

An Assessment of the Understanding of Artificial Intelligence Concepts Among Undergraduate Students in Developing Countries

Hilda Hassan Narch*

PhD in Educational Administration Beirut, Lebanon

*Corresponding author: Hilda Hassan Narch, PhD in Educational Administration Beirut, Lebanon.

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Abstract

This research investigates the discrepancy between the rapidly evolving field of artificial intelligence (AI) and the readiness of local university students in Lebanon to embrace these advancements. Specifically, it aims to evaluate their capacity to acquire AI skills and apply them effectively.

To accomplish the research objectives, the researcher emphasized the significance of artificial intelligence in the educational domain, particularly higher education. The study assessed the level of comprehension and awareness among local university students in Lebanon regarding the fundamental purpose of artificial intelligence.

To attain the results and recommendations that serve the main research objective, the researcher formulated two primary hypotheses: (1) to determine the degree of familiarity among local university students in Lebanon with artificial intelligence skills and (2) to assess the extent of awareness regarding the significance of artificial intelligence applications in the targeted universities.

To achieve the intended goal, the researcher employed a descriptive analytical approach to comprehensively explore the subject matter. The study relied on a collection of relevant literature in the theoretical section and utilized a questionnaire with a random sample of students from selected Lebanese universities in the applied section. The questionnaire was designed to assess the participants' understanding of artificial intelligence skills and applications.

In conclusion, the researcher analyzed the questionnaire data using Statistical Package for Social Sciences (SPSS) to identify the key findings. Statistical techniques were employed to examine the responses collected from the study participants.

Keywords: Artificial Intelligence Applications, Artificial Intelligence Skills, Local Universities, Developing Countries

Introduction

The 21st century marks a pivotal juncture for the globe. It is an era characterized by rapid and radical transformations in human life across all domains. Consequently, institutions, particularly educational ones, have been compelled to adapt to these swift changes by embracing digital transformation and artificial intelligence. This integration aims to revolutionize their operations and practical applications, ensuring their relevance and showcasing their innovative capabilities within an increasingly competitive global landscape [1].

Given that universities serve as the cornerstone of higher education and play a pivotal role in shaping societies and preparing future generations, they are uniquely positioned to serve as a driving force behind national development [2]. As such, universities must adapt to the rapidly changing landscape and invest in technological advancements, including artificial intelligence, through the implementation of strategic plans that align with the demands of the digital age [3].

Researchers, experts, and scholars are currently concentrating their efforts on the most pressing issues that accompany human development and contribute to advancements across all aspects of life, including the economy, society, industry, science, health, and more. Consequently, the spotlight has been directed towards the most potent catalyst for change: artificial intelligence. This is due to the myriad of life-enhancing services that AI offers to both individuals and nations alike [4].

As higher education represents the pinnacle of the educational process, empowering students to become highly skilled, knowledgeable, and exceptional human resources, it is imperative that universities deliver high-quality education that fosters both personal development and academic outcomes [5]. To achieve this, universities must stay abreast of contemporary technological advancements, identify strengths and weaknesses in their ability to adopt and implement technological applications, and thereby ensure the success of quality education and administration within educational institutions, particularly at the university level [6].

Given that artificial intelligence has revolutionized the education sector by enhancing the capabilities of both teachers and learners through its diverse applications, artificial intelligence has become an indispensable tool across all scientific, practical, and even humanistic disciplines [7]. The use of smart devices and the interaction with artificial intelligence programs and applications by both teachers and students has become commonplace and is rapidly expanding [8].

Artificial intelligence has not only imitated human intelligence but has surpassed it by transforming individual intelligence into technological applications that contribute to the advancement of universities, particularly those aiming for top global rankings in various scientific fields. This is achieved through the adoption and implementation of artificial intelligence applications in administrative, academic, and other operations [9].

Significance of the Research

The significance of this research can be divided into two main parts:

Theoretical Significance

The theoretical significance of this research focuses on the educational sector in general and universities in particular. It explores the transition from traditional to contemporary education that keeps pace with artificial intelligence. The research highlights the importance of utilizing artificial intelligence in the academic university setting to keep up with the technological revolution, which inevitably increases the university's competitive capacity both locally and internationally. It sheds light on the skills and applications of artificial intelligence in the academic setting, with a particular focus on the obstacles and challenges hindering the use of artificial intelligence applications in the academic sector.

Practical Significance

The practical significance of the study lies in providing information about the current state of artificial intelligence in local universities in developing countries, specifically in Lebanon. It sheds light on the targeted university students and studies their familiarity with the skills and applications of artificial intelli-

gence. This allows the researcher to clarify the current understanding of artificial intelligence concepts among students who are expected to apply curricula that may mimic the era of artificial intelligence. The results may help determine the position of universities in developing countries in the rankings of the artificial intelligence era and provide recommendations that may contribute to bridging the gap and improving the quality of educational outputs to keep pace with this era.

