

The Effectiveness of Employing Artificial Intelligence Applications in Developing Scientific Research Skills Among Graduate Students at An-Najah National University

Worood Rasem Shukri Khalifih

PhD Learning and Teaching,
An-Najah National University - Palestine

Orcid: 0009-0008-6076-5650

Worood.khalifih90@gmail.com

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Abstract

This study aimed to identify the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University. Also, it aims to identify the effect of some demographic variables such as gender, age, specialization and residence. Analytical descriptive approach was used, by using the questionnaire as tools for the study. The sample of the study consisted of (194) students chosen by stratified random method. The results showed high response on the total degree of the main question. Moreover, there are no statistically significant differences attributed to the variables of age, specialization while there are statistically significant differences due to gender in favor of males and in residence in favor of refugee camp. The study recommended the necessity of raising the level of employing artificial intelligence applications and implementing their applications and profound studies should be conducted..

Key words : *artificial intelligence applications, scientific research skills, graduate students.*

Introduction

Scientific research and its skills are considered one foundations of progress in societies in the current era and one of the most important pillars of scientific developments and transformations towards progress, by clarifying the importance of scientific research as a basic tool for society, with its higher scientific institutions, to understand the world and measure scientific and technical developments and their impact on various aspects of life, as skills are considered scientific research and academic writing in various fields are among the most important basics for achieving success among postgraduate students, as this success and its achievement require the researcher's familiarity with these skills and the ability to collect and analyze information and produce high-quality scientific content, which requires exceptional and distinguished skills in research, investigation, and writing.

According to Al-Rashedy and Al-Farety (2024), the technical development that has swept the world in an amazing way has greatly affected the basics of scientific research, and the possibility of accessing data and information through the various platforms and programs that have become available to researchers. To keep pace with this technical and temporal development, there was a necessity to use methods and tools that are more effective than traditional scientific research methods. In order to maintain the continuity and quality of the

research presented, this effectiveness lies in what is called artificial intelligence, technology that is more flexible and more effective than other modern technologies, as these technologies complement each other and meet in one forest.

Palestine with higher educational institutions and students are not immune from these developments taking place around, as these developments effectively affect the higher educational institutions, their students, and the areas of scientific research in them, as a result of the tremendous progress in the field of communication. Therefore, this study aims to investigate the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University.

Statement of Problem

Scientific development and keeping pace with it, which has taken and continues to sweep the world steadily, is considered one of the greatest challenges faced by individuals, groups, and countries. This causes the rapid emergence of science and its applications in various aspects of life. Scientific research is one of the most important foundations of keeping up with this development in the scientific field, which enables societies to transform towards technical and scientific progress, as it is one of the most important means of understanding the world surrounding us in all its aspects. Therefore, benefiting from technical progress, especially from artificial intelligence, is an urgent necessity to keep pace with the major developments in the field of information and communications revolution in order to make a qualitative breakthrough in the field of education and scientific research.

Also, Vernena, et al(2022) believe that scientific research and its applications are considered one of the most important effective means that work to expand human cognitive boundaries through the use of scientific methods and logical analyzes by researchers and those in charge of exploring unknown aspects, understanding the complex relationships between them, and interpreting them in a way that contributes to supporting and developing their knowledge foundation.

For postgraduate students, scientific research skills are considered one of the most important basics for their success, as it requires the researcher to be familiar with these skills , the ability to collect information, analyze it, and come up with results that are considered to generate high-quality scientific content. Therefore, there have been many studies that have shown the difficulties faced by students. Postgraduate studies deal with the skills and requirements of scientific research such as Katherine, et all, 2020, others have indicated lack of understanding of the requirements of scientific research by postgraduate students, such as the study (Willow, 2023), while studies that addressed the effectiveness of the use of modern technologies such as the artificial intelligence program by postgraduate students, except for the study have not been found such (Al-Rashdi and Al-Qarati, 2024), so the focus is this study answers its main question: *What is the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University?*

Likewise, the second main question: *Do the attitudes of graduate students at An-Najah National University towards the effectiveness of employing artificial intelligence applications in developing scientific research skills differ according to variables of (gender, specialization, age, and place of residence)?*

Study Hypotheses

The study seeks to examine the following hypotheses:

1. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to gender.
2. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to specialization.
3. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to age.
3. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence.

