the educational system.

There are various terms and concepts about integrating the computers in education. However, most revolve around the electronic education environment. Its types are (Chakour, 2020, p. 160):

a. The direct synchronous electronic education: The teacher and student coexist and communicate at the same time in a virtual world using the instantaneous chat; and are not necessarily physically connected.

b. The indirect asynchronous electronic education: The teacher and students must not coexist at the same time and place. The learner gets extensive courses according to a planned educational program, where he chooses the times, places, and circumstances that suit him.

3. The university student:

He is the person whose scientific skills allowed him to pass to the university to study a specific major. He is one of the basic elements of the educational process at the university and represents the majority of the university population (Morsin, 2002, p. 33).

First: the theoretical study:

1. The importance of using AI applications in education:

Education is one of the fields that need AI applications, which improve and develop the educational content and system. The importance of these applications manifests in:

- AI provides many teaching skills and presents many aspects of the lesson to help the teachers get a better assessment and satisfy the different educational needs of the students.

- The expert teachers need teaching more than the academic content. The deep learning, the non-cognitive skills, and the content mastery are crucial in determining the academic results and the student life.
- AI applications ensure the students get excellent teaching that needs simplifying the innovations using the electronic education (Al Ghamidi, 2024, p. 28).
- AI applications facilitate access to the scientific researches and discoveries because they help development in the scientific fields.
- AI mimics the human intelligence processes, as the computers solve complex problems, take logical rapid decisions, and think as the human (Mahmoud, 2020, pp. 190-191).
- AI programs provide many ready software for self-learning or learning with the teacher. In addition, they provide the teachers with teaching methods and skills that help them grow better. Moreover, they can be used for discussion and exchange of ideas; what positively influences the educational process (Soualma, 2022, p. 18).
- AI applications are employed in education to found smart learning environments that make the educational process revolve around the student, through employing different programs of exploratory, collaborative, and adjustable teaching, educational bots, software, and games that target the learners' needs and focus on the challenges they face. In addition, they develop the problem-solving skills, the critical thinking, the productivity, and the programming (Soualma, 2022, p. 18).
- The AI-based smart education programs may help the students adapt and understand the subject and gain life skills. These programs calculate the rate of advance in education and provide feedback; what encourages the learner to improve and look for more educational resources.
- AI-based programs widen the self-learning opportunities and make the learners active in the educational process. They are flexible, modern and exact programs that help students innovate. AI is one of the mechanisms that help integrate the technological development in education, as it creates a space for communication between the teacher and learner, and helps the learner gain new information with the least efforts in the shortest time (Al Ghamidi, 2024, pp. 29-30).

The importance of AI applications in education lies within solving the issue of the scientific expansion, breaking the psychological barriers between the teacher and the students, satisfying the scientific needs of the learners, and reducing the costs of education.

2. The characteristics of using AI in the educational environment:

The use of AI in the educational practices has many advantages, as follows (Al Ghamidi, 2024, pp. 30-33):

- Adding joy and pleasure to the courses and end routine and boredom.

- Increasing the efficiency of the educational curricula through deducing the required knowledge and skills in time.
- Developing the education quality and improving the access to high-quality educational resources.
- Supporting the students, understanding their behaviors, and delivering courses in a way that suits their needs and abilities.
- Saving time and effort to help the teachers assess and correct.
- Making up for the lack of competent teachers in some fields.
- Allowing the students to interact with the educational curricula, as they can get information fast.
- Liberating the students from boredom in the educational environment. For instance, the smart courses applications and the different platforms suit all the students' needs and inclinations.

AI applications aim at finding modern methods of electronic education to serve the future of the humanity and cope with the scientific and technological research to increase the efficiency of the academic achievement in all the educational institutions.

3. Employing AI applications in the educational process:

AI has many applications that can be used in education to foster the efficient education and facilitate the advance and achievement of the goals. These applications can be summed up mentioning (Muslim, 2023, pp. 14-15):

- Chatbots: They are computing software designed to intelligently mimic the human conversations and provide interaction with the user using text and/or voice. These applications may be chat applications or websites. They allow the learners to ask questions about a given field to get answers, support, advice, and compassion according to their needs.

