THE ROLE OF E-LEARNING IN ENHANCING THE QUALITY OF HIGHER EDUCATION OUTPUTS FROM THE PERSPECTIVE OF FACULTY MEMBERS: A CASE STUDY OF MOHAMMED BOUADIAF UNIVERSITY - M'SILA –

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SUMMARY

This study examined the topic of e-learning as a mechanism for improving the quality of higher education outputs from the perspective of faculty members. It focused on a case study of Mohammed Bouadiaf University in M'Sila. The study utilized a descriptive and analytical approach and applied it to a sample consisting of 35 individuals of Master 02 majoring in the strategic management at the Department of Management of the University of Mohamed Boudiaf in Msila..

The study concluded that e-learning has a positive impact on various aspects, including the quality of graduates, the quality of scientific research, and community service. These are all elements that can be relied upon to measure the quality of higher education outputs. Based on this, the study suggests the necessity of expanding the use of e-learning in the university, in addition to focusing on providing its various requirements while emphasizing the importance of aligning its goals with those of the external environment.

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Key words: E-Learning, Quality of Higher Education, Higher Education Outputs.
Classification: I21, I23, O30.

دور التعليم الالكتروني في تحسين جودة مخرجات التعليم العالي من وجهة نظر هيئة التدريس –دراسة حالة جامعة محمد بوضياف – المسيلة–

ملخص

تناولت الدراسة موضوع التعليم الالكتروني كآلية لتحسين جودة مخرجات التعليم العالي من وجهة نظر هيئة التدريس–دراسة حالة جامعة محمد بوضياف –المسيلة–، باستخدام المنهج الوصفي والتحليلي وبالتطبيق على عينة مكونة من 35 مفردة (طالبا) ماستر02 تخصص الإدارة الإستراتيجية بقسم التسيير بجامعة محمد بوضياف بالمسيلة..

وتوصلت الدراسة إلى وجود أثر إيجابي للتعليم الالكتروني على كل من: جودة الخريجون، جودة البحث العلمي، خدمة المجتمع، وكلها عناصر يمكن الاعتماد عليها لقياس جودة مخرجات التعليم العالي، وعلى هذا الأساس تم اقتراح ضرورة التوسع في استخدام التعليم الالكتروني في الجامعة بالإضافة إلى التركيز على توفير مختلف متطلباته مع التأكيد على أهمية ربط أهدافه مع أهداف البيئة الخارجية.

كلمات المفتاحية: التعليم الالكتروني، جودة التعليم العالي، مخرجات التعليم العالي.

تصنيف جال:I21 ، I23، O30.

LE ROLE DE L'APPRENTISSAGE EN LIGNE DANS L'AMELIORATION DE LA QUALITE DES RESULTATS DE L'ENSEIGNEMENT SUPERIEUR DU POINT DE VUE DES MEMBRES DU CORPS PROFESSORAL UNE ETUDE DE CAS DE L'UNIVERSITE MOHAMMED BOUADIAF - M'SILA -

RÉSUMÉ

Cette étude examine le sujet de l'apprentissage en ligne en tant que mécanisme permettant d'améliorer la qualité des résultats de l'enseignement supérieur du point de vue des membres du corps professoral. Elle se concentre sur une étude de cas de l'Université Mohammed Bouadiaf à M'Sila. L'étude utilise une approche descriptive et analytique et l'applique à un échantillon composé de 35 individus étudiants du Master 02 spécialité management stratégique au Département de Management de l'Université Mohamed Boudiaf de Msila..

L'étude conclut que l'apprentissage en ligne a un impact positif sur divers aspects, notamment la qualité des diplômés, la qualité de la recherche scientifique et le service à la communauté. Ce sont tous des éléments sur lesquels on peut compter pour mesurer la qualité des résultats de l'enseignement supérieur. Sur cette base, l'étude suggère la nécessité d'étendre l'utilisation de l'apprentissage en ligne à l'université, en plus de se concentrer sur la fourniture de ses diverses exigences tout en soulignant l'importance d'aligner ses objectifs sur ceux de l'environnement externe.

Mots-cles : Apprentissage en ligne, Qualité de l'enseignement supérieur, Résultats de l'enseignement supérieur.

