The Reality of Artificial Intelligence application and its Impact on Improving the Quality of Higher Education: University of Adrar as a Model.

واقع تطبيق الذكاء الاصطناعي وتأثيره في تحسين جودة التعليم العالي جامعة ادرار نموذجاً

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Abstract:

This study aims at knowing the role of Artificial Intelligence in improving the quality of higher education by relying on the questionnaire for the data collection on the variables of the study. A random sample of sixty-eight singles was selected from Adrar University's faculty and administrative staff. Using the plspm package, R software was used to analyze the data. The study concluded that there is no interest on the part of the university in the advanced modern technologies that improve the quality of higher education.

Keywords: Artificial Intelligence; quality of education; Adrar University; plspm package; R.program .

JEL Classification Codes: A2, O3.

ملخص::

تهدف هذه الدراسة إلى معرفة دور تطبيقات الذكاء الاصطناعي في تحسين جودة التعليم العالي، وذلك بالاعتماد على الاستبيان كأداة لجمع البيانات عن متغيرات الدراسة ,تم اختيار عينة عشوائية مكونة من 68 مفردة من أساتذة وموظفين إداريين في جامعة ادرار، وتم تحليل البيانات بالاعتماد على برنامج R عن طريق تحليل المسار بطريقة المربعات الصغرى باستخدام حزمة plspm .وتوصلت الدراسة الى عدم وجود اهتمام من طرف الجامعة بالتقنيات الحديثة المتطورة التي تحسن من جودة التعليم العالي

كلمات مفتاحية: الذكاء الاصطناعي. ،جودة التعليم. ،جامعة ادرار. ،حزمة plspm. ،برنامج R.

تصنيفات JEL : A2 ، O3.

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Introduction:

       Educational institutions were and still are a place for the dissemination of science and knowledge and a source of growth and building societies and civilizations, and accordingly, education has become a mainstay for renaissance and development. The education sector has recently witnessed radical changes in teaching methods and teaching models, due to modern technological developments that covered all fields and domains, including the higher education and scientific research sector. The importance of artificial intelligence in many fields, including a more prominent role in education, makes it one of the most significant technological developments in recent decades.

       Integrating artificial intelligence applications in higher education has received wide attention by many researchers, because of its great benefits in improving and developing the educational process, in addition to achieving academic excellence for learners, and this is what most studies have found, such as the study of Elkin and other (2014); the emphasis of many studies on the advantages provided by artificial intelligence applications to the educational process, Even though the Ministry of Higher Education in Algeria is aware of the many benefits of introducing and utilizing artificial intelligence applications in education, it still uses some traditional methods in teaching. Accordingly, the study problem is defined by the following central question:

What is the impact of applying artificial intelligence on the quality of higher education at Adrar University?

To answer the main question, the following sub-questions were posed:

- ➢ What is the impact of smart teaching systems on improving the quality of higher education at Adrar University?
- ➢ What is the effect of virtual reality on improving the quality of higher education at Adrar University?
- ➢ What is the effect of educational robots in improving the quality of higher education at Adrar University?
- ➢ What is the impact of smart content on improving the quality of higher education at Adrar University?
- ➢ What is the effect of adaptive learning environments on improving the quality of higher education at Adrar University?
- ➢ What is the reality of the application of artificial intelligence applications at Adrar University?

Study hypotheses:

- ➢ There is a significant effect of smart teaching systems in improving the quality of higher education at the University of Adrar;
- ➢ There is a significant effect of virtual reality on improving the quality of higher education at the University of Adrar;
- ➢ There is a significant effect of educational robots in improving the quality of higher education at the University of Adrar;
- ➢ There is a significant effect of smart content in improving the quality of higher education at the University of Adrar;
- ➢ There is a significant effect of adaptive learning environments on improving the quality of higher education at Adrar University.

Objectives of the study:
➢ To identify the applications of artificial intelligence that can be functional in the field of education;
➢ Highlighting the importance of integrating artificial intelligence applications into educational institutions;
➢ Identifying the extent to which faculty members adhere to quality assurance standards;
➢ Identifying the relationship of artificial intelligence with the quality of higher education.