The Augmented Reality: It is a synchronic interactive technique based on adding new information (text, image, audit, video, etc) in multidimensional forms to the vivid reality. In this regard, the text, image, or fixed shapes related to the educational content change into a vivid reality when turning the phone camera towards it using the Augmented Reality applications.

- The Virtual reality: It is an interactive computing mimicry of the reality that allows the learner to interact, delve into, master, and surf in this reality. In addition, it allows making dangerous scientific experiments or participating to visiting specific places such as the house, class, etc. It requires using special tools such as the head helmet, gloves, glasses, etc.

- Audio Industry: It is an interactive computing mimicry of the reality that allows the learner to interact, delve into, master, and surf in this reality. In addition, it allows making dangerous scientific experiments or participating to visiting specific places such as the

house, class, etc. It requires using special tools such as the head helmet, gloves, glasses, etc.

- **The Expert Systems:** They are computing systems that mimic the behavior of the expert of using knowledge, making judgments and deductions, and giving advice and solutions to problems. It allows transmitting the human experience to the expert computing system through the knowledge engineer.

- The Robotics: They are electromechanical machines that exercise their tasks through following a set of instructions stored in the electronic memory of the device. These orders are designed with specialized computer software connected to the Robot, which can be an educational tool or a teacher. In this context, the learner can learn about the robot, with the robot, and from the robot.

- The Intelligent Adaptive Learning: It is using AI methods to satisfy the different educational needs of the learner. It uses algorithms that use the learner answers to adapt the educational content and provide resources that suit his needs, in addition to immediate feedback without the intervention of a teacher.

- The Smart Educational Games: They are games programed by the computer to achieve specific educational goals. They are characterized with excitement, challenge, imagination, and competition and are designed in a way that simulates the mental activity, increases concentration, improves decision making and problem-solving, and strengthens the social relations.

- The Smart Evaluation: They are computing programs that can evaluate the higher thinking abilities, correct the tasks and complicated exams, show the data, analyze the learners' performance, show the weaknesses and strengths, and provide the necessary support in due time.

- Distinguish and Read Letters: They are computing programs that convert the printed images and written texts into audio files that can be adjusted through analyzing the document and comparing it to the handwritings or the sample letters stored in the database. Besides, they use a proofreader to guess the unknown words.

- Summarize Texts: They are computing programs that can summarize long texts into clear short passages. The reader can deduce the main information in short time, regardless the nature of the text.

- Language Processing: It allows the computer to chat with people through answering specific questions. There are programs that understand the handwriting and process the orthographic and grammatical mistakes.

The applications that can be used in education are (Al Ghamidi, 2024, pp. 49-56):

- Class Dojo: it uses the game elements and the digital games design techniques to manage the behavior and foster the positive practices of the students and link them with

the teachers in a virtual community. In addition, it provides the immediate translation to allow the students to chat with foreigners and break the language barriers. Its main advantages are:

- It controls the behaviors of the students and encourages their skills and values.
- It provides immediate observations about the performance and collaboration in the educational process.
- The students present what they learned through images and videos.
- It allows the continuous access to the cultural, scientific, and university events and activities.

Content Technology: It provides summaries of books and educational curricula using AI applications. It provides a better educational content in short time at low costs. It uses AI and Deep Learning algorithms to create a suitable educational content based on the inputs of the teacher, such as the curricula, the classes, etc. It provides content to a specific student or to all the students.

- Al-Moallem: It uses AI applications to recognize Arabic, and Arabic dictionary to play Quran. It aims at facilitating Quran learning and recitation, and at giving access to the foreigners and people with specific needs. Its main advantages include:

- Allowing visual memorization through presentation, repetition, and hiding some words.
- Allowing memorizing Quran and correcting mistakes.
- Allowing the immediate voice search and sharing the recitation with others.