Research Problem

The advent of the Fourth Industrial Revolution, the revolution of technology and change, and the proliferation of artificial intelligence and its applications have had a significant impact on universities in terms of their development, quality, and competitive ability in the local and international academic arena. This has necessitated a shift in the strategic processes of these universities to align with the era of artificial intelligence, ensuring their survival and advancement locally, regionally, and globally [10].

Despite the urgent need to adopt artificial intelligence technologies and applications in universities, implementation remains timid due to several weaknesses, most notably: the lack of qualification of educational staff and students to use AI applications, the scarcity of conferences and workshops for university stakeholders, and the reluctance to redevelop university curricula to emulate artificial intelligence technologies [11].

It is also worth noting that there is a general lack of familiarity with and use of artificial intelligence skills and applications in Arab universities, which necessitates intensifying efforts and research to identify the existing gap and work to address it [12]. Based on the preceding discussion, the central research question can be formulated as follows:

To What Extent are Students in Lebanese Universities Familiar with Artificial Intelligence Skills and Applications?

Research Objectives

This research aims to:

- Measure the extent to which Lebanese university students are acquainted with the fundamental concepts and techniques of artificial intelligence.
- Determine the extent to which local university students in Lebanon familiar with using artificial intelligence applications to meet their educational needs.

Research Hypotheses

- There is a statistically significant correlation between the level of artificial intelligence-related training and preparation received by Lebanese university students and their proficiency in artificial skills and requirements.
- There is a statistically significant correlation between the university-level training and preparation in Lebanon and university students' familiarity with the skills and requirements of artificial intelligence.

Research Limitations

Scope: This research is delimited to assess the extent of Lebanese university students' familiarity with artificial intelligence skills and applications, aiming to determine the level of the educational process in the era of artificial intelligence.

- **Timeframe:** The research questionnaire was administered during a brief period, spanning the first few weeks of May 2024.
- **Geographic Scope:** The empirical study was conducted in selected local universities in Lebanon.
- **Population:** The questionnaire was administered to a sample of students from the targeted universities, representing various specializations.

Study Terminology

- **Artificial Intelligence Applications:** Artificial intelligence applications are revolutionizing traditional approaches across various aspects of life, including the university educational setting. These applications facilitate new discoveries and innovative techniques, shifting away from the traditional university paradigm. Moreover, they contribute to supporting students by developing tailored educational content that aligns with individual student needs [13].
- **Artificial Intelligence Skills:** AI skills translate into the production of new knowledge not only by employing data through storage, processing, and utilization to solve problems and accomplish tasks efficiently, but also by enabling organizations to implement innovative management strategies aimed at successfully deploying AI technologies to achieve their goals [14].
- **Local Universities:** Local universities are institutions of higher education that strive for excellence in educational and community services, working to develop educational outcomes by effectively investing in human resources, including faculty, staff, and students, with the aim of achieving top rankings in both local and international classifications [15].
- **Developing Countries:** These are societies that differ from developed nations in terms of their cultural, social, and natural resource endowments, as well as their strategic capabilities across various sectors [16].

Previous Studies

Ibrahim's Study (2015)

This study aimed to address the practical pedagogical challenges encountered by students during their field placements at the Faculty of Education, Suez Canal University, Egypt.

To achieve this, an expert system based on artificial intelligence was developed. A questionnaire was administered to identify specific student challenges during field placements, followed by a second questionnaire distributed to curriculum and teaching methods experts, as well as field placement supervisors, to identify potential solutions. The study sample consisted of 25 targeted students.

Results indicated that the AI-based expert system was effective in addressing students' practical pedagogical challenges and enhancing their decision-making skills [17].

Ocana and Fernandez's Study (2019)

This study aimed to explore the impact of artificial intelligence on the educational process in general and to guide students in making the right choice for their university major.

The researcher used a questionnaire as a research tool within a descriptive-analytical approach.

The results confirmed the role of artificial intelligence in raising the educational level in schools and its positive impact on guiding students in choosing their university major. However, the difficulties revealed by the results lie in the need to develop and implement targeted strategic plans in universities to develop the skills of all teaching staff and employees on how to apply technology that involves artificial intelligence applications [18].

Al-Mutairi's Study (2019)

This study investigated the correlation between educational decision-making and the integration of artificial intelligence. The study sample comprised 56 academic leaders within the Kuwaiti Ministry of Education. Findings revealed a significant gap between the potential of artificial intelligence in educational decision-making and its actual implementation. The study further highlighted the absence of adequate training programs for both leaders and staff in artificial intelligence applications within the ministry [19].