JEL Classification: I21, I23, O30.

INTRODUCTION

The world has witnessed developments in all fields since the last third of the 20th century and the beginning of the 21st century. These progress, although multidimensional, have been closely linked to technological changes and leaps at both the macro level (countries) and the micro level (organizations). Alongside these changes, there has been a need to employ technological advancements and its various tools to achieve economic, social, cultural, and scientific goals, as well as to strengthen the connection between different components of society, including individuals and organizations.

Algeria, like other countries in the world, has adopted this trend in order to achieve various government policies, especially after focusing on creating and improving the performance of different organizations by effectively linking them to organizations that provide the economic and social environment with competencies. Therefore, the university is considered a strategic scientific center and the main starting point for achieving any long-term economic, social, and scientific policy, as improving the outputs of higher education which represents an effective entry point for improving the performance of profit and non-profit organizations. This requires research into ways to achieve this improvement.

E-learning is a new type of education imposed by the scientific developments the world is witnessing today. (Ajrach, 2017, p. 18)

It represents in its core an innovative type of self-service got by the self-efforts without the help of the provider, only in narrow limit). (Nacira, p. 88)

Besides, it is defined as an educational system that uses the information techniques and computer nets to maximize the educational scientific energies using the computer, the internet, and the electronic programs (01).

Based on the above opinions, the study seeks to establish a link between different technological manifestations, particularly e-learning,

on one hand, and the quality of the outputs of this education on the other hand.

Study problem:

The problem of this study can be formulated in the following main question:

What is the impact of e-learning on improving the quality of higher education outputs in Algeria?

The following sub-questions fall under this problem:

- What is the impact of e-learning on the quality of graduates of higher education?
- What is the impact of e-learning on the quality of scientific research at the university?
- What is the impact of e-learning on the university's service to the community it belongs to?

Study Hypothesis:

This study proceeds from the following main hypotheses:

There is a statistically significant positive impact of e-learning on improving the quality of higher education outputs in Algeria at a significance level of 5%.

The following sub- hypotheses fall under these main hypotheses:

- **Sub-hypothesis 1:** There is a statistically significant positive impact of e-learning on improving the quality of graduates of higher education in Algeria at a significance level of 5%.
- **Sub-hypothesis 2:** There is a statistically significant positive impact of e-learning on improving the quality of scientific research in higher education institutions in Algeria at a significance level of 5%.
- **Sub-hypothesis 3:** There is a statistically significant positive impact of e-learning on the university's service to the community it belongs to in Algeria at a significance level of 5%.

Study importance:

The importance of the study lies in its connection to a major requirement, which is linking Algerian universities to the job market, represented by the quality of higher education outputs. One of the

avenues to enhance and meet this requirement is through e-learning. This can help in controlling and studying the job market by employing technology to achieve the economic and social goals of the state, as well as linking the university to the economic and social environment.

Study Objectives:

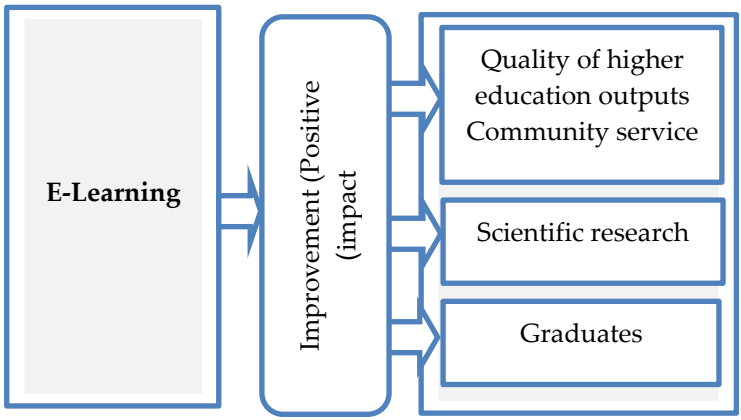
The study aims to achieve several objectives, including:

- Identifying the various theoretical concepts related to the study variables (e-learning, quality of higher education outputs).
- Studying the reality of e-learning in Algerian universities.
- Identifying the inputs that impact the improvement of the quality of higher education outputs through e-learning in Algerian universities.