- Socratic: It helps students do their homeworks through providing answers and different resources, including videos, texts, etc to explain the related concepts and foster the performance and understanding.

- Brainly: It uses the class social communication net to help collaboration between students to give correct answers alone or with the help of experts all along the day. Its main advantages are:

- Getting spontaneous answers to the questions.
- Recognizing the texts with more than 35 languages using Google Vision AI.

- Quizlet: It provides special educational courses to the students according to their needs. It chooses the starting point in each course and uses the language procession to interpret and evaluate the answers. Its main advantages are:

- It shows the student advance and level, and gives views about what can be improved.
- It allows the students to make educational cards, or use premade ones, about any educational topic.

- Musio: It is an educational social bot based on AI and the Deep Learning algorithms to make virtual chats, recognize things, and understand the facial expressions. It helps people who want to improve their English through chatting over different topics. This application is accompanied by Sophy application that allows it to read and interact with the content of the educational subjects, and another application that allows the users to monitor their advance in English. Its main advantages are:

- It can store and retrieve the previous chats.
- It can examine the pronunciation and correct English mistakes.
- It can interact with the users separately.
- It can understand the facial expressions and the context and goal of the conversation.
- It can describe the events it sees.
- It can recognize the voices and people.

- Santa: It is an application that helps the learners improve their English level and prepare for Toeic test. It uses AI and Deep Learning to evaluate the level of the learner and choose the best educational courses. In addition, it can predict the grade of the examinee using his correct answers and the time spent in answering. Its advantages include:

- Monitoring the advance and performance to support the students.
- Recommending the use of educational materials and questions that help the students work on their weaknesses in listening, vocabulary, grammar, etc.

- Alta: It is an educational system that uses AI techniques and Machine Learning to provide an educational experience to the student to improve his learning and provide the teachers with information and views about their performance. Its advantages are:

- It allows the teacher to manage the educational content, as he chooses the educational goals and suitable homeworks and tests.
- It allows the teacher to convey information and explain the concepts to the students.
- It provides educational content based on the students' performance and goals in different fields, including mathematics, chemistry, etc.
- It identifies the students' weaknesses and helps remedy them.
- It focuses on what the students need to learn, not what they really know.

- Duolingo: It is an application for languages learnings. It provides educational courses based on the performance and advance of each learner. In addition, it allows making placement tests based on the previous answers of the users. Besides, it provides chatbots that suit the linguistic level of the users.

- Smodin: It is a digital platform that uses AI, language procession, and Deep Learning to provide a set of language related applications that help perform the daily tasks, such as paraphrasing, proofreading, converting the text into speech, etc. Its main advantages are:

- It provides tools for paraphrasing and quoting from books, papers, websites, etc in different languages and styles.
- It fosters the students' learning and helps understand the different topics and rapidly grasp the information.
- It allows translation into more than 100 different languages, and can immediately translate YouTube videos, whose translation files can be downloaded in Json and CSV formats.

Besides, AI applications help develop the different skills of the students, such as the linguistic communication, the social communication, the personal skills, the study skills, the good remembrance, the time management, and the technology use through the intelligent education programs.

4. The types of the electronic education environments:

a. The direct net learning: This environment directly provides the educational subject via the net. The student fully relies on the internet and the technological tools to access information, and has no need for the teacher. However, this environment may negatively affect learning due to the absence of the teacher.

b. The blended net learning: It is the most efficient, as it merges the electronic and traditional learning to allow the interaction between the student and the teacher in a pleasant way, and makes the student a main part of the course. For instance, the student may read the lecture on CDs and enjoy video and text explanation before coming to the university. This helps the student better discuss and understand the lesson at the university. This environment creates creativity and encourages thinking and responsibility taking. In addition, the diversity of the technological tools and the methods of their use allow the learner to choose what suits him.

c. The supportive net learning: The student uses the net to get different source of the information.

Third: the field study:

Identification of the problem:

Since the new millennium, the Algerian Ministry of Higher Education has witnessed different changes in the educational system, including the teacher, the student, the policy, and the environment. In this regard, the Ministry focused on the technological development and considered it the main tool in the educational process. Through this paper, we shall shed light on the effect of AI and its applications on the electronic

education environment, and on its importance as a tool used by the teacher inside and outside the educational context.