The importance of studying:

The purpose of the current study is shed light on modern technologies that can be functional in the development of the educational process, including artificial intelligence. It is one of the important topics in which most literary studies are interested, and the study tried to link them to highlight the importance of using artificial intelligence techniques in higher education as a major sector on which development plans and programs depend heavily. Also, the current study may identify the difficulties that prevented the use of technologies Artificial Intelligence in the educational process and present solutions for them, which will contribute to the development of the educational process.

The used approach:

In order to achieve the objectives of the study and to test the validity of the hypotheses, the descriptive analytical approach was used for the study variables, where the method of partial least squares path analysis using the PLSPM package was used to analyze the data and test the hypotheses in order to reach results on the subject of the study.

Study Model:

The study model is represented in the independent variable artificial intelligence, symbolized by **X**, and measured in five dimensions: smart teaching systems, virtual reality, educational robots, smart content, adaptive learning environments. The dependent variable represented in the quality of higher education, symbolized by **y**, and measured in one dimension.

Figure 01: Pathway Model for the Study
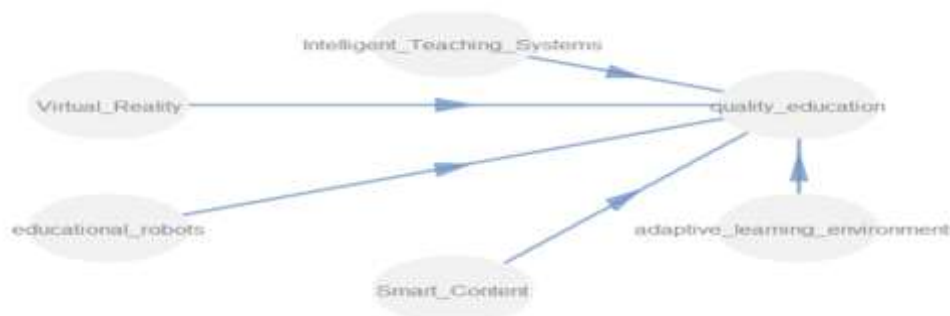
Source: Created by researchers using the R3.5.1 PLSPM package

Previous studies:

Phillips's study (2013), entitled "Using the keyword method and the smart board in vocabulary instruction for students with learning disabilities." The study aims to learn about the effectiveness of using the keyword method and the presentation using smart blackboard in

teaching vocabulary to undergraduate students. The study was applied to the third grade of a Catholic school, and there was a significant improvement in the students' scores in the vocabulary acquisition test in reading and social studies .

Elkin and others (2014) study, entitled "Implementing a robotics curriculum in an Early childhood Montessori classroom." The study aims to reveal how robots are used as a new educational tool in the early educational classes at Montessori School. The study concluded that students were able to assemble and program a robot without the robot also helped the students to use their computers effectively in educational activities**.**

Xu and Others (2017) study, entitled "Design and Implementation of Chinese Vocabulary Learning Case Based on Mobile Virtual Reality for -The Belt and Road- " The study aims to search for a method of learning Chinese vocabulary using virtual reality and mobile phone in the Belt and Road region. To Unity 3D, because of the study, the researcher stated that the application of virtual reality in education enriches the teaching process and increases student engagement and passion significantly.

Lan Wu's study (2019), entitled "The Student Model construction of Intelligent teaching System Based on Bayesian Network." The study attempted to design an intelligent student model based on the Bayesian network and analyze the factors that affect the student learning process. The study concluded that the Bayesian-based student model helps Students understand well the level of knowledge they are learning, in addition to making use of the characteristics of prior knowledge and ex-post data, and then compare a realistic estimate of students' knowledge.

Study El-Sabbagh (2021), entitled "The adaptive e-learning environment based on learning styles and its impact on development students' engagement." This study aimed to design an adaptive electronic learning environment based on students' learning methods and their impact on student participation. Adaptive learning environment engage students towards learning.

Terminology of the study:

Artificial Intelligence (AT): It is the opportunity for electronic systems to think like a human being and can make decisions and adjust themselves without the intervention of the human individual, as they are trying to simulate human intelligence (Selçuk, 2003, p. 07).