Al-Amri's Study (2019)

This study aimed to investigate the effectiveness of one of the applications of artificial intelligence, specifically chatbots, in enhancing students' scientific knowledge. The study was conducted on a purposive sample of ten sixth-grade female students in Jeddah, who were divided into experimental and control groups. The results indicated a higher level of recall, comprehension, and application among the experimental group, which emphasizes the need to train teachers in schools to use chatbots and other AI applications due to their significant role in enhancing students' skills in the learning process. Consequently, students can acquire artificial intelligence skills and apply them to their studies [20].

Mira and Qateh's Study (2019)

This study aimed to determine the perceived importance of artificial intelligence applications in university teaching from the perspective of university lecturers. The researchers employed an analytical approach and collected data from a random sample of 200 lecturers. The results highlighted the positive impact of artificial intelligence applications on the teaching process, particularly the application of "immediate assessment" [21].

Al-Dossari's Study (2020)

This study aimed to assess the level of familiarity of academicians at Prince Sattam bin Abdulaziz University with artificial intelligence skills and applications. The researcher employed an open-ended questionnaire using a qualitative research methodology.

The results highlighted the need for increased awareness regarding the use of artificial intelligence applications in the education sector, due to the low level of awareness about artificial intelligence skills and applications [22].

Mahmoud's Study (2020)

The primary objective of this study is to investigate strategies for enhancing the learning process in Egypt during the COVID-19 pandemic by aligning it with the demands of the digital age and exploring the potential applications of artificial intelligence.

Employing a descriptive-analytical research design, the researcher collected data through a questionnaire administered to a sample of 31 educational administrators.

The findings highlighted significant barriers to the integration of artificial intelligence in education, including a lack of technological preparedness among both teachers and students, as well as the persistence of traditional pedagogical approaches that are not conducive to digital learning environments. Based on the results, the study recommends the strategic adoption of artificial intelligence tools to foster student engagement, knowledge acquisition, and overall academic achievement, thereby facilitating a more effective and efficient learning experience [23].

Al Kanaan's Study (2021)

This study aimed to investigate the extent to which pre-service science teachers were familiar with the integration of artificial intelligence applications in science education. A descriptive survey methodology was employed, with a sample size of 43 pre-service science teachers. The findings revealed a low level of awareness among these teachers regarding the characteristics and features of artificial intelligence, as well as how to effectively utilize it in science education. Consequently, the study recommended the dissemination of information to raise awareness about the importance of adopting artificial intelligence applications in education, particularly in the field of science [24].

Ibrahim's Study (2022)

This study aimed to investigate the extent to which high school physics curricula incorporate artificial intelligence applications and its ethical implications. A descriptive-analytical approach was employed to conduct a content analysis of high school physics textbooks, which served as the study population. The findings revealed a significant gap in the integration of artificial intelligence applications and its associated ethical considerations within the examined physics curricula. Consequently, the study recommended a comprehensive review of educational curricula to facilitate the inclusion of artificial intelligence across all subjects, with a particular emphasis on physics [25, 26].

A Commentary on Previous Studies

These studies aimed to demonstrate the significance of artificial intelligence in the education sector at all levels, with varying target samples and dimensions adopted in each study to explain the positive impact of AI applications on the educational process, studies, and students alike.

The studies conducted by Ousama Ibrahim, Ocana and Fernandez, Al-Amri, and Mira and Qateh's converge in highlighting the importance of AI applications in elevating the educational process in schools and universities.

The study conducted by Ocana and Fernandez, Al-Dossari, Al-Amri, Mahmoud, and Al-Kanaan concurred on the necessity

of equipping both faculty and students in schools and universities with the skills required to utilize artificial intelligence applications. The objective is to enhance awareness and productivity within the educational sector.

Similarly, Ousama Ibrahim and Al-Mutairi shared the same goal in their research, focusing on determining the efficacy of artificial intelligence applications in developing sound educational decision-making skills among educational leaders and students.

Furthermore, a study by Manal Ibrahim and Al-Kanaan highlighted the absence of artificial intelligence applications in secondary school curricula. They recommended the need for training to update educational curricula to align with the demands of the artificial intelligence era.

Research Methodology

The primary objective of scientific research is to illuminate the phenomenon under investigation by delving into its dimensions, identifying independent and dependent variables, and elucidating the methodological procedures employed in the study, including its controls and steps. This compels researchers to transcend theoretical analysis and complement their studies with an empirical component, utilizing necessary scientific research tools for data collection and analysis. This research aims to ascertain the extent to which local university students in Lebanon are familiar with the skills and applications of artificial intelligence.

To achieve this objective, the researcher adopted a descriptive-analytical approach to comprehensively understand all aspects of the topic. This involved collecting data that accurately represents the subject matter, aiding in problem clarification and analysis to arrive at specific conclusions based on established procedures. Subsequently, particular automated methods were employed for data analysis.