Methodology and Study Model:

The study relies on a descriptive and analytical methodology to describe, analyze, and interpret the impact of e-learning on improving the quality of higher education outputs in Algerian universities. It adopts the model illustrated in the following figure:

Figure 1. Study Model



Source: Prepared by the researchers based on previous studies.

1- THE CONCEPTUAL FRAMEWORK OF E-LEARNING IN HIGHER EDUCATION INSTITUTIONS

The first axis addresses various theoretical concepts related to the independent variable of the study (e-learning in higher education institutions) by elucidating its meaning, importance, objectives, and the different components encompassed by this modern form of education.

1.1- The Concept of E-Learning in Higher Education Institutions

E-learning is defined as: "Facilitating learning and teaching through online networks using technological systems" (Connolly & Stansfield, 2009, p. 56). It is also defined as: "Delivering electronic educational content through computer-based media and networks to learners, enabling them to interact actively with this content, as well as with the teacher and peers, whether synchronously or asynchronously. It also allows learners to complete their education at their own pace, time, and location, while managing this education through these media" (Amer, 2007, p. 19). Furthermore, it is described as "an educational system for delivering educational or training programs to learners or trainees anytime and anywhere using interactive information and communication technologies such as the Internet, radio, local or satellite television channels, magnetic disks, telephones, email, computers, and distance conferences. It provides an interactive and multi-source learning environment synchronously and remotely, without being confined to a specific location, relying on self-learning and interaction between the learner and the teacher" (Ahmed, 2004, p. 269). From the aforementioned, it becomes evident that e-learning:

- Represents one of the modern forms of education.
- Facilitates a two-way connection between the learner and the education service provider.
- Allows overcoming limitations of time and place while ensuring a rapid flow of information.

E-learning offers two types or modes of education: synchronous (live or real-time) education, which requires learners to be present at the same time in front of their computers to engage in discussions and conversations among themselves and with the teacher through chat rooms or receiving lessons via virtual classrooms, and asynchronous (non-direct) education, which does not require learners to be present at

the same time or in the same place. It is facilitated through various e-learning technologies, where information exchange occurs between learners themselves and between them and the teacher at different times. In this mode, learners choose the times and places that suit them (Al-Halafawi, 2009, p. 14). In both modes, several means are utilized, including (Moulah & Abu Rotwa, 2009, p. 28):

- CDs designed to provide two-way interaction between the student and the software being used.
- Networks such as the Internet, through websites and programs that enable following lessons, discussions, and remote lectures.
- E-books that can be electronically distributed through networks and stored in various media.

The importance of e-learning lies in its effectiveness, which enables various advantages, including (Al-Zarkany, 2007, pp. 176- 177):

- **Effectiveness:** The transmission method allows learners to repeat according to different sensory methods and provides the opportunity for immediate electronic interaction between learners and between them and the teacher through email, discussion boards, chat rooms, and similar means.
- **Cost-effectiveness:** Instant e-learning services save learners the trouble of traveling to distant educational centers, meaning they save on travel costs and gain more time.
- **Easy access to curricula:** E-learning curricula are available 24/7, allowing online learners to access them at any convenient time, surpassing the constraints of place and time in the learning process.
- **Enhances participation:** E-learning provides opportunities for participation through virtual classrooms, chat rooms, email, and video conferences.
- **Integration:** E-learning provides learners with integrated knowledge and educational resources through assessment tools that analyze learner knowledge and progress, ensuring the availability of standardized educational standards.

- **Flexibility:** The ability to work with a wide range of instructors at any time and place, using various methods and ensuring more accuracy and fairness in performance assessment.
- **Learner-centered approach:** E-learning allows learners to choose the appropriate learning pace, content, and tools that match their interests, needs, and skill levels.