Quality Of Education: the World Bank (1995: 46) puts forth the following concept:" Quality in education is difficult to define and measure. An adequate definition must include student outcomes. Most educators would also include in the definition the nature of the educational experiences that help to produce thus outcomes—the learning environment" (Ashraf and Others, 2009, p. 19).

1- Artificial Intelligence and the Quality of Education:

1-1 Artificial Intelligence (AT):

The first appearance of artificial intelligence was in the fifties and exactly in 1956, John McCarthy presented a work project at Dar Mott College in the United States of America (Olaf Zawacki and Others, 2019, p. 03), so that the first handbook of artificial intelligence defined it as "a computer system linked to human characteristics that performs Intelligent behaviors and skills, for example language understanding, thinking, and problem solving" (Jai Voon, 2020, p. 05). Artificial intelligence books define it as the study of "intelligent agents" meaning a device that perceives its environment and takes actions that increase its chance of successfully

achieving its goals (Sebbagh, Benachnhou, 2021, p. 297) **.** Thus, artificial intelligence is intelligence that machines show, performs tasks like the human mind, works, and makes decisions similar to humans, in order to implement them in education in order to improve and develop the educational level**.**

 1-2Quality of higher education:

Quality in higher education is one of the important issues raised around the world. It is a multi-dimensional, multi-level and dynamic concept related to the contextual settings of an educational system, mission, and institutional goals. It is the ability to qualify and train the student and provide him with the necessary knowledge and experience and prepare him in the form of a graduate capable of achieving his goals and the goals of his community (Harnane, 2017, p. 707) **.**

 1-2 Applying Artificial intelligence in education.

The educational process was previously based on the teacher, the student, and the educational means, but with the tremendous technological developments, startup companies in cooperation with educational institutions have integrated artificial intelligence into the parties to this process with the aim of obtaining better results. A teacher in some educational institutions. Artificial intelligence techniques provide an opportunity to achieve personalized education for each student individually, as it helps to communicate information to the student more efficiently and at the same time can evaluate the student in a good way and determine the appropriate teaching method for each student, and thus learners can be more enthusiastic, attractive, and independent in the learning process. In addition, part of the processes is lifted from the teacher's shoulders. Artificial intelligence has an important role in the modern educational process. It is an urgent necessity, and its applications cannot be dispensed with, as it achieves many advantages for the student and the teacher.

2- Analysis of the results:

 2-1 Study community

The study population is represented in all employees of the University of Adrar, both professors and administrative staff. The reason for choosing the latter is that they have a direct and indirect impact on improving the quality of education. About 68 individuals were selected for a random sample, which represented the unit of analysis. A simple sample of 110 individuals was selected from the study population based on the **Stephen Thompson** equation to determine the sample size:

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

in which:

N: the size of the population;

P: the availability of the characteristic with a maximum error of 0.5;

Z: the standard degree of the normal distribution 1.96 for the significance level of 0.05;

d: The amount of error here is 0.05.

By numerical application, the sample size n was calculated, which is 85.

2-2 The validity of the variables:

To test the validity of the variables of the model, it will rely on the evaluation of Ravand and Baghaei, which states that the evaluation of the model in terms of the validity of the variables must have a coefficient of C.alpha and a coefficient of DG.rho greater than 0.7 and the closer to the correct one the latent root of the first factor is greater than one And the potential root of the second factor is less than one integer, in addition to the loading coefficients of the measured variables being greater than 0.7, and in the case of the coefficients between 0.4 and 0.7, the AVE is tested for the effect of increase or decrease and the threshold is adopted 0.5 so that if the deletion does not lead to an increase above the threshold, they are kept , and if the deletion leads to an increase above the threshold, they are deleted, but in the case of the loading coefficients with saturations less than 0.4, they are permanently deleted from the model and the measured variables that meet the conditions are adopted (Ravand, Baghaei, 2016, p. 04)**.**

Table No. 1: Validity test of the artificial intelligence variable scale.