The descriptive-analytical approach is crucial for describing and interpreting contemporary phenomena. This method serves as a cornerstone for systematic interpretation and analysis to elucidate a specific phenomenon or problem through data that elucidates the characteristics of the study in a real-world context. This is achieved by defining the study population and sample within a specific time frame.²⁶

Research Population and Sample

This research constitutes a type of scientific study focused on a singular population that encapsulates all elements of the problem under investigation. The necessary data and information were collected from individuals who form the sample of the research population. Given that the research population is specifically circumscribed to students of local Lebanese universities, the researcher opted for a random sampling technique. A total of 159 students, both male and female, were selected from various targeted universities, encompassing diverse specializations and academic years.

Research Instrument

A questionnaire was utilized as the primary research tool for the study titled "Evaluating the Comprehension of Artificial Intelli-

gence Concepts among Undergraduate Students in Developing Countries: A Case Study of Selected Lebanese Universities." The questionnaire was divided into five sections. The initial section collected demographic data from the university students. The subsequent section aimed to gauge the students' overall comprehension of artificial intelligence. The third section delved into the integration of artificial intelligence within the university setting. The fourth section explored the specific skills required for applying artificial intelligence in academic pursuits. Finally,

the fifth section assessed the extent to which students were familiar with various artificial intelligence applications.

Data Analysis

Reliability and Validity of the Questionnaire

The calculated Cronbach's alpha values can assist in assessing the strength of the correlation between the items in the questionnaire. High Cronbach's alpha values indicate that the items

Questionnaire is Strongly Correlated, Suggesting high Internal Consistency Reliability. Consequently, the Results Obtained from the Questionnaire can be Considered more Reliable.

Section	No. of Questions	Cronbach's Alpha	Coefficient of Reliability and Validity
Second	4	0.535	Acceptable
Third	4	0.938	Very Good
Fourth	4	0.727	Good
Fifth	5	0.876	Good
Entire Questionnaire	17	0.867	Good

The table above indicates high internal consistency reliability for the entire questionnaire, with Cronbach's alpha of 0.867. Regarding the questionnaire sections, the second section exhibits acceptable internal consistency, likely due to the diversity of its items. The remaining sections demonstrate good to very good internal consistency, with Cronbach's alpha values exceeding 0.7. Consequently, it can be concluded that the questionnaire items are well-correlated and the instrument exhibits both reliability and validity.

Statistics Section

A total of 159 participants completed the online questionnaire, representing both male and female individuals across various academic levels. First-year students constituted the largest proportion of participants (33%), while doctoral students represented the smallest group (5%). Participants' ages ranged from 21 years

and above. The majority of participants (37.7%) were aged between 18 and 21 years, followed by the 21-25 age group (35.2%). Those aged 25 and above accounted for 27% of respondents.

Regarding academic majors, the highest proportion was in the humanities (49.7%), while the lowest was in the natural sciences (3.1%). Other majors included medical and health sciences (15.09%), administrative sciences (13.84%), engineering sciences (11.95%), and technological sciences (6.29%).

The questionnaire was developed using Google Forms, and all statistical analyses were conducted using SPSS software. Descriptive statistics, percentages, and hypothesis testing were employed. Spearman's correlation coefficient was used to examine the relationship between variables, and a p-value of less than 0.05 was adopted as the significance level.

The Questionnaire Comprises Four Sections Relevant to The Research Subject, Utilizing 5-Point Likert Scale Questions

Total score for each question	Numerical value for each section question	
1 to 1.8	1	Strongly disagree
1.81 to 2.6	2	Disagree
2.61 to 3.40	3	Neutral
3.41 to 4.20	4	Agree
4.21 to 5	5	Totally agree

Section Two: Artificial Intelligence Comprehension

Table 1: Statistical Analysis of Section Two: AI Comprehension

AI Comprehension	Mean	Median	Standard deviation	Variance	Minimum	Maximum
You have a comprehensive understanding of all domains in which AI is applied.	3.57	4	0.776	0.602	1	5
AI can positively impact both your professional and social life.	3.99	4	0.574	0.329	1	5
AI has potential risks.	4.06	4	0.781	0.611	1	5
AI technologies can be leveraged to optimize your academic performance.	3.99	4	0.716	0.513	1	5
Total	3.9	4	0.46	0.2116	1	2

The analysis of AI comprehension questions revealed a consistent 'agree' response across all items, with a mean score of 3.9 and a standard deviation of 0.46.

The distribution of responses to questions about AI comprehension exhibited a positive skew toward agreement. The 'agree' category was the most prevalent, representing 62.90% of responses, while 'strongly agree' and 'neutral' each accounted for 16.35%. This indicates a high level of familiarity and understanding of artificial intelligence and its various applications among the participants.

The analysis of AI comprehension questions revealed a consistent 'agree' response across all items, with a mean score of 3.9 and a standard deviation of 0.46.