1.2- Objectives of E-Learning

By utilizing e-learning, several objectives can be achieved, which revolve around a set of points mentioned below (Manahel, Manahi Al-Rafi'i, & Mohi al-Khatib, 2016, pp. 40- 41):

- Providing a flexible learning environment and preparing a qualified and skilled teaching staff in using modern teaching strategies and methods.
- Supporting the interaction process among students, learners, and assistants through the exchange of experiences, opinions, discussions, and meaningful dialogues.
- Acquiring teachers' technological skills to utilize modern educational technologies and enhancing curricula through conducting electronic activities, in addition to equipping learners with self-learning skills.
- Developing the role of teachers in the educational process to keep pace with successive scientific and technological advancements.
- Making training more flexible and liberating it from complex constraints, as studying can be conducted without time or geographical barriers, such as the need to travel to university centers and training institutes.
- Providing information and knowledge to students that cannot be delivered through traditional education and addressing the issue of information illiteracy for all education professionals.

1.3. Components of E-Learning

The e-learning system includes the following components (Amer, 2007, p. 45):

- **Instructional Component:** It deals with the purposes, objectives, content, teaching strategies, and learning strategies used in delivering the content and media in this form of learning. Here, the importance of the e-book emerges as the educational curriculum similar to the traditional textbook, albeit with differences in its format and superior content. It may include written texts, images, and video clips that make the educational content more enjoyable and clearer for students. The e-book can be accessed through web pages or stored on magnetic discs.
- **Assessment Component:** It focuses on assessing learners' achievements, evaluating teaching methods, and the e-learning environment.
- **Technological Component:** It involves the design of software, courses, websites on networks, browsing programs, and other related technologies.
- **Administrative Component:** It deals with the administration of e-learning by providing administrative services to e-learners, such as admissions, registration, exam management, and others.
- **Guidance Component:** It provides guidance and support to learners, both academically and technically.
- **Ethical Component:** It focuses on the ethical principles and rules for teachers and learners in dealing with software, tests, courses, and other content posted on networks.
- **Regulatory Component:** It relates to the laws, regulations, and legislation governing e-learning and the required standards to be met.

2- Quality of Higher Education System Outputs

The second axis of the study addresses the dependent variable (outputs of higher education) by discussing its concept and different elements, while specifying classification and the possible forms these outputs can take.

2.1- Concept of Quality in Higher Education System Outputs

Learning outcomes refer to the expressions that describe the expected educational results at the end of the learning process, which manifest in the learner's knowledge, understanding, and performance capabilities. The program aims to achieve these outcomes through specific educational activities, strategies, knowledge, and assessment methods that measure the extent to which these outcomes are achieved (Sharia, 2019, p. 05). Higher education outputs encompass everything produced by the educational and training process, including human resources, research products, and social services. In other words, they represent the overall outcome of scientific activities in higher education institutions (Buemama, 2018, p. 87). Higher education outputs are also defined as: "The results obtained after processing the inputs, which include students as human resources, educational materials, teaching staff, along with the material and financial resources represented by facilities and funding necessary for the educational process" (Shabelle, 2018, p. 19).

2.2- Elements of Higher Education System Outputs

Higher education is closely related to the needs and requirements of society. This necessitates that the knowledge provided by higher education institutions be closely linked to these needs. Since these needs change over time and with developments occurring in the world, institutions in this sector - higher education - need to change and renew the types of knowledge they offer. Additionally, the transfer and development of knowledge can only be accomplished by experienced researchers skilled in research and experimentation. This has led to the expansion and increased diversity and comprehensiveness of higher education outputs (Yasser, 2020, p. 149). The elements of higher education outputs include the following (Amar, 2020, pp. 116- 117):

- The qualitative level of graduates
- Training programs directed towards community institutions (individuals, organizations)

- Scientific consultations, providing support and knowledge guidance to individuals, organizations, and governments
- Scientific projects and scientific research that study external environmental phenomena and problems
- Books and scientific publications aimed at serving the community
- Organizing conferences and seminars that facilitate the transfer and exchange of knowledge, experiences, and expertise
- Enhancing the reputation of the higher education institution and increasing beneficiary satisfaction.

