

Artificial intelligence and its impact on job opportunities among university students in North Lima, 2023

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Abstract

Introduction: Artificial intelligence is a technology that replaces human activities, favors business productivity and raises concerns about job losses and economic and social challenges. Method: The research uses a quantitative approach and a non-experimental study design with correlational scope. It identifies two variables: artificial intelligence (AI) and job opportunity. It evaluates students of the Adult Education Program (PFA) of the Universidad César Vallejo. Data collection was done through a virtual survey with Likert scale questions. Results: The study conducted a descriptive analysis of two variables: artificial intelligence and job opportunities. A moderate and positive correlation was observed between both variables, suggesting a significant relationship between the level of artificial intelligence and job opportunities of the respondents. Discussion: The study reveals a positive and moderate correlation between the knowledge of artificial intelligence and the perception of job opportunities. It is important to adapt to this global technology to improve employability. Conclusion: The findings support that artificial intelligence transforms society and the labor market. Although 86% of students know AI, most need more training in this field, even in areas with projected growth in AI-related employment.

Keywords: Artificial intelligence; business intelligence; job opportunities

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1. Introduction

Artificial intelligence (AI) is the name given to devices, machines, or software that can substitute human activities, greatly favoring the productive activity of the companies that use it. According to studies, this innovation, the new industrial revolution of the 21st century, will cause the loss of employment, impacting workers and the current society; physical jobs or repetitive actions are the most likely to disappear, as well as those that AI can replace with better results.¹

AI covers many application areas, such as logical reasoning, knowledge representation, image recognition,

perception, and natural language processing.² These advances greatly simplify human-machine interaction: they make it easier to talk to machines, translate text quickly and efficiently, perform facial recognition, develop predictive models, and even perform predictive maintenance to detect errors quickly.³ These application areas already exist, although they are closely related to the degree of digitization of the related activities.⁴

The debate is currently focused on AI and the purely economic and social changes it brings with it. In the last two decades, artificial intelligence has made great advances, mainly due to the collection of abundant data (big data), the potential growth of computation, and the development of new machine-learning techniques.⁵

AI is a force for change that will explode society and working conditions, is as common a technology as electricity or the internal combustion engine, and will spread in the coming years in ways we cannot even imagine today ⁶. While these changes cannot be prevented, it is also uncomfortable to see them as inevitable due to machine learning and algorithm advances. On the other hand, we are beginning to see legislative changes led by the European Commission to promote artificial intelligence development without slowing down technological development and on the basis of ethical principles that respect fundamental rights ^{7,8}. In a globalized world, digital transformations may affect us, where the availability of certain information and the labor market is becoming increasingly globalized ⁹.

It is being observed that technological progress has been very fast. There is no capacity to assimilate these transformations by the society where it is the society itself, the main one involved in this new evolution called technoscience ^{10,11}. Authors argue that using artificial intelligence has generated a change in the world economy and, therefore, the new economy and see technology as an opportunity to promote talent ¹².

Recent studies have already warned that companies and employers are looking for these new competencies in work in this new scenario.¹³ To obtain a job, these skills can make a difference ^{14,15}.

As Lasse Rouhiainen mentions, people already use AI-based technologies to significantly improve and increase efficiency in almost all areas of their lives. His research shows that artificial intelligence is innovating a new business model, creating a competitive advantage for companies that seek to understand and effectively apply these tools ^{16,17}. The advantage has also been seen in using this technology in hazardous work environments for people seeing that AI outperforms humans in many physically demanding activities ¹⁸.

In Peru, Perez and Rojas have studied the impact of artificial intelligence on companies with a global vision. They mention that one of the long-term goals of artificial intelligence is to perceive, think, learn, communicate, and act in complex environments and expect business models to change in the future. ¹⁹ The authors also point out that determinations about the evolution and activation of technology in companies and organizations are still unresolved, so the debate about whether artificial intelligence will create more jobs than it will lose will remain unresolved for a long time.^{20,21} While automation can often speed up certain processes, it also means greater business efficiency, so these tools tend to consume labor and increase unemployment.²²