Study Objectives

The current study sought to achieve the following objectives:

1. Determining the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University.
2. Clarifying the effect of variables (gender, specialization, age, and place of residence) in identifying the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University.

Significance of the Study

The Significance of this study appears through preparing a theoretical framework of its own, through reviewing previous studies and contemporary literature directly related to it, identifying its intellectual contents, and concluding the most important useful indicators for graduate students and universities as higher educational institutions. In this study, and proceeding with building the framework. The theoretical importance also appears in the attempt to draw attention to the necessity of shedding light to modern technologies, such as employing artificial intelligence applications in developing scientific research skills.

Limitation of the Study

The current study was limited to the following limits:

1. Objective limit: The study addressed the effectiveness of employing artificial intelligence applications in developing scientific research skills.
2. Spatial limit: The study was limited to An-Najah National University in the city of Nablus.
3. Human limit: The study was limited to graduate students at An-Najah National University.
4. Time limit: The study was conducted during the academic year (2023/2024).
5. Procedural limit: The results of this study are determined by the tool that the researcher used to collect the data, the nature of the statistical analysis used to analyze the data and producing results to answer the questions she posed.

Study Terms

According to Issam,(2022, 118),*Artificial Intelligence* is programs that allow computers to perform all mental operations, especially those targeting higher levels of thinking, such as making decisions, solving problems, and divergent thinking. This is done by simulating the human mind .Artificial intelligence is defined by Agkun & Greenshow (2022, 431) as the ability of a machine to simulate the human mind through computer programs

that are designed and carry out those activities that usually require intelligence. It is concerned with developing machines and adding this ability to them. Al-Azzam, (2021) has defined Artificial Intelligence as directing a computer to perform tasks performed by humans in a better way to achieve greater efficiency and effectiveness. The researcher defines it procedurally as the ability of graduate students at An-Najah National University to use an artificial intelligence application to carry out educational tasks.

Scientific Research according to Bushra(2020) is an organized intellectual process that investigates facts and solves problems in organized scientific ways .Both Al-Rashidi and Al-Qarati (2024) define it as a set of systematic procedures that the researcher carries out to identify the relationships between research variables related to the subject of the study and which are based on a set of scientific methods in proportion to the subject of the study and which aim to solve the problem of the study and reach results and recommendations. Scientific. Mahmoud (2019) defines it as the study of a specific phenomenon by scientists and specialists by relying on collecting data and information related to that phenomenon using an organized and logical method aimed at proving a specific fact.

The researcher defines it procedurally as the capabilities and skills that the researcher possesses in carrying out effective and influential research work.

Previous Studies

Al-Rashidi and Al-Qarati (2024) conducted a study about “*The Effectiveness of Using the Artificial Intelligence Program Typesti.io in Developing Scientific Research Skills and the Attitudes of Graduate Students Towards It,*” which aimed to measure the effectiveness of using the artificial intelligence program Typesti. Io in developing scientific research skills among students at universities in the Kingdom of Saudi Arabia through the use of the descriptive analytical approach by distributing a questionnaire as a study tool among (41) postgraduate students in Saudi universities. The results indicated that there was high degree of effectiveness in implementing the aforementioned program. The study recommended the necessity of implementing systems Artificial intelligence in scientific research due to its importance.

Michele et al, (2023) study measured *the impact of using artificial intelligence in scientific research*. The study discussed the impact of artificial intelligence in helping researchers write scientifically, organize materials, create a preliminary draft, proofread, summarize data, and present suggestions for structure and references through the use of the descriptive approach and administration of the study tool among Italian university students. The results showed that the use of artificial intelligence programs can be useful and effective in scientific research. The study recommended proposals that encourage the possession of skills in using Artificial Intelligence programs..