The dimension	Code	loading	C.alpha	DG.rho	eig.1st	eig.2nd	AVE
Intelligent_Teaching -Systems	X11	0.17	0.80	0.87	2.56	0.68	0.23
	X12	0.09					
	X13	0.19					
	X14	0.92					
Virtual_Reality	X21	0.90	0.86	0.90	3.23	0.88	0.63
	X22	0.75					
	X23	0.88					
	X24	0.73					
	X25	0.69					
educational_robots	X31	0.84	0.84	0.89	3.13	0.65	0.62
	X32	0.89					
	X33	0.81					
	X34	0.65					
	X35	0.70					
Smart_Content	X41	0.89	0.47	0.69	1.64	1.52	0.30
	X42	0.79					
	X43	0.28					
	X44	-0.01					
	X45	-0.12					
adaptive_learning _environments	X51	0.76	0.72	0.83	2.25	0.95	0.51
	X52	0.68					
	X53	0.82					
	X54	0.57					

Source: Created by researchers using the R3.5.1 PLSPM package

The table illustrates the results of the validity of the independent variable of the artificial intelligence. Its indicators ranged from acceptable to satisfactory, as it is noted that the

loading coefficients of most of the items almost exceeded 0.7, which makes them valid for measuring the validity of the variable.

Teaching systems variable, Cronbach's alpha index, scored 0.80, and DG.rho index reached 0.87, which is a good value, and the potential root of the first factor is greater than one with a value of 2.56, and the potential root of the second factor is less than one integer 0.68, so the item x12 will be deleted to raise the loading coefficient that measures for the other two items , thus keeping items x11.x13.x14.

The variables of virtual reality, educational robots, their indicators were all good, fulfilling the conditions, and therefore they were all accepted. The smart content variable has unsatisfactory indices, which calls for deleting items x43.x44.x45 with loading coefficients less than 0.7 from the model. As for the adaptive learning environments variable, item x54 recorded a saturation of less than 0.7, which affects the average percentage of variance extracted with an increase above the threshold, which calls for its deletion from the model and the retention of other items.

Table No. (2): Validity test of the higher education quality variable scale

The dimension	Code	loading	C.alpha	DG.rho	eig.1st	eig.2nd	AVE
quality_education	Y1	0.28	0.65	0.74	3.16	1.80	0.13
	Y2	0.13					
	Y3	-0.30					
	Y4	-0.27					
	Y5	0.03					
	Y6	0.49					
	Y7	0.24					
	Y8	0.34					
	Y9	0.20					
	Y10	-0.34					
	Y11	-0.51					
	Y12	0.20					
	Y13	0.74					

Source: Created by researchers using the R3.5.1 PLSPM package

The above table displays the results of the validity of the dependent variable, the quality of higher education, as it turns out that its indicators are not completely satisfactory, and therefore calls for deleting items y1.y2.y3.y4.y5.y9.y10.y11.y12 that were not consistent with this variable, as saturations were recorded. Less than 0.7 affects the average variance ratio extracted, and from it this variable is now measured in 4 terms.

2-3-Test the validity of the model differentiation.

After making the required adjustments in the first stage, deleting the items with saturation less than 0.7 and keeping the other items that measure the model well, and this is what the following table shows:

Table No. (3): Load coefficients of the measured variables for the latent variables of the model

Block	Code	loading	C.alpha	DG.rho	eig.1st	eig.2nd	AVE
Intelligent_Teaching -Systems	X11	0.91	0.724	0.845	1.93	0.598	0.53
	X13	0.79					
	X14	0.38					
Virtual Reality	X21	0.91	0.862	0.901	3.23	0.884	0.64
	X22	0.72					
	X23	0.83					
	X24	0.77					
	X25	0.77					
Educational robots	X31	0.90	0.849	0.893	3.13	0.654	0.59
	X32	0.89					
	X33	0.78					
	X34	0.58					
	X35	0.67					
Smart Content	X41	0.97	0.646	0.849	1.48	0.523	0.69
	X42	0.66					
Adaptive-learning environments	X51	0.67	0.689	0.830	1.87	0.798	0.62
	X52	0.78					
	X53	0.90					
Quality education	Y6	0.72	0.714	0.824	2.16	0.710	0.51
	Y7	0.60					
	Y8	0.65					
	Y13	0.87					