Table 2: Distribution of Participants' Opinions on AI Comprehension

AI Comprehension	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
You have a comprehensive understanding of all domains in which AI is applied.	1.30%	9.40%	25.20%	59.70%	4.40%
AI can positively impact both your professional and social life.	3.99	4	0.574	0.329	1
AI has potential risks.	1.30%	0.00%	9.40%	77.40%	11.90%
AI technologies can be leveraged to optimize your academic performance.	0.60%	1.30%	20.10%	47.80%	30.20%
	3.9	4	0.46	0.2116	1
	1.30%	2.50%	10.70%	66.70%	18.90%
Total	1.13%	3.30%	16.35%	62.90%	16.35%

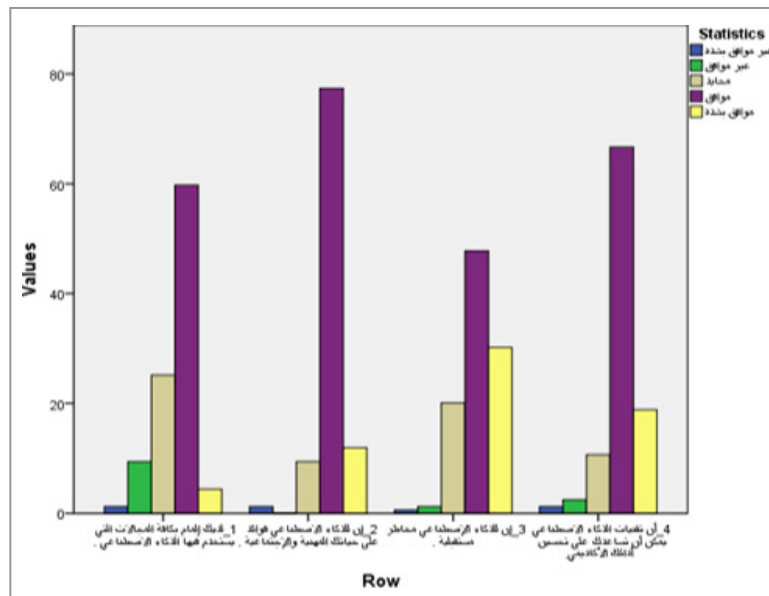


Figure 1: Distribution of Participants' Opinions on AI Comprehension

Section Three: Data on Artificial Intelligence in Higher Education

Table 3: Section Three: Data on AI in Higher Education

Data on AI in Higher Education	Mean	Median	Standard deviation	Variance	Minimum	Maximum
The university provides specialized AI programs tailored to student needs.	3.06	3	1.083	1.173	1	5
The university provides a suitable learning environment for students to use AI technologies in education and research.	3.11	3	1.035	1.071	1	5
The university offers Students training in AI techniques.	2.96	3	1.124	1.264	1	5
The university aims to empower its students to leverage artificial intelligence technologies within their respective fields.	3.08	3	1.105	1.222	1	5
Total	3.015	3.25	0.998	0.996	1	5

Regarding the questions about data on AI in higher education, all items in this group achieved a neutral rating. The overall score for this group was neutral with a mean of 3.015 and a standard deviation of 0.998. This indicates a neutral level of information

provided by the university regarding artificial intelligence. The "agree" response category had the highest percentage of responses at 35.70%, followed by "neutral" at 27.65% and "disagree" at 21.40%.

Table 4: Distribution of Participants' Opinions Regarding data on AI in Higher Education

Section Three: Data on AI in Higher Education	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The university provides specialized AI programs tailored to student needs.	8.80%	23.30%	26.40%	35.80%	5.70%
The university provides a suitable learning environment for students to use AI technologies in education and research.	8.80%	18.90%	28.30%	40.90%	3.10%
The university offers students training in AI techniques.	11.90%	23.30%	27.00%	32.10%	5.70%
The university aims to empower its students to leverage AI technologies within their respective fields.	10.10%	20.10%	28.90%	34.00%	6.90%
Section Three Total	9.90%	21.40%	27.65%	35.70%	5.35%

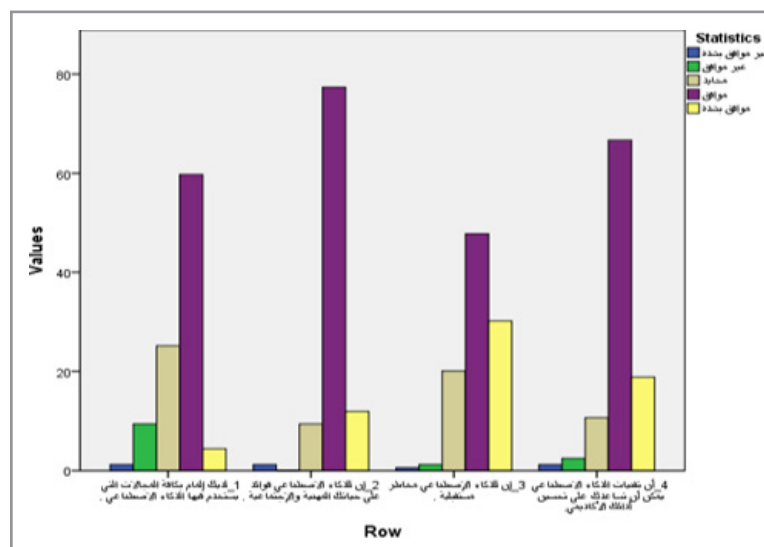


Figure 2: Distribution of Participants' Opinions on AI Comprehension in Higher Education