In an attempt to clarify *using Artificial Intelligence in scientific research*, **Zuheir’s study (2023)** aimed to identify the possibilities and concerns of using artificial intelligence applications in scientific research, with a focus on using natural language processing to generate high-quality articles by creating four articles using Chat Technology GPT, which was reviewed by 23 experts. Results indicated that artificial intelligence generates significantly high-quality research and that the texts that can be written through this technology contribute to significantly improving the quality of scientific articles. There are also concerns about this use, and it was recommended that the study calls for the need to address the aforementioned concerns in the future.

Al-Maliki (2023) conducted a study of “*The Role of Artificial Intelligence Applications in Enhancing Educational Strategies in Higher Education*,” which aimed to clarify the role of artificial intelligence applications in enhancing educational strategies in higher education. It also addressed the strategic benefits that educational institutions can obtain from Integrating artificial intelligence into them, such as improved administrative functions, educational capabilities, research capabilities, and improved learning environments, identified potential obstacles to their implementation that may limit their effectiveness, such as resistance to change and technical limitations. The study relied on a narrative literature review methodology during twenty studies. One of the most important results was that artificial intelligence has an important role in enhancing the role of teachers, improving learners’ performance, and making the learning process more efficient. The results also concluded that there is an urgent need to educate stakeholders in education about the importance of using artificial intelligence applications in education strategies, and not to make challenges an obstacle to employing it there

The reality of employing artificial intelligence and its relationship to the quality of performance of Jordanian universities from the point of view of faculty members was tested by **Al-Muqiti (2022)** which aimed to identify the use of artificial intelligence techniques in improving the performance of Jordanian universities through the use of the descriptive, correlational approach and the distribution of the study tool, the questionnaire among sample of Faculty members in those universities. The results indicated that the use of artificial intelligence techniques in improving the performance of Jordanian universities was in moderate degree. The results also indicated that there were no statistically significant differences due to gender variable, while there were statistically significant differences attributed to the type of college and in favor of scientific colleges. The study recommended set of proposals that included raising the level of employing artificial intelligence applications in Jordanian universities.

Al-Sarihi (2022) in his study: “*The Role of Artificial Intelligence Applications in Supporting Knowledge Processes*,” aimed to identify artificial intelligence applications and their role in supporting knowledge applications in Bahraini universities by using the descriptive approach and applying the study tool among sample of academics in Bahraini universities. Results indicated that artificial intelligence applications support knowledge processes to a great extent, and the study recommended the need for attention in linking artificial intelligence and scientific knowledge.

Al-Yazji (2019) in her study about *the effectiveness of using artificial intelligence applications in supporting university education in the Kingdom of Saudi Arabia*, aimed to identify what artificial intelligence can do in improving the quality of education in Saudi universities . Inductive approach using the descriptive analytical method was adopted, administrating study tool among university academics and through theoretical analysis of artificial intelligence . Results concluded that the use of artificial intelligence in improving university education in the Kingdom of Saudi Arabia was in moderate degree. The study recommended raising the level of use of artificial intelligence in university education.

Previous studies were similar to the current study in terms of the goal, which is to investigate the effectiveness of artificial intelligence in developing scientific research, such as Al-Rashidi and Al-Qurati (2024), the study by Michele et al (2023), the study by Zuheir (2023) , Al-Maliki’s study (2023i) , Al-Muqaiti’s study (2022) , Al-Sarihi (2022) and the study by Al-Yaziji (2019) . On the other hand, they differed with the current study in the

environment in which it was conducted, . The current study has benefited from previous studies in developing a tool for the study, in the study’s literature, and in its recommendations.

Sampling, Instrumentation and Procedure

The sample consisted of (194) individuals out of the study community of (6422) postgraduate students at An-Najah National University during year 2023/2024. The study sample was chosen by available method. The returned questionnaires were 194 which consisted the study sample . The background of these students were varied in terms of gender , specialization, gender and place of residence as shown in Table (1) below.