Source: Created by researchers using the R3.5.1 PLSPM package

It is noticed from the above table that the latent variables of the model and in which the latent variable artificial intelligence kept the measured variables with loading coefficients less than 0.7 but greater than 0.4 so that the latent variable artificial intelligence kept the maximum loading coefficient for the measured variable x11 and x21 with a value of 0.90, as for the latent variable the quality of higher education It kept the measured variables with loading coefficients less than 0.7 but greater than 0.6, as the maximum loading factor for the measured variable y13 was 0.87 and the lowest loading factor for the measured variable y7 was 0.60.

After evaluating the validity of the measurement model variables and making the required adjustments, we move to the stage of evaluating the validity of the differentiation validity of the path model, in which the **Fornell-Larker** criterion is analyzed, which is shown in the following table:

Table No. (4): Fornell-Larker Standard

	Intelligent Teaching Systems	Virtual Reality	educational robots	Smart Content	adaptive learning environments	quality education
Intelligent-Teaching Systems	**0.73**					
Virtual Reality	0.275	**0.801**				
educational robots	-0.033	0.069	**0.773**			
Smart Content	0.119	0.060	-0.279	**0.833**		
Adaptive-learning environments	0.285	0.407	0.125	-0.028	**0.798**	
quality education	0.191	0.459	-0.233	0.170	0.303	**0.72**

Source: Created by researchers using the R3.5.1 PLSPM package

It is noticed from the table No (04) that the values related to the correlations between the latent variables exceed the value of 0.7, which represents the square root of the average variance extracted (AVE) for each variable with the most significant correlation coefficients between the various latent variables that do not exceed the highest value of 0.46, and therefore, it can be said that the model has differentiation validity Better compared to other possible builds.

Table No. (5): Intersectional loading coefficients

block	Intelligent Teaching Systems	Virtual Reality	Educational robots	Smart Content	Adaptive learning environments	Quality education
X11	**(0.91)**	0.29	0.05	0.10	0.16	0.17
X13	**(0.79)**	0.11	0.03	0.05	0.27	0.11
X14	**(0.38)**	-0.02	0.48	-0.09	-0.20	-0.04
X21	0.22	**(0.91)**	-0.07	0.18	0.35	0.49
X22	0.36	**(0.72)**	-0.01	-0.20	0.47	0.26
X23	0.21	**(0.83)**	-0.09	0.16	0.45	0.42
X24	0.14	**(0.77)**	0.32	-0.02	0.21	0.22
X25	0.21	**(0.77)**	0.29	-0.03	0.15	0.35
X31	-0.07	0.02	**(0.90)**	-0.21	0.12	-0.27
X32	0.06	0.01	**(0.89)**	-0.26	0.09	-0.19
X33	-0.06	0.17	**(0.78)**	-0.24	0.12	-0.14
X34	0.19	0.16	**(0.58)**	-0.26	0.15	-0.02
X35	-0.12	0.08	**(0.67)**	-0.26	0.08	-0.07
X41	0.06	0.07	-0.25	**(0.97)**	-0.04	0.18
X42	0.26	0.00	-0.27	**(0.66)**	0.01	0.06
X51	0.16	0.23	-0.17	0.22	**(0.67)**	0.21
X52	0.18	0.26	0.13	-0.15	**(0.78)**	0.21
X53	0.32	0.44	0.28	-0.10	**(0.90)**	0.28
Y6	0.21	0.07	-0.23	0.24	0.18	**(0.72)**
Y7	0.16	-0.12	-0.09	0.32	0.03	**(0.60)**
Y8	0.20	-0.03	0.00	0.23	0.12	**(0.65)**
Y13	0.28	0.30	-0.24	0.47	0.17	**(0.87)**

Source: Created by researchers using the R3.5.1 PLSPm package

It is noticed from the table No (05) that the external loading coefficients of the artificial intelligence variables recorded higher values compared to the cross-loading coefficients corresponding to the other possible constructs. For the dependent variable, the quality of higher education, these coefficients recorded higher cross-loading values than the other corresponding constructs, which indicates a good differentiation sincerity compared to other constructs.