For his part, Armas Morales refers to the future use of artificial intelligence in various regions of the world (obviously also in Peru), which is related to the productivity and profitability of the company. Creating new jobs in the digital space offers people and companies opportunities for renewal and digital transformation.²³ However, its impact on the labor market must be addressed as it may increase unemployment in high-tech

jobs.^{22,23} Other Peruvian authors have addressed the issue of potentially generating an unemployment crisis. However, they also describe the benefits identified by the population when using AI in the commercial and production area. ^{26,27}

In the study, Féliz Díaz et al. comments that 93% of respondents use artificial intelligence in certain processes, mainly supporting customer service, marketing, sales, predictive management, and monitoring based on technology and chatbot analysis. Respondents report even more versatile business benefits, improved processes, better productivity, a smaller customer base, more information, better decisions, better analytics, and faster response time ²⁷⁻²⁹.

In Latin America, the use of artificial intelligence ranges from the application of artificial intelligence through a virtual assistance system for drafting judicial documents developed by the Public Prosecutor's Office of the Autonomous City of Buenos Aires (Argentina) ³⁰, the development of a UNIMA device (Mexico) to diagnose diseases quickly and easily ³¹, the construction of a robot to explore mines independently (Peru) to find gases harmful to human health (methane, carbon dioxide, and ammonia) and then alert miners working in the mine ³²; to the creation of AI projects that solve sustainability problems and protect the environment by collaborating with people, such as Auravant (Argentina), a digital platform that allows farmers to manage and control their fields ^{15,33}.

In the present work, we propose to evaluate the impact of AI on university students in North Lima through research with a quantitative approach allowing us to identify the advantages and disadvantages of AI, its development over time, and the current uses of AI-based technology. On the other hand, in order to continue with the sequence and structure of this research, we raise the general hypothesis that poses the existence of a significant impact between Artificial Intelligence on the job opportunities of university students in North Lima, 2023; there is a demonstrative relationship between "Artificial Intelligence" and its labor impact on university students in North Lima, 2023.

2. Methods

A quantitative approach, a non-experimental design study with a correlational scope, was carried out.

The following variables were identified, and the following contextualization was proposed that fits the line of analysis of the research work:

Variable one: artificial intelligence (AI), whose conceptual definition is: artificial intelligence-based technologies are referred to as complex computer systems that use humanoid machines and software for the performance of repetitive tasks and their cognitive environments.

Variable two: job opportunity, whose conceptual definition is: any condition that a person needs to improve

his or her employment situation; this could mean the possibility of advertising, offering a contract, or offering to start a new project or business.

The population evaluated in the study is composed of students of the Adult Education Program (PFA) of the Universidad César Vallejo of all professional schools, men and women indistinctly, being the age of consideration over 18 years old and under 60 years old, they are distinguished by their labor insertion and belong to the Economically Active Population (EAP).

For the sample, we consider a group of students who meet the relevant characteristics for our study, as mentioned above in the inclusion criteria; To calculate the number of students to be evaluated, the formula for qualitative variables of an unknown number is used. The sample is a relevant portion of the student population of the PFA program at Universidad César Vallejo, Lima Norte - Campus Los Olivos. Applying the formula for infinite populations, we obtained the result of a sample of 385 students with a confidence level of 95%, a success rate of 50%, and an estimation error of 5%.

The data collection method used in the research was a virtual survey. This survey contained multiple choice questions on a Likert-type scale from 1 to 5: never 1, rarely 2, sometimes 3, almost always 4, always 5.

For the instrument's reliability in the present research, we will use the statistical method Cronbach's Alpha; for this, we used a pilot sample of 20 respondents, obtaining a value of 0.724, equivalent to 72.4% reliability, greater than the limit of 0.5. Therefore, the survey is approved as an instrument for the collection.

This research is subject to the necessary ethical guidelines, which include objectivity, honesty, and respect for the rights of others.

Table 1: Summary of case processing.

Cases	N	%
Valid	20	29.4
Excluded ^a	48	70.6
	68	100

Elimination by list is based on all variables. Cronbach's Alpha 0.724 N=20

In order to process the information resulting from the questionnaire, the statistical program Jamovi 2.3.26 was used, using Spearman's correlation test, with a sample size of 41 respondents. The test was used to determine the degree of correlation between the variables.

3. Results

Table 2 shows the descriptive analysis of the variables studied separately, and Table 3 shows them together.