Table (1) : Distribution of Sample According to Study Independent Variables

Variable	Class	Frequency	Percentage %
Gender	Male	68	35.1
	Female	126	64.9
	Total	194	100.0
Specialization	Scientific	80	41.2
	Humanitarian'	114	58.8
	Total	194	100.0
Age	Less than 30 years	126	64.9
	30-40 years	42	21.6
	More than 40 years	26	13.4
	Total	194	100.0
Place of residence	City	41	49.3
	Village	32	38.8
	Refugee camp	10	11.9
	Total	194	100%

Instrumentation

To achieve the objectives of the study, the researcher used a 20-item questionnaire by using literature review and previous studies The questionnaire consisted of two sections; the first focused on demographic profile such as gender , specialization, gender and place of residence whereas the second consisted of 20 items. The scores of responses to each item were calculated according to a five-point Likert scale, in which very high =5 points, high=4 points, moderate = 3, low = 2 points and very low = 1 point.

Validity of the Questionnaire

To ensure the validity of the questionnaire, it was rated by a jury of experts in the field of education. The questionnaire, then, was piloted on 30 students with similar level of proficiency. The purpose of the pilot study was to determine whether the questions were comprehensible and can be interpreted by the students as they are intended measure. The students who were involved in the pilot study were excluded from the actual research. The respondents’ comments and the jury's suggestions were taken into consideration to modify and improve the questionnaire's content and wordings by omitting, adding or rephrasing items bringing the number of items from 22 to 20.

Reliability of the Questionnaire

The reliability of the questionnaire as calculated through Cornbach Alpha formula was (0.81) which is acceptable for the purpose of the study.

Procedure

The final draft of the questionnaire was distributed to the study sample on line . It took about three weeks for the instrument to be distributed, collected, and returned to the researcher. The total number of the returned questionnaires was 196 and only 194 were analyzed because 2 questionnaires were excluded as their responses were neither consistent nor complete

Data Analysis

The data collected were analyzed using (SPSS) to provide answers to the questions of the study. Means, frequencies, standard deviations, t-tests for Independent Samples, One-Way Analysis of Variance (ANOVA), and LSD Test for distance comparisons were used to find out descriptive statistical analysis. To analyze the findings, the researcher used the following scale to represent the estimation level of workers' responses.

4.0 - and more :Very High	3.50 – 3.99 :High	3-00–3.49 :Moderate
2.50- 2.99 Low	less than 2.5 : Very Low	

Results and Discussion

This study aimed at identifying the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University. It also aimed at identifying the effect of gender, age, specialization and residence on the level of the effectiveness of employing artificial intelligence applications in developing scientific research, the researcher analyzed the data in accordance with the study questions and the results were as follows:

Results related to the Main Question. *What is the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University?*

To answer this question, the researcher used means and standard deviations as shown in Tables (2).

Table (2): Means , Standard Deviations and estimation level of the level of effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University in descending order

No.	Item	Means	standard deviations	Estimation level
1	Artificial intelligence with its applications helps me develop and improve scientific research skills	4.43	0.67	Very High
10	Artificial intelligence is used to innovate new paths in	4.23	0.87	Very High

	the field of scientific research			
2	Artificial intelligence programs help me analyze information and link results to each other	4.17	0.62	Very High
11	Artificial intelligence applications help me identify strengths and weaknesses in the field of scientific research	4.16	0.83	Very High
4	Using artificial intelligence helps me access a huge database of necessary data and information	4.15	0.82	Very High
5	Artificial intelligence technologies motivate me to access everything new in scientific research	4.13	0.83	Very High
17	Artificial Intelligence applications help me, the researcher, to design research that is characterized by modernity and originality through many smart applications	4.12	0.86	Very High
15	Artificial intelligence applications help the researcher excel and innovate in the field Scientific Research	4.10	0.83	Very High
13	Artificial intelligence applications help me correct errors that I may make while doing scientific research	4.07	0.80	Very High
18	Artificial Intelligence applications help me, the researcher, to view the experiences of others in the fields of scientific research to develop my capabilities	4.04	0.74	Very High
3	Artificial intelligence technologies motivate me to innovate and renew scientific broadcasting	4.01	0.95	Very High
7	Using artificial intelligence technologies helps me as an easy and simplified way in scientific research skills	4.00	0.88	Very High