2-4- Descriptive analysis of the study variables

2-4-1 - Descriptive Analysis of the Artificial Intelligence Variable

Table No. (6): Results of the descriptive analysis of the artificial intelligence variable

block	Arithmetic average	standard deviation	Relative importance	ranking	Approval Score
X11	3.73	0.923	74.6	10	high
X13	3.80	0.954	76	8	high
X14	3.85	0.963	77	5	high
X21	4.02	0.821	80.4	1	high
X22	3.93	0.685	78.6	3	high
X23	3.85	0.963	77	5	high
X24	3.66	1.063	73.2	11	high
X25	3.88	0.927	77.6	4	high
X31	3.39	0.802	67.8	13	medium
X32	3.51	1.121	70.2	12	high
X33	3.73	0.837	74.6	10	high
X34	3.29	0.955	65.8	14	high
X35	3.78	1.013	75.6	9	medium
X41	3.00	1.118	60	15	medium
X42	3.83	0.704	76.6	7	high
X51	3.98	0.651	79.6	2	high
X52	3.80	0.813	76	8	high
X53	3.76	0.916	75.2	9	high
X	**3.71**	**0.41**	**74.1**		high

Source: Prepared by researchers based on spss*20 program

It is clear from the above table that the arithmetic average of the artificial intelligence variable was 3.71 with a high degree, which explains an existing influence of artificial intelligence among faculty members**.**

2-4-2 - Descriptive analysis of the variable of higher education quality.

Table No. (7): Results of the descriptive analysis of the variable of higher education quality

block	Arithmetic average	standard deviation	Relative importance	ranking	Approval Score
Y6	2.98	0.961	59.6	3	medium
Y7	3.56	0.896	71.2	1	high
Y8	2.90	1.200	58	4	medium
Y13	3.29	0.844	65.8	2	medium
Y	**3.18**	**0.71**	**63.6**		medium

Source: Prepared by researchers based on spss*20 program

It is clear from the above table that the arithmetic means of the variable of education quality reached 3.18 with a medium degree, where the phrase 7 occupied a higher degree where the phrases reached 6,13.8, medium degrees. Close or almost general agreement of faculty members about the dimension statements that are proven by the standard deviation, which was estimated at 0.71.

5- Testing Hypothesis

The following results were obtained for the following path model:

Figure (02): The results of the path model for the study
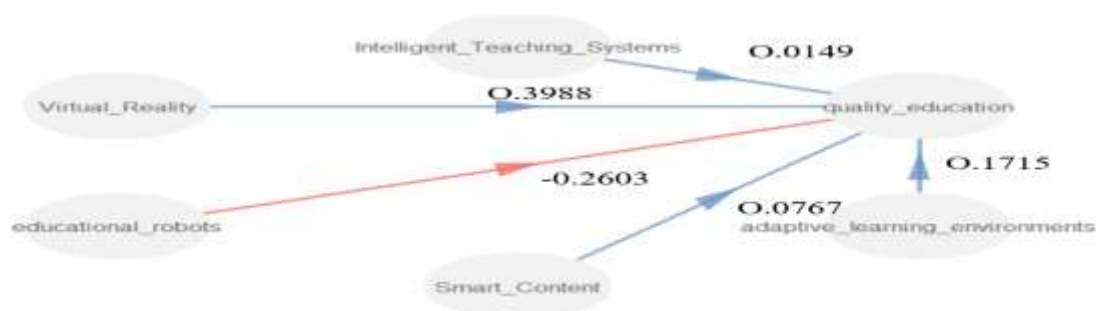
Source: Prepared by researchers using the R3.5.1 PLSPM package

Table No. (08): Results of the direct impact test of the latent variables of the study model

	Estimate	Std. Erro	t.value	Pr(>|t|)	The result
Intelligent_Teaching_System -> quality_education	0.0149	0.150	0.091	0.921	insignificant
Virtual_Realit -> quality_education	0.399	0.157	2.55	0.015	moral
educational_robots-> quality_education	-0.260	0.147	-1.77	0.086	insignificant
Smart_Content -> quality_education	0.0767	0.147	0.521	0.605	insignificant
adaptive_learning_environments quality_education ->	0.171	0.158	1.09	0.285	insignificant

Source: Created by researchers using the R3.5.1 PLSPm package

➤ **The first hypothesis:**

The first hypothesis states that: "There is a significant effect of smart teaching systems in improving the quality of higher education." It is clear from the table that the direct effect was positive. Student's statistic has a value of 0.091 with a probability value of 0.921 It is a value greater than the nominal level of significance 0.05, and therefore , the alternative hypothesis is rejected.