It should be noted that the diversity of educational process outputs can largely depend on the nature and diversity of goals, taking into account the conditions and requirements of the surrounding environment, as well as the effectiveness and efficiency of these institutions. This leads higher education institutions to adopt certain types of outputs over others (Mustafa, 2020, p. 61). In terms of quantity, higher education outputs refer to the number of graduates from higher education institutions and the volume of research conducted by these institutions. Regarding the qualitative aspect of higher education outputs, it refers to the quality of competencies possessed by university graduates, the extent to which these competencies align with the needs of institutions and society, and the authenticity and global readability of scientific research and its contribution to development goals. These qualitative aspects can be classified into the following elements (Boufalta, 2019, pp. 89- 90):

- **Graduates:** Graduates, along with the skills, experiences, and habits they acquire, represent the most important educational outputs in higher education institutions. The degree of their quantitative and qualitative alignment with the needs of social and economic development plans is the decisive factor in assessing the quality of the learning process in those institutions. Thus, students are one of the key elements in the learning process because these institutions are established to serve and benefit them.

- **Scientific research and community service:** This refers to comprehensive research characterized by addressing specific problems and providing objectivity in research, relying on observation and experimentation rather than customs, traditions, or personal experience, thereby enabling its scientific generalization.

2.3- Contributions of E-Learning in Improving the Quality of Higher Education Outputs

Based on the theoretical discussion, a model can be proposed to illustrate the mechanism of how e-learning contributes to improving the quality of higher education outputs, including the following elements:

- **Contribution of e-learning in improving the quality of graduates:** By facilitating and enhancing the integration of all elements of the educational process to meet the needs of students, surpassing the limitations of time and place.
- **Contribution of e-learning in improving the quality of scientific research:** By providing the requirements for scientific research and enabling access to digital repositories and books that are difficult to obtain through traditional means.
- **Contribution of e-learning in enhancing the university's service to the community it belongs to:** By providing a virtual space that enables the university to communicate and interact with the external environment from anywhere, facilitating positive and interactive impact.

3. Case Study: The Impact of E-Learning on Improving the Quality of Higher Education Outputs from the Perspective of the Faculty at Mohammed Boudiaf University - M'Sila

To study the impact of e-learning on improving the quality of higher education outputs from the perspective of the faculty at Mohammed Boudiaf University in M'Sila, the following points are addressed:

3.1- Sample and Tool

Initially M'Sila University was chosen as one of the universities striving to digitize all its activities, including the educational process,

through the adoption of e-learning. Based on a sample consisting of 35 individuals of Master 02 majoring in strategic management at the Department of Management of the University of Mohamed Boudiaf in Msila.., an electronic questionnaire (study tool) is prepared and randomly sent to the accessible faculty members. The total number of participants is 41 individuals, while 35 questionnaires are collected, accounting for 85.36% of the total sample under study. The following are relied upon:

- Likert five-point scale for the questionnaire items (strongly disagree, disagree, neutral, agree, strongly agree).
- SPSS version 26 software for data processing.
- Measurement scales and statistical tests that are compatible with the nature and distribution of the respondents' data.

3.2- Validity and Nature of Data Testing for the Tool

To ensure the validity of the study tool and test the nature of its data, the following methods and tests are employed:

3.2.1- Face Validity

The questionnaire is reviewed by three experts to correct it from objective, formal, methodological, and statistical perspectives before its distribution.

3.2.2-Reliability Test (Cronbach's Alpha)

Determining the reliability coefficient of the tool helps assess its stability in measurement. The results of the reliability test are presented in the following table:

Table 1. Reliability Test Results

Axes	**E-Learning**	**Quality of Higher Education Outputs**			
Dimensions	-	Graduates	Scientific Research	Community Service	Overall Axis
value of the stability coefficient	0.809	0.778	0.753	0.845	0.791

Source: Prepared by the researchers based on SPSS.V26 outputs.

From the above table, it is obvious that the value of Cronbach's alpha coefficient for each dimension and aspect of the tool exceeds the

standard value of 0.7. Thus, the questionnaire demonstrates stability in its dimensions and aspects and is considered a valid tool for the study.

3.2.3-Normality Testing

Since the study is confirmatory and there are numerous statistical tests and measures that examine the impact, it is necessary to determine the appropriate ones. This mainly depends on the nature of the data. The following table illustrates this:

Table 2. Results of Residual Distribution Shape Test

	E-Learning		
Quality of Higher Education Outputs	Graduates	Scientific Research	Community Service
Statistical Significance of the Shapiro-Wilk Test	0.421	0.168	0.192

Source: Prepared by the researchers based on SPSS.V26 outputs.