19	Artificial Intelligence applications help me to highlight my talents and skills in scientific research	3.96	0.83	High
14	Artificial intelligence applications provide me with immediate feedback on my work in scientific research	3.95	0.87	High
12	Artificial intelligence applications help solve intractable problems facing scientific research	3.87	0.87	High
16	Artificial Intelligence applications help me, the researcher, to reach everything new in the field of research preparation	3.86	0.92	High
20	Artificial Intelligence applications help me to highlight my talents and skills in scientific research	3.63	0.99	High
6	Artificial intelligence helps me analyze the results of scientific research Scientific research	3.44	1.12	Moderate
9	Using artificial intelligence applications is better than using modern methods	3.42	1.19	Moderate
8	Artificial intelligence programs help me evaluate my scientific research	3.32	1.12	Moderate
Total Degree		4.01	0.95	Very High

Table (3) shows that: the degree of the items of the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University were between moderate and very high. The means ranged from (3.32) to (4.43), for the items of (*Artificial intelligence programs generate laziness and dependency in the researcher*) and (*Artificial intelligence, with its applications, contributes to the development of scientific research skills*). This result indicates that the effectiveness of employing artificial intelligence applications in developing scientific research skills among graduate students at An-Najah National University was very high regards the mean of (4.01).

The items of : (*Artificial intelligence, with its applications, contributes to the development and development of scientific research skills, the use of artificial intelligence applications help reducing time and effort in the field of scientific research, I find that artificial intelligence programs are useful and contribute to teaching me new skills in scientific research, artificial intelligence is used in creating new paths in the field of scientific research,*

the researcher must develop the skills of using artificial intelligence because it is more effective and modern in the fields of scientific research, the researcher must engage in qualifying courses that include the use of artificial intelligence techniques in scientific research, artificial intelligence applications help the researcher to access everything new in the field of research preparation, artificial intelligence applications provide a huge database that helps the researcher, Artificial intelligence applications help solve problems facing researchers, artificial intelligence applications help researchers design research through many smart applications, the researcher must rely on new methods in scientific research such as using artificial intelligence techniques, and I have no objection to using techniques of artificial intelligence (while I was engaged in carrying out scientific research) received very high degree of response from the respondents, which indicates the advantages of using artificial intelligence techniques and its applications in scientific research. It also indicates a great desire to use these techniques due to the advantages they provide to researchers in the field of scientific research.

The items (Artificial intelligence applications help the researcher become aware of everything new in the fields of scientific research, Artificial intelligence applications stimulate the researcher's own scientific research skills, Artificial intelligence applications help the researcher become aware of the competition with others in the fields of scientific research, Applications of artificial intelligence help the researcher to excel and innovate in the field of scientific research, and applications of artificial intelligence help to highlight the creators and elite researchers. received a large degree of response, as they indicate some of the advantages of the uses of artificial intelligence, such as competition, excellence, highlighting the creators, stimulating the self, and being aware of everything... is new. The items (You should not rely on artificial intelligence in all aspects of scientific research, the researcher prefers traditional methods more than using modern methods such as artificial intelligence applications, and artificial intelligence programs generate laziness and dependency in the researcher) received a moderate response score, which are some of the defects and concerns that can be emerge from the use of these techniques.