➤ **The second hypothesis:**

The second hypothesis states that: "There is a significant effect of virtual reality in improving the quality of higher education." It is clear from the table that the direct effect was positive. The student's statistic has a value of 2.55 with a probability value of 0.015 It is a value less

than the nominal level of significance 0.05, and accordingly, it accepts the alternative hypothesis.

➢ **The third hypothesis:**

The third hypothesis states that: "there is a significant effect of educational robots in improving the quality of higher education." It is clear from the table that the direct effect was negative, Student's statistic has a value of (-1.17)with a probability value of 0.086 It is a value greater than the nominal level of significance 0.05, and accordingly, the alternative hypothesis is rejected .

➢ **The fourth hypothesis:**

The fourth hypothesis states that: "There is a significant effect of smart content in improving the quality of higher education." It is clear from the table that the direct effect was positive. Student's statistic has a value of 0.521 with a probability value of 0.605 It is a value greater than the nominal level of significance 0.05, and accordingly, the alternative hypothesis is rejected.

➢ **The fifth hypothesis:**

The fifth hypothesis states that: "There is a significant effect of adaptive learning environments in improving the quality of higher education." It is clear from the table that the direct effect was positive, Student's statistic has a value of 1.09 with a probability value of 0.285 It is a value greater than the nominal level of significance 0.05, and accordingly, the alternative hypothesis is rejected**.**

Conclusion:

Thanks to technology and digital developments, the concept of education has changed. Education in its traditional form is outdated, as artificial intelligence techniques have revolutionized the educational process, contributing to the improvement the quality of education, in addition to raising the level of technological knowledge of learners and teachers with simple experiences, especially since we live in a reality that depends on technology despite all the pros and cons of the applications of artificial intelligence in the educational field, but it has not received much attention in educational institutions in Algeria. The study concludes the following:

01- The study finds that there was no significant effect of smart teaching systems in improving the quality of higher education with a positive impact estimated at 0.0149. The results of the current study contradicted the results of the study (2020 Lan Wu), where he indicated that the student model based on Bayesian is the core of the smart teaching system as it contributes to Assessment of students' cognitive ability, their acquisition of skills and their ability to think, and the results of his study concluded that the model was able to determine the student's performance in answering the questions presented to him by the system in terms of time and degree of correctness, in addition to suggesting specialized educational services to improve the quality of education.

02- The study shows that there is a positive effect of virtual reality in improving the quality of higher education, amounting to 0.399, and the results of this study were similar to the results of all studies, including the study (Xu and Other, 2017), which indicates that the use of virtual reality in education enriches The teaching process increases student passion and this explains the contribution of virtual reality to motivating and encouraging students to learn and thus improving the quality of education.

03-The results shows that there was no significant effect of the educational robot in improving the quality of higher education with a negative effect of (-0.260), and this explains the belief of some faculty members that the educational robot will replace them and thus dispense with the role of the teacher in the educational process, which negatively affects the quality of education. The results of the study contradicted the findings of the study (Elkin et al, 2014), that is, using the educational robots raised the level of students and helped them to use their computers effectively.

04- The results reflect that there was no significant effect of smart content to improving the quality of higher education, which explains the lack of electronic devices and modern software to employ artificial intelligence techniques in the educational process, so that the results of the study contradicted the study (Phillips, 2013), where his study found a noticeable improvement In the students' score in the test for acquiring vocabulary in reading and social studies, and this shows that the smart board has a role in improving the quality of education by attracting students' attention and engaging all their senses, making them more interactive and understanding of the educational situation, as it links the different learning styles and students' interests and ability with their knowledge and experience Thus, they review and practice the activities on the smart board with the teacher and their colleagues, and this is reflected in the learning effect for a long period of time, and thus employing what has been learned in solving problems in various fields.