The Shapiro-Wilk test is chosen to determine the shape of residual regression equations. This test requires that the sample size does not exceed 50 observations, a condition met by the studied sample since its size is 35, which is less than the standard value of 50. It can be observed from the table that the statistical significance value (Sig) exceeds 0.05. Therefore, the data follows a normal distribution, and the applicable tests are parametric tests.

3.3- Analysis of First Axis Data

The first axis focuses on the personal variables of the studied sample (gender, age, academic degree, experience). To analyze this data, percentages and frequencies are presented according to these variables, as shown in the following table:

Table 3. General Data of the Studied Sample

Gender	**Frequency**	**%**	**Age**	**Frequency**	**%**
Male	21	60	Less than 30 years old	5	14.3
Female	14	40	30-40 years old	14	40

-	-	-	Over 40 years old	16	45.7
Total	35	100	Total	35	100
Academic Rank	**Frequency**	**%**	**Professional Experience**	**Frequency**	**%**
Assistant Professor H	6	17.1	Less than 03 years	3	8.6
Lecturer	25	71.5	03-10 years	26	74.3
Higher Education Professor	4	11.4	More than 10 years	6	17.1
Total	35	100	Total	35	100

Source: Prepared by the researchers based on SPSS.V26 outputs.

Based on Table 3, the following observations can be made:

- **Gender:** It can be observed that males constitute the majority of the studied sample, accounting for 60%, while females account for 40%. This aligns with the reality indicating the predominance of males in the majority of sectors.
- **Age:** The age groups of (30-40) years and above 40 years form the majority of the study sample, accounting for 40% and 45.7%, respectively. In contrast, the age group below 30 years accounts for 14.3%.
- **Academic Degree:** Lecturers constitute 71.5% of the total studied sample, while assistant professors and higher education professors share the remaining percentage in similar proportions.
- **Professional Experience:** The percentages of professional experience years correspond to the academic degree variable since the latter is linked to the number of years of experience as a promotion requirement. The category of experience years (3-10 years) accounts for 74.1%, while the remaining categories share the remaining percentage.

3.4- Analysis of the E-Learning Axis and Higher Education Outputs

In analyzing the data of this axis, we rely on calculating the arithmetic means, standard deviations, and determining the direction of the average scores for the items and dimensions related to it.

3.4.1-Analysis of the E-Learning Axis

The following table presents the results of the analysis of this axis:

Table 4. Analysis of the E-Learning Axis

Paragraph: The use of e-learning at the university allowed for:		Arithmetic Mean	Standard Deviation	Direction of the Mean
1	Providing a flexible and efficient learning environment compared to traditional methods.	4.42	0.5576	Strongly Agree
2	Increasing interaction between service recipients and providers.	4.11	0.6761	Agree
3	Increasing interaction between service recipients and providers.	4.31	0.6311	Strongly Agree
4	Facilitating the transfer and exchange of ideas and raising the level of students.	4.02	0.7853	Agree
General direction		4.22	0.7804	Strongly Agree

Source: Prepared by the researchers based on SPSS.V26 outputs.

The values of the arithmetic means ranged between "Agree" and "Strongly Agree," with standard deviations not exceeding 0.78. This indicates a consensus and homogeneity among the individuals of the studied sample regarding the positive use of e-learning at the study unit (Mohamed Boudiaf University in M'Sila).

Analysis of the Higher Education Outputs Axis:

3.4.2- The following table presents the results of the analysis of this axis

Table 5. Analysis of the Higher Education Outputs Axis

Graduates Dimension		Arithmetic Mean	Standard Deviation	Direction of the Mean
5	University graduates possess the necessary cognitive competence for professional integration.	3.6	0.5545	Agree
6	University graduates have the ability to communicate and work collaboratively.	3.8	0.5009	Agree
7	University graduates have the ability for self-learning and knowledge transfer.	4	0.6393	Agree