Section 4: Artificial Intelligence Application Skills in Studies

Table 5: Statistics of Section Four: AI Application Skills in Studies

AI Skills in Studies	Mean	Median	Standard deviation	Variance	Minimum	Maximum
AI-driven online learning platforms are utilized for both the acquisition of new knowledge and the reinforcement of previously learned material.	3.59	4	0.949	0.901	1	5
You have previously studied courses related to AI applications.	2.81	3	1.052	1.107	1	5
You have participated in workshops or academic training sessions on AI applications.	2.52	2	0.999	0.998	1	5
You use AI-based tools to manage your time and learn independently.	3.33	3	0.965	0.93	1	5
Total	3.05	3	0.735	0.540	1	5

Regarding the questions about the AI Application Skills in Studies all questions in this group received a neutral score except for the third question, which received a disagreement score. The total score was neutral with a mean of 3.05 and a standard deviation of 0.735.

The neutral stance towards AI Application Skills in Studies is evident, with the highest percentage of responses falling under the 'agree' category at 34.90%, followed by 'neutral' at 26.43% and 'disagree' at 24.50%.

Table 6: Distribution of Participants' Opinions Regarding AI Application Skills in Studies

Section Four: AI Application Skills in Studies	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
AI-driven online learning platforms are utilized for both the acquisition of new knowledge and the reinforcement of previously learned material.	4.40%	9.40%	18.90%	57.20%	10.10%
You have previously studied courses related to AI applications.	9.40%	34.60%	25.80%	26.40%	3.80%
You have participated in workshops or academic training sessions on AI applications.	13.20%	42.10%	28.30%	12.60%	3.80%
You use AI-based tools to manage your time and learn independently.	5.70%	11.90%	32.70%	43.40%	6.30%
Section Four Total	8.18%	24.50%	26.43%	34.90%	6.00%

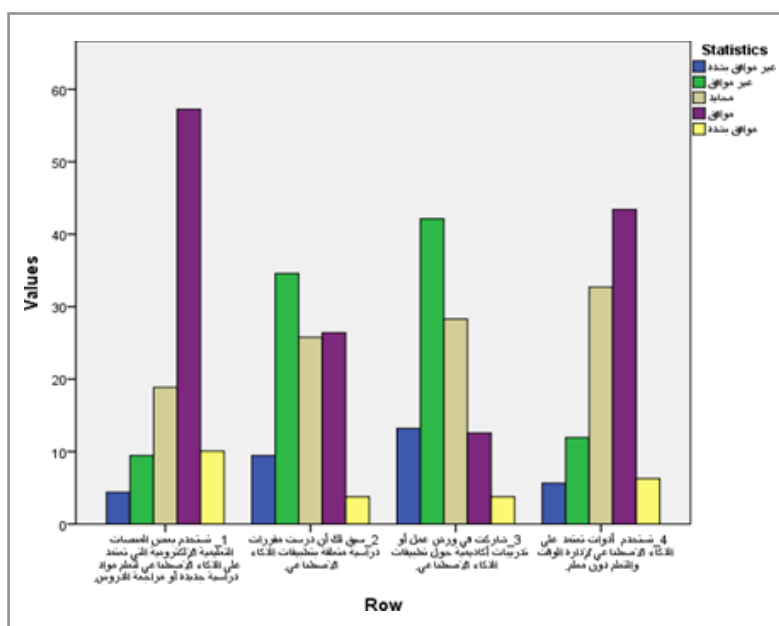


Figure 3: Distribution of Participants' Opinions on AI Application Skills in Studies

Section Five: Comprehension of Artificial Intelligence Applications

Table 7: Section Four Statistics: Comprehension of AI Applications

Comprehension of AI Applications	Mean	Median	Standard deviation	Variance	Minimum	Maximum
You are familiar with the application of intelligent content that transforms traditional textbooks into smart books.	3.27	4	0.979	0.958	1	5
You are familiar with the application of expert systems.	3.11	3	1	1	1	5
You have knowledge of implementing intelligent tutoring systems.	2.9	3	1.008	1.015	1	5
You are familiar with the application of educational robots.	2.84	3	1.043	1.087	1	5
You are familiar with the application of adaptive learning environments.	3.07	3	0.962	0.926	1	5
Total	3.03	3	0.816	1.04	1	4.8

With regard to the questions about AI Applications Comprehension, all items in this group achieved a neutral score. The overall score was neutral, with a mean of 3.03 and a standard deviation of 0.816.