Table 2: Descriptive analysis.

Variable and level	Frequen cy	Total Percenta ge	Cumulati ve Percenta ge
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		ge		
Artificial intelligence	Mediu m	30	73.2	73.2
	Low	5	12.2	84.5
	High	6	14.6	100
Job Opportunity	Low	8	19.5	19.5
	Mediu m	25	61	80.5
	high	8	19.5	100

Note: The table shows the frequencies according to level. Source: Own elaboration.

Table 3: Descriptive analysis of the two variables.

	Total
N	41
Lost	0
Mean	57.8
Median	58
Standard Deviation	10.8
Minimum	39
Maximum	78

The table shows the descriptive data for the total. Own elaboration.

Regarding the artificial intelligence variable, a total of 41 respondents were observed, of which 73% of the respondents (30 people) presented a medium level, 12.2% (5 people) a low level, and 14.6% (6 people) a high level corresponding to the independent variable (artificial intelligence).

On the other hand, Job opportunity shows a total of 41 respondents, of which 53.7% of the respondents (22 people) present a medium level, 34.1% (14 people) a high level, and 12.2% (5 people) a low level corresponding to the dimension "maximizing performance."

Table 4: Frequency analysis.

Level	Frequency	Total Percentage	Cumulative Percentage
Medium	30	73.2	73.2
Low	4	9.8	82.9
High	7	17.1	100

The table shows the descriptive data for the total. Own elaboration.

Table 4 shows a total of 41 respondents, where 73.2% of the respondents (30 people) present a medium level, 9.8% (4 people) a low level, and 17.1% (7 people) a high level corresponding to the total of both independent and dependent variables (artificial intelligence and job opportunity).

Table 5: Frequency analysis of the dimensions.

Dimensions		Frequen cy	Total Percenta ge	Cumulati ve Percenta ge
Maximize	Mediu	22	53.7	53.7

performance	m			
	High	14	34.1	87.8
	Low	5	12.2	100
Worker job profile	Medium	13	31.7	31.7
	High	8	19.5	51.2
	Low	20	48.8	100

Note: The table shows the level of the labor profile of the workers. Own elaboration.

When interpreting the dimension "maximizes performance," a total of 41 respondents were observed, of which 53.7% of the respondents (22 people) presented a medium level, 34.1% (14 people) a high level, and 12.2% (5 people) a low level. On the other hand, in the dimension "labor profile of the workers," a total of 41 respondents were observed, of which 31.7% of the respondents (13 people) presented a medium level, 19.5% (8 people) a high level, and 48.8% (20 people) a high level.

Table 6: Data correlation matrix.

		SUMA VI	SUMA VD
SUMA VI	Spearman's Rho	-	
	LG	-	
	P value	-	
SUMA VD	Spearman's Rho	0.461	-
	LG	39	-
	P value	0.002	-

Note: The table shows the Spearman correlation of variables. Own elaboration.

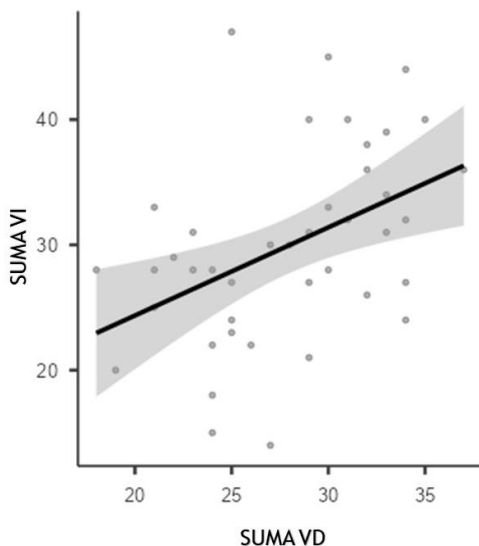


Figure 1: Independent variable vs. dependent variable. Note: The image shows the correlation of variables. Own elaboration.

Table 6 and Figure 1 shows that in the statistical analysis of the hypotheses, there is a correlation. From Table 6, a

p-value of less than 0.05 was obtained; therefore, the working hypothesis is rejected, and the alternative hypothesis is accepted; there is a relationship between variables. By obtaining a Spearman's Rho equal to 0.461, we can conclude a moderate positive correlation between the two hypotheses.