8	University graduates can provide added value to the external environment.	3.91	0.453	Agree
General direction		3.82	0.781	Agree
Scientific Research Dimension		**Arithmetic Mean**	**Standard Deviation**	**Direction of the Mean**
9	Scientific research aligns with the needs of the economic and social environment.	4.14	0.6482	Agree
10	Scientific research aligns with the specializations of the researchers who conducted them.	4.05	0.7252	Agree
11	The university has qualified scientific competencies for scientific research.	4.25	0.7005	Strongly Agree
12	Scientific research at the university is of high quality.	4	0.6444	Agree
General direction		4.11	0.6657	Agree
Community Service Dimension		**Arithmetic Mean**	**Standard Deviation**	**Direction of the Mean**
13	The university provides consultations for the benefit of the community components it serves.	4.34	0.639	Strongly Agree
14	The university provides knowledge support and guidance for the benefit of the community components it serves.	4.11	0.5667	Agree
15	The university holds scientific symposiums that allow for the transfer and exchange of knowledge, experiences, and expertise.	4.42	0.7592	Strongly Agree
16	The university provides training courses for the benefit of the community components it serves.	4.28	0.71	Strongly Agree
General direction		4.23	0.5083	Strongly Agree

Source: Prepared by the researchers based on SPSS.V26 outputs.

Most of the directions of the study sample regarding the graduates dimension are concentrated at a score of 3.82, indicating agreement,

with relatively small standard deviations ranging between 0.45 and 0.63. This means that there is a general trend reflecting the consensus among the respondents of the studied sample regarding the availability of the quality element of graduates. The same applies to the dimension of the quality of scientific research, which, although one of its items has an average score of "Strongly Agree" with a total standard deviation of 0.66, the overall trend was at the "Agree" level. In contrast, the third dimension (community service) records the highest overall average score with a strong agreement direction (4.23) and the lowest total standard deviation (0.50). This indicates a general trend and homogeneity among the items of the study unit that it provides services to the community to which it belongs.

4. Testing Study Hypotheses

4.1- Sub-Hypothesis 01

To test the first sub-hypothesis, which revolves around the significant positive effect of e-learning (EL) on improving the quality of higher education graduates (GRA) in Algeria at a significance level of 5%, the simple regression model is used, as shown in the following table:

Table 6. Results of Regression Model Testing for the First Sub-Hypothesis

Indicator	**Pearson correlation**	**Significance of correlation**	**Explained variance**	**F-test value**	**Significance of F-test**
	0.805	0	0.637	60.66	0
Estimated model	Coefficient			T-test value	Significance of T-test
Constant	0.206			0.427	0.672
EL	0.924			7.788	0

Source: Prepared by the researchers based on SPSS.V26 outputs.

There is a statistically significant strong correlation of 80.5% between e-learning and the quality of graduates from Mohamed Boudiaf University in M'Sila. The variations in the independent variable explain 63.7% of the variations that occur in the dependent variable, assuming the other variables remain constant. This allows the construction of a statistically significant regression model (according to

the Fisher F-test), with the same condition (significance) for the model parameters except for the constant (according to the Student's t-test). The regression equation takes the following form:

GRA=0.206 + 0.924EL

The above equation indicates that the coefficient of the regression model is estimated to be 0.924. This means that the independent variable has an impact of the same value on the dependent variable, and any improvement in the use of e-learning by one unit leads to an improvement in the quality of graduates from Mohamed Boudiaf University in M'Sila by 0.924 units. This confirms the validity of accepting the first sub-hypothesis, which states: "There is a statistically significant positive effect of e-learning on improving the quality of higher education graduates in Algeria at a significance level of 5%."

4.2- Sub-Hypothesis 02

To test the second sub-hypothesis, which revolves around the significant positive effect of e-learning (EL) on improving the quality of scientific research (RES) in higher education institutions in Algeria at a significance level of 5%, the simple regression model is used, as shown in the following table:

Table 7. Results of Regression Model Testing for the Second Sub-Hypothesis

Indicator	**Pearson correlation**	**Significance of correlation**	**Explained variance**	**F-test value**	**Significance of F-test**
	0.744	0	0.54	40.98	0
Estimated model	Coefficient			T-test value	Significance of T-test
Constant	1.148			2.48	0.018
EL	0.728			6.402	0

Source: Prepared by the researchers based on SPSS.V26 outputs.