These results due to the fact that the respondents from the study sample have a desire to enter the world of artificial intelligence and applications because of their great advantages in this field. The results are in line with Al-Rashidi and Al-Qarati (2024), which showed high degree of effectiveness in using the artificial intelligence program Typesti. Io in developing scientific research skills and attitudes of graduate students, Michele et al,(2023), which revealed an effective and beneficial effect of using artificial intelligence programs in scientific research, Zuheir(2023), which showed that intelligence Artificial intelligence generates significantly high-quality research, and the texts that can be written through this technology contribute to significantly improving the quality of scientific articles. Likewise, with the results of Al-Maliki's study (2023i) which showed that artificial intelligence has an important role in enhancing the role of teachers, improving learners' performance, and making the learning process more efficient and Al-Sarihi's study (2022) which showed that artificial intelligence applications support knowledge processes to a great extent and in. In contrast, they differs with the result of Al-Muqiti's study (2022) which showed that the use of artificial intelligence techniques in improving the performance of Jordanian universities was to a moderate degree, and with the result of Al-Yaziji's study (2019) which concluded that the use of artificial intelligence in improving university education in the Kingdom of Saudi Arabia was in moderate degree.

Results related to the Second Question. *Do the attitudes of graduate students at An-Najah National University towards the effectiveness of employing artificial intelligence applications in developing scientific research skills differ according to variables of (gender, specialization, age, and place of residence)?*

To answer this question, the researcher analyzed the following study hypotheses as shown below .

Results Related to the Study Hypotheses

1. *There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to gender.*

To analyze the first hypothesis , T- Test for Independent Samples was used and table (3) shows the results.

Table (3): T-test for Independent Samples for *the effectiveness of employing artificial intelligence applications in developing scientific research skills due to gender*

Total	Gender	N	Mean	S. D	t	Sig.*
	Male	68	4.11	0.41	4.140	0.000*
	Female	126	3.86	0.37		

***The mean difference is significant at the 0.05 level.**

Table (3) shows statistical significant differences at ($\alpha \leq 0.05$) *between the study sample's responses averages regarding g the effectiveness of employing artificial intelligence applications in developing scientific research skills due to gender.* Significant value was (0.000) which is less than 0.05. These differences are in favor of male level due to the mean of (4.11) while female mean is (3.86) . This result is due to the fact that males have a greater desire to use artificial intelligence applications than females because it saves effort and time. They are also more daring to use these applications to access databases and information necessary for scientific research, while females may have a desire for traditional methods. This results is in line with the result of Al-Muqaiti's study (2022), which revealed that there are statistical differences according to the gender variable

2. *There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to specialization.*

To analyze the second hypothesis , T- Test for Independent Samples was used and table (4) shows the results.

Table (4): T-test for Independent Samples for *the effectiveness of employing artificial intelligence applications in developing scientific research skills due to specialization*

Total	Specialization	N	Mean	S. D	t	Sig.*
	Scientific	80	3.94	0.40	-0.339	0.735
	Humanitarian	114	3.96	0.41		

***The mean difference is significant at the 0.05 level.**

Table (3) shows no statistical significant differences at ($\alpha \leq 0.05$) *between the study sample's responses averages regarding g the effectiveness of employing artificial intelligence applications in developing scientific research skills due to specialization*. Significant value was (0.735) which more less than 0.05. . The researcher explains this result to that the use of artificial intelligence applications in scientific research is of great importance in all scientific and human specializations. This result is in contrast with the result of Al-Muqaiti's study (2022), which revealed the presence of statistical differences according to the college type variable and in favor of scientific colleges.

2. *There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to age.*

To analyze the third hypothesis , , One Way ANOVA test was used and tables (4 and 5) show the results.

Table(4):Frequencies ,Means and Standards Deviations of *the effectiveness of employing artificial intelligence applications in developing scientific research skills due to age*

Age	N	Mean	S.D
Total Degree	Less than 30 years	126	3.92
	30-40 years	42	4.01
	More than 40 years	26	4.01
Total	194	3.95	0.40

Table (4) shows that there are differences in the means of the age variable levels, where the highest was for the (30-40 years and more) and the lowest for the (Less than 30 years) level. To verify whether the differences in the means had reached the level of statistical significance. The researcher used One Way ANOVA, and Table (5) shows this.