05-The results of the study showed that there was no significant effect of adaptive learning environments on improving the quality of higher education with a positive effect of 0.171, and this explains the faculty members' dependence on the traditional learning environments. The results of the current study contradicted the results of the study (Hassan A. El-Sabbagh 2021), that indicates that the design of appropriate adaptive electronic learning environments contributes to the allocation and adaptation of learning to the learner according to his needs and characteristics in order to improve the quality of education, and the results of his study concluded that the experimental group is statistically higher than the control group, in addition to the possibility of the adaptive learning environment to involve students towards learning.

Considering the findings of the study, it recommends the following:

- Supporting the educational environment with electronic devices and modern software to employ artificial intelligence techniques in the educational process;
- provision of telecommunications infrastructure in educational institutions;
- Holding training courses for faculty members and learners to develop their skills and train them on applying artificial intelligence techniques and its positive effects in improving the educational process.
- Providing support and motivation to faculty members who use modern technologies in the educational process;
- The study recommends increasing the university's interest in education quality standards.

Study suggestions:

- Conducting the same study in private educational institutions;

- Challenges that prevent the use of artificial intelligence techniques in educational institutions in Algeria.

Sources and references:
1. Ashraf Mohammed ,Yusnidah Ibrahim & R.Joarder Mohd .H .(2009). Quality education management at private Universities in bangladesh :an exploratory study ,Journal Pendidik dan Pendidikan,24,17-32.
2. El-Sabagh Hassan A.(2021).Adaptive e-learning environment based on learning styles and its impact on development students' engagement, International Journal of Educational Technology in Higher Education,18 ,1-24, Heidelberg(Netherlands).
3. Harnane Najwa . (2017). The possibility of applying the quality standards of higher education in Algerian university :an exploratory study from the point of faculty members , Journal of Economic and Financial Research, 4(2),703-724, University of Oum El Bouaghi (Algeria).[An Arabic]
4. Lan Wu.(2019).Student model construction of intellingent teaching system based on Bayesian network, Personal and Ubiquitous Computing ,24(03) ,419-428,London(Netherlands).
5. Olaf Zawacki Richter, Victoria Marin, Bond Melissa & Gouverneur Franziska. (2019). Systematic review of research on artificial intelligence applications in higher education -where are the educators?, International Journal of Educational Technology in Higher Education ,16(1) ,1-27, Heidelberg(Netherlands).
6. Ravand Hamdollah & Baghaei Purya. (2016). Partial Least Squares Structural Equation Modeling with R. Practical Assessment, Research& Evaluation , 21(11),1-15,College Park (United States).
7. Sullivan Amanda & Umaschi Bers Marina.(2014). Implementing a Robotics Curriculum in an Early Childhood Montessori Classroom, Journal of Information Technology Education :Innovations in Practice,13,153-169,Santa Rosa(United States).
8. Sebbagh Rafika & Benachnhou Farida. (2021). Reality of Artificial Intelligence A study based on the Emirati experience' s case. Revue Organisation & Travail , 10 (02),295-307.
9. XU Ya-jing, ZHENG Shi–jue, CHEN Qiu-rui, OU Shi-rou, LIU Cong & XIAO Yao.(2017).The Design and Implementation of Chinese Vocabulary Learning Case Based on Mobile VR for"The Belt and Road", 2ndIntemational Computational Modeling, Simulation and Applied Mathematics.
   ➢ University theses :.
10. Jai Voon Chong.(2020).Perspectives on artificial intelligence in education:A study of public elementary school teachers. Biola University,United States.
11. Phillips Maria Grace.(2013).Using the keyword Method and the Smart Board in vocabulary instruction for students with learning disabilities, College of Education ,Rowan University .
12. Selçuk Akgul.(2003).A Financial approach to artificial intelligence and an artificial intelligence application in istanbul stock exchange, Financial Accounting Section (ING), MARMARA University ,Istanbul.