Problem of the study:

This study answers these questions:

- What are the goals of using AI applications in the educational environment?
- To what extent is the use of AI application efficient for the university student?
- What is the status-quo of using AI applications in the electronic education environments?

Aims of the study:

This study aims at:

- Knowing the various aspects of the topic through collecting field data.
- Designing a study tool through investing the information collected from the field, the sources, and the references.
- Studying the characteristics of the tool, including the validity and consistency, to rely on it in the field study.
- Testing the study tool on the sample to know its suitability and find out more about the use of AI in the electronic education environments for the university student.

Method of the study:

Each study requires a given method. Since our topic revolves around the use and effect of AI applications on the electronic education environments, we decided to use the analytical descriptive method.

The field study tool:

To conduct the study and collect data on the topic, we designed a questionnaire to measure the use of AI applications in the educational practices.

Sample of the study:

The sample includes 88 university students from the Algerian universities because they are in a decisive phase.

The study limitations:

a. The temporal limitations:

The study was conducted from 20/04/2024 to 07/05/2024, where we administered and collected the study tool via websites.

b. The spatial limitations:

The sample we used is the social media.

The statistical procession tools:

To deal the questionnaire, we used the percentages in the following equation:

$$\frac{\text{Frequency X 100}}{\text{The number of informants}}$$

Analysis of the study results:

1. Analysis and presentation of the results:

Distribution of the students according to the gender:

Gender	Male	Female
Percentage %	23	65
Total	88	

The table shows that most of the informants are females with a rate of 65% while the males are 23% due to the random administration of the questionnaire on social media and the high number of females at the Algerian universities, as the females are aware about the value of knowledge to get rid of underdevelopment, satisfy the social needs, and achieve a venerable position within the society.

Distribution of the students according to the age:

Category	Frequency	Percentage
(20- 25)	59	67.05%
(26-47)	29	32.95%
Total	88	100%

The table shows that most of the informants are aged between 20 and 25, with a rate of 67.05%, while 32.95% are between 26 and 47 years old. Thus, most of the students are in the natural age category for being at the university, with few students who are old due to the late enrollment at the university or the delayed success in the Baccalaureate exam.

Distribution of the informants according to the educational cycle:

University cycle	Bachelor	Master
Frequency	79	09
Percentage%	89.78%	10.22%
Total	100	

The table shows that the bachelor students exceed the master ones, because the bachelor ones do not work unlike the master students who make 10.22% of the informants.

To what extent are AI applications used in the scientific researches:

	Frequency	Percentage%
To a big extent	10	%11.36
To an extent	66	%75.01
No benefit	12	%13.63
total	**88**	**% 100**

The table shows that 75.01% of the informants use AI applications in most of the scientific researches to an extent, while 11.36% use them to a big extent. This shows the contradiction in using AI applications in the academic researches assigned by the teachers in the applied courses.

When to use AI applications in the electronic education environment?

	Frequency	Percentage
In the direct net learning	56	% 63.63
In the blended net learning	10	% 11.36
In the supported net learning	22	% 25.01
Total	**88**	**% 100**

The table shows that the informants use AI application in the direct net learning with a rate of 63.63% because it is the most efficient electronic environments, as it creates interaction between the student and the learner and encourages deep thinking about the course. As for the blended net learning, it is slightly used unlike the supported net learning that got a rate of 25.01%. The latter enables the student to invest his knowledge in looking for the previous educational materials to get sources of information in a brief time.

Did the use of AI achieve the following educational outcomes?

	Frequency	Percentage
Scientific fields	38	%43.18
Cognition	17	%19.31
Performance	5	% 5.68

Skills	28	% 31.83
Total	**88**	**% 100**

The table shows that the educational outputs targeted by the use of AI reached a rate of 43.18% for the scientific fields, 19.31% for the cognition, 31.83% for the skills, and 5.68% for the performance. These outputs are found in most of the students due to their low linguistic performance and reliance on technology to make their researches.