There is a statistically significant strong correlation of 74.4% between e-learning and scientific research at Mohamed Boudiaf University in M'Sila. The variations in the independent variable explain 54% of the variations that occur in the dependent variable, assuming the other variables remain constant. This allowed the construction of a statistically significant regression model (according to the Fisher F-test), with the same condition (significance) for the model parameters

(according to the Student's t-test). The regression equation takes the following form:

RES=1.148 + 0.728EL

The above equation indicates that the coefficient of the regression model is estimated to be 0.728. This means that the independent variable has an impact of the same value on the dependent variable, and any improvement in the use of e-learning by one unit leads to an improvement in the quality of scientific research at Mohamed Boudiaf University in M'Sila by 0.728 units. This confirms the validity of accepting the second sub-hypothesis, which states: "There is a statistically significant positive effect of e-learning on improving the quality of scientific research in higher education institutions in Algeria at a significance level of 5%."

4.3- Sub-Hypothesis 03

To test the third sub-hypothesis, which revolves around the significant positive effect of e-learning (EL) on university community service (CS) at a significance level of 5%, the simple regression model is used, as shown in the following table:

Table 8. Results of Regression Model Testing for the Third Sub-Hypothesis

Indicator	**Pearson correlation**	**Significance of correlation**	**Explained variance**	**F-test value**	**Significance of F-test**
	0.78	0	0.597	51.421	0
Estimated model	Coefficient			T-test value	Significance of T-test
Constant	1.802			5.447	0
EL	0.583			7.171	0

Source: Prepared by the researchers based on SPSS.V26 outputs.

There is a statistically significant strong correlation of 78% between e-learning and community service at Mohamed Boudiaf University in M'Sila. The variations in the independent variable explain 59.7% of the variations that occur in the dependent variable, assuming the other variables remain constant. This allows the construction of a statistically significant regression model (according to the Fisher F-test), with the same condition (significance) for the model parameters (according to the Student's t-test). The regression equation takes the following form:

CS=1.802 + 0.583EL

The above equation indicates that the coefficient of the regression model is estimated to be 0.583. This means that the independent variable has an impact of the same value on the dependent variable, and any improvement in the use of e-learning by one unit leads to an improvement in the quality of community service provided by Mohamed Boudiaf University in M'Sila by 0.583 units. This confirms the validity of accepting the third sub-hypothesis, which states: "There is a statistically significant positive effect of e-learning on university community service at a significance level of 5%."

Conclusion

E-learning constitutes one of the most important methods that can be relied upon to develop the learning process at universities due to its positive effects on the overall outcomes of higher education. The field study conducted at Mohamed Boudiaf University in M'Sila has provided a set of results confirming the existence of this impact in a positive direction through improving the quality of higher education outcomes at the university. Additionally, the theoretical and applied study has led to a set of results upon which a series of suggestions have been formulated to enhance effective connectivity between the university and the economic and social environment.

Study Results:

- E-learning is a modern tool that cannot be dispensed with in the future. It can improve the educational process and enhance its outcomes.
- The sample respondents tend to believe that e-learning at Mohamed Boudiaf University in M'Sila is moving towards achieving its intended purpose.
- There is a positive effect of e-learning on improving the quality of higher education outcomes, whether in terms of enhancing graduates' efficiency, improving the quality of scientific

research, or ensuring that the educational process at the university contributes to serving the community.

- It is observed that the positive impact of e-learning on the quality of graduates is the most significant, followed by scientific research and then community service in terms of relative importance, based on the study sample's perspectives.
- According to the opinions of the studied sample, the impact of e-learning on community service is relatively minimal compared to other dimensions.

Study Suggestions:

- The necessity to expand the use of e-learning at the university and apply it to all elements of the educational process.
- Providing various necessary requirements for implementing e-learning.
- Conducting training and development courses related to the management and use of the e-learning system at the university.
- Adopting legislation that encourages service providers and recipients to positively integrate into the e-learning approach.
- Setting the goal of improving higher education outcomes as a directed objective for the implementation of e-learning at the university.
- Periodic evaluation of higher education outcomes to ensure flexibility in controlling them through continuous electronic processes.
- Studying previous national and international experiences of educational institutions to benefit from their expertise regarding e-learning and improving the quality of the educational process.

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