Table (5): Results of One Way ANOVA for the effectiveness of employing artificial intelligence applications in developing scientific research skills due to age

Age	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	0.365	2	0.183	1.092	0.338
	Within Groups	31.953	191	.1670		
	Total	32.319	193			

*** The mean difference is significant at the 0.05 level.**

Table (3) shows no statistical significant differences at ($\alpha \leq 0.05$) *between the study sample's responses averages regarding g the effectiveness of employing artificial intelligence applications in developing scientific research skills due to age*. Significant value was (0.338) which more than 0.05. This result is being justified by the fact that the use of artificial intelligence applications in scientific research is of great importance and does not differ according to age levels, since graduate students have a wide degree of technical knowledge and the ability to access the required data and information due to the need for it in their studies.

3. *There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence .*

To analyze the fourth hypothesis , , One Way ANOVA test was used and tables (6,7 and 8) show the results.

Table(6):Frequencies ,Means and Standards Deviations of the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence

residence	N	Mean	S.D
Total Degree			
City	66	3.89	0.43
Village	96	3.93	0.42
Refugee camp	32	4.15	0.22
Total	194	3.95	0.40

Table (4) shows that there are differences in the means of the place of residence variable levels, where the highest was for the (Refugee camp) and the lowest for the (City) level. To verify whether the differences in the means had reached the level of statistical significance. The researcher used One Way ANOVA, and Table (7) shows this.

Table (7): Results of One Way ANOVA for the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence

Place of residence	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	1.612	2	0.806	5.014	*0.008
	Within Groups	30.707	191	.1610		
	Total	32.319	193			

* The mean difference is significant at the 0.05 level.

Table (7) shows statistical significant differences at ($\alpha \leq 0.05$) between the study sample's responses averages regarding the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence . Significant value was (0.008) which less than 0.05. In order to explore the differences between the means of place of residence , LSD test for post hoc comparisons was used and the results are shown in table(8).

Table (8): Results of LSD Test for Post Hoc Comparisons for the effectiveness of employing artificial intelligence applications in developing scientific research skills due to place of residence.

Place of residence	City	Village	Refugee camp
Total	City	—	-0.04242
			-0.26534*

Village	_____	_____	-0.22292*
Refugee camp	_____	_____	_____

*** The mean difference is significant at the 0.05 level.**

Table (8) shows that the differences in total degree were between (Refugee camp) and (City an village) levels in favor of (Refugee camp) . The researchers attribute this result to the fact perhaps the desire of graduate students from camp residents is greater as a result of their possession of technical expertise and their desire to obtain everything that is new and distinctive in the field of using artificial intelligence.

Recommendations

Based on the results of the study, several suggestions have been recommended :

1. Encouraging the acquisition of skills in using artificial intelligence programs among graduate students at universities.
2. The need to address concerns about the use of artificial intelligence technologies among students.
3. The necessity of applying artificial intelligence systems in scientific research and training researchers on them.
4. Raising the level of employing artificial intelligence applications in Palestinian universities.
5. Extensive studies on the use of artificial intelligence applications in scientific research should be conducted.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Ethics Committee

The present study involving human participant was approved and obtained ethical permission no. (2024/20 from 1.8.2024-2.10.2024) by the scientific and ethical committee of the college for the study. Written consent was also obtained from the participant in the current study.

Author contributions

The author completed this study by making significant contributions including designing the study according to the formulation of its objectives. AFAN, IZ prepared the draft and implemented the study design; AFAN, NS collected the data; AFAN, AD performed the statistical analysis of the data; AFAN data interpretation; The author of the manuscript conducted a literature search and collaborated in critical review and editing of the manuscript. The author was a contributor and responsible for the content of the manuscript and approved the version submitted for publication.

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