To what extent does the university student take advantage of AI applications?

	Frequency	Percentage%
To a big extent	23	% 26.15
To an extent	59	% 67.04
No benefit	6	% 6.81
total	**88**	**% 100**

The table shows that 67.04% of the students take advantage of AI applications to an extent, 26.15% take advantage to a big extent, while only 6.81% take no benefit.

Which skills are achieved by using AI applications?

	Frequency	Percentage%
The technology use	47	% 61.54
The social communication	33	% 32.69
The linguistic communication	8	% 5.77
Total	**88**	**% 100**

The table shows that 61.53 of the informants believe that the use of AI application achieves the skills of technology use in the educational functions during looking for an educational content. However, 32.69% and 5.77% have different views and see that AI applications promote innovation and development to allow the student master his language and know other languages and cultures through the linguistic communication.

What AI applications are used by the student in the electronic learning environments?

	Frequency	Percentage%

Augmented reality	10	% 11.36
Intelligent adaptive learning	53	% 60.22
Chatbots	25	% 28.4
Total	88	% 100

The table shows the possibility of using AI applications by the student during learning. 60.22% of the students tell that they use these applications in the intelligent learning environment to focus more on their linguistic performance and acquire the educational subject far from the noise of the teamwork. Besides, 28.4% use the augmented reality in education.

Do AI applications satisfy the students' needs?

	Frequency	Percentage%
Educational	50	% 56.82
Communicative	38	% 43.18
Total	88	% 100

The table shows that 56.82% of the students see that AI satisfies their needs in the linguistic and scientific fields, while 43.18% see that they satisfy their communicative needs. This marks a contradiction in the students' views regarding the needs to be satisfied by AI applications.

Do AI applications generate new ideas and views?

	Frequency	Percentage%
Yes	55	62.5%
No	33	37.5%
Total	88	100%

The table shows that 32.92% of the students, which is a considerable rate, see that AI applications generate new ideas and views. We must point that the experts must set AI systems that suit the various university fields.

Conclusion:

The use of computing and digitalization in the higher education is a necessity imposed by the current developments. In this regard, AI has systems and applications that facilitate communication and education inside the educational institutions and ensure the

achievement of the pedagogical aims. Thus, we shall give some recommendations regarding education in the light of AI:

- It is necessary to make training to the university students on how to use the electronic programs in the educational process.
- The Algerian university must integrate the modern techniques, computers, devices, and robots to cope with the educational curricula, mainly in language learning.
- Researches must be made to identify the obstacles and difficulties faced by the university students during the use of AI applications in education.
- It is necessary to focus on the scientific and practical employment of the multimedia using AI in developing Arabic curricula, teaching methods, and learning strategies.

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Appendices:

Questionnaire: the use and effect of AI applications on the electronic learning environments for the university students:

PS: Please put a cross (X) in the suitable column:

Gender: ☐ male ☐ female ☐

Age: 20-25 ☐ 26-47 ☐

Educational cycle: bachelor ☐ Master ☐

Students' questionnaire:

To what extent are AI applications used in the scientific researches?

To a big extent ☐ To an extent ☐ No benefit ☐

When to use AI applications in the electronic education environment?

In the direct net learning ☐ In the blended net learning ☐

In the supported net learning ☐

Did the use of AI achieve the following educational outcomes?

Scientific fields ☐ Cognition ☐ Performance ☐ Skills ☐

To what extent does the university student take advantage of AI applications?

To a big extent ☐ To an extent ☐ No benefit ☐

Which skills are achieved by using AI applications?

The technology use ☐ The social communication ☐

The linguistic communication ☐

What AI applications are used by the student in the electronic learning environments?

Augmented reality ☐ Intelligent adaptive learning ☐ Chatbots ☐

Do AI applications satisfy the students' needs?

Educational ☐ Communicative ☐

Do AI applications generate new ideas and views?

Yes ☐ No ☐