This indicates a neutral level of awareness regarding the university's offerings on AI applications. The "agree" category had the highest percentage of responses at 37.48%, followed by "neutral" at 29.70% and "disagree" at 22.40%.

Table 8: Distribution of Participants' Opinions Regarding AI applications Comprehension

Section Five: AI Applications Comprehension	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
You are familiar with the application of intelligent content that transforms traditional textbooks into smart books.	5.70%	17.00%	25.80%	47.80%	3.80%
You are familiar with the application of expert systems.	6.90%	20.80%	29.60%	39.60%	3.10%
You have knowledge of implementing intelligent tutoring systems.	9.40%	25.80%	32.10%	30.80%	1.90%
You are familiar with the application of educational robots.	11.30%	28.30%	27.00%	32.10%	1.30%
You are familiar with the application of adaptive learning environments.	6.90%	20.10%	34.00%	37.10%	1.90%
Section Five Total	8.04%	22.40%	29.70%	37.48%	2.40%

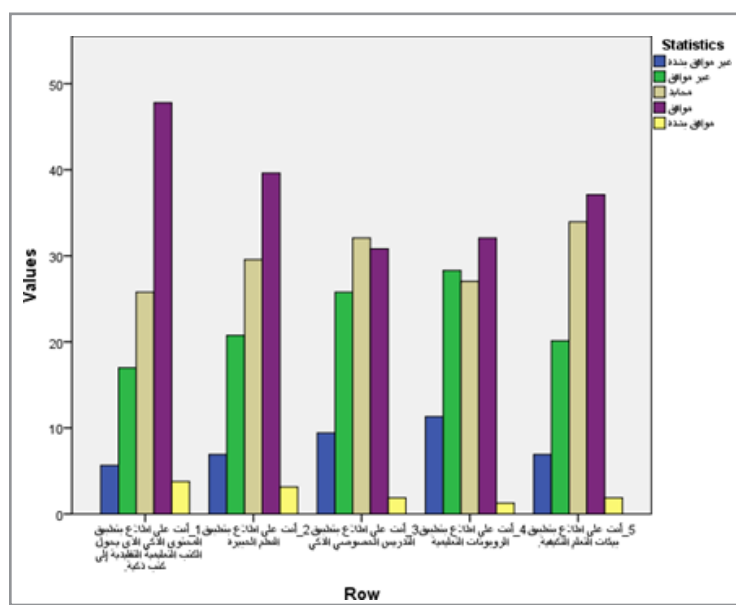


Figure 4: Distribution of Participants' Opinions Regarding Comprehension of AI Applications

Research Hypotheses Analysis

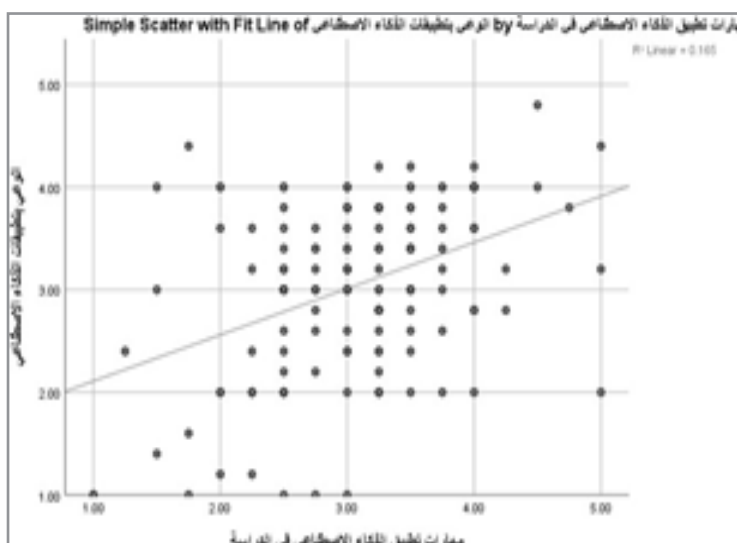
First Hypothesis: There is a statistically significant correlation between the level of artificial intelligence-related training and preparation received by university students in Lebanon and their proficiency in artificial skills and requirements.

Table 9: Calculating The P-Value Based on Spearman's Rank Correlation Coefficient (Rho) For Sections Two and Three

		Correlations		AI Applications in Studies		AI Comprehension	
				Correlation Coefficient	1.000	.046	
				Sig. (2-tailed)	.	.565	
				N	159	159	
		Correlations		Correlation Coefficient	.046	1.000	
				Sig. (2-tailed)	.565	.	
				N	159	159	
Spearman's rho	AI application skills in studies	Correlation Coefficient	1.000	.346**			
		Sig. (2-tailed)	.	.000			
	N	159	159				
	Knowledge of AI Applications	Correlation Coefficient	.346**	1.000			
		Sig. (2-tailed)	.000	.			
		N	159	159			
** Correlation is significant at the 0.01 level (2-tailed).							

As shown in Table 9, Spearman's correlation coefficient is 0.046, with a p-value of 0.565. Since this p-value is greater than the significance level of 0.05, there is no statistically significant correlation

between university training and preparation in Lebanon and students' familiarity with AI skills and needs. Therefore, the first research hypothesis cannot be supported.



Second Hypothesis: There is a statistically significant correlation between the university-level training and preparation in Lebanon and university students' familiarity with the Artificial Intelligence skills and requirements.

Table 10: Calculating the p-value based on Spearman's rho for sections four and five Correlations

			AI Application Skills in Studies	AI Applications Comprehension
Spearman's rho	AI Application Skills in Studies	Correlation Coefficient	1.000	.346**
		Sig. (2-tailed)	.	.000
		N	159	159
	AI Applications Comprehension	Correlation Coefficient	.346**	1.000
		Sig. (2-tailed)	.000	.
		N	159	159

** Correlation is significant at the 0.01 level (2-tailed).

As illustrated in Table 10, Spearman's correlation coefficient between the university educational process in Lebanon and students' proficiency in using AI applications is 0.346, with a highly significant p-value less than 0.001.

These findings provide strong evidence in favor of the second research hypothesis, indicating a positive association between the two variables.

Hypothesis Results

First Research Hypothesis was Rejected. There is no statistically significant correlation between university training and preparation in Lebanon and university students' familiarity with AI skills. This suggests:

- A lack of capacity among universities in Lebanon to invest in AI, creating educational environments, specialized programs, scientific research, and training in this field.
- Question 3 in Section Four confirmed that students do not participate in workshops or academic training on AI applications in Lebanese universities.

- Second Research Hypothesis was accepted. There is a statistically significant correlation between the university educational process in Lebanon and students' familiarity with using Artificial Intelligence applications.

Based on an analysis of Sections Four and Five of the questionnaires, it is evident that:

- University students' comprehension of AI applications relies primarily on individual initiative, with less than 40%.
- Similarly, the number of skills that students possess in applying AI to their studies is limited, suggesting a negligible role for the targeted universities in training students on how to utilize AI in their academic pursuits. This finding is further corroborated by Question 3 in Section Four.

Overall Results

- A high percentage of students (62.9%) strongly agreed and 16.35% agreed, indicating that over 75% of students surveyed reported being aware of and familiar with AI in the targeted universities.

- Approximately 40% of students agreed or strongly agreed that their universities provided information about AI. However, neutral or disagreeing responses accounted for over 55%, suggesting that the targeted universities are not keeping pace with AI in their educational sectors.
- Nearly 40% of students agreed that they could apply AI in their studies, while over 55% were neutral or disagreed. Additionally, 80% of students disagreed or were neutral about participating in AI workshops and academic training at their universities. This indicates that these institutions do not provide the necessary training for students to keep up with AI advancements and have not yet integrated AI applications into their academic curricula.
- 40% of students were aware of various AI applications that could assist them in their studies. However, over 55% of students were neutral or disagreed, suggesting that while students have some awareness, their ability to apply AI in their studies is limited. This is further supported by the findings of Question 3 in Section 4, which highlighted the minimal role of the targeted universities in training students on AI applications.
- The results indicated that approximately 40% of the surveyed university students expressed awareness of various AI applications that can assist students in their studies. However, a higher percentage, exceeding 55%, held neutral or negative views on this matter.

Recommendations

- Strongly encourage universities in Lebanon and in developing countries to activate initiatives related to AI, given the critical importance of this topic for development and investment in youth.
- Update curricula across all university disciplines to reflect the era of data-driven AI change.
- Provide support to students at target universities to develop technological skills that align with the AI era and facilitate their understanding of AI applications that support their studies.
- Provide academic and technological resources to enable faculty and administrative staff at target universities to enhance their awareness and understanding of AI applications.
- Encourage researchers to conduct scientific research in the field of AI and its applications in the academic sector in general and universities in particular.
- Organize targeted training courses and scientific seminars to raise awareness among university

Opening New Horizons

- This research has highlighted the outcomes of the educational process, specifically focusing on the extent to which students are aware of AI and familiar with its applications that support them in their university studies across various specializations in developing countries - a case study of local universities in Lebanon.
- After analyzing the results and formulating recommendations, the researcher aims to open new avenues for future researchers to advance the target universities towards development and keeping pace with the era of AI through the following question

Are Decision-Makers in Local Universities in Developing Countries Capable of Adopting AI and Its Applications to Serve the Improvement, Development, and Sustainability of These Universities?

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