4. Discussion

The present study has provided detailed insight into the respondents' perception of artificial intelligence and job opportunities. The findings obtained through different descriptive and correlational analyses have shed light on the relationship between the two variables and provided a complete understanding of the factors that could influence the perception of job opportunities in the context of artificial intelligence.^{34,35}

First, the results of the individual descriptive analysis of the variable "Artificial Intelligence" reveal that most respondents (73.2%) present an average knowledge of artificial intelligence;³⁶ this suggests a moderate degree of familiarity in this field among the participants. However, it is important to note that a significant proportion of respondents have a low (12.2%) and high (14.6%) knowledge of artificial intelligence, indicating the presence of a heterogeneous distribution in terms of understanding of this technology.³⁷

Similarly, the descriptive analysis of the variable "Job opportunity" shows that the perception of job opportunities is more evenly distributed among the respondents. Sixty-one percent of participants perceive job opportunities at a medium level, while 19.5% see them as low, and another 19.5% see them as high. These results suggest that while there is an overall positive perception of job opportunities, a non-negligible proportion of people see these opportunities as limited.³⁸

Combining both variables in Table 3 provides a more comprehensive view of the overall picture. The mean of 57.8 and median of 58 indicate that, on average, participants have a moderate perception of artificial intelligence and job opportunities. However, the standard deviation of 10.8 suggests some variability in responses, reinforcing the idea that respondents have different perspectives.^{39,40} Corvalla indicates that a certain level of knowledge in this area corresponds to better job opportunities¹⁵.

In the specific analysis of the relationship between "Artificial intelligence" and "Job opportunity" (Table 6 and Figure 1), a moderate positive correlation is evident (Spearman's Rho = 0.461); this means that, in general, those individuals with a higher level of knowledge in artificial intelligence also tend to perceive greater job opportunities.⁴¹ However, it is important to note that the correlation is moderate, implying that other factors not yet explored could influence the perception of job opportunities.^{42,43}

It is essential to keep in mind the limitations of the study in order to interpret the results properly. The sample of 41

respondents may be different from the population as a whole, which could affect the generalizability of the findings.^{44,45} In addition, although the correlation between artificial intelligence and job opportunity is significant, other socioeconomic, educational, and cultural factors that could influence the perception of job opportunities should be considered⁴⁶⁻⁴⁸.

Regarding the specific objective, which is to know the job opportunities of university students in northern Lima, we found a very significant relationship between job opportunities and university students; this occurred because each of the respondents effectively upon completion and often before they are always attentive to a job offer that is presented to them, students seek to be useful and competitive.^{49,50}

In this sense, several studies in other professional areas comment that students and graduates already use AI-based technologies to significantly improve and increase efficiency and effectiveness in the areas they intend to develop throughout their lives⁵¹⁻⁵⁵. This research shows that artificial intelligence is transforming the way business is done, creating a competitive advantage for companies seeking to understand and effectively apply these tools and also the way they select new personnel;⁵⁶ this said, the impact of artificial intelligence on the employment of university students is extremely worrying for those who are not adapting to this global technology; if you are not in the digital world, you will disappear, and you will have fewer job opportunities⁵⁷.

5. Conclusions

The findings are consistent with previous research, highlighting artificial intelligence as a transformative technology redefining society and the labor market. Its adoption is expected to continue to grow in the future.

Analysis of surveys administered to 41 university students shows that 86% have knowledge of artificial intelligence, but mostly at a low level; this suggests the need for more training in this field.

It is projected that job development will be concentrated in areas related to artificial intelligence, according to previous studies. However, 38% of respondents still need AI training from their companies.

6. Recommendations

It should be taken into account that AI is an inevitable evolution that is changing our lives, so in this situation, it is necessary to adapt and seek coexistence with it, to be part of its evolution in the face of job opportunities, to have a vision of vanguard in the face of such growth, to be technically trained.

Companies that use AI must manage all their resources for its proper use. However, we must be clear that it is our responsibility that AI can be misused, so it is necessary to

take the advantages that AI could generate against the job performance that we are performing.

We must remember that AI will play an important role in the future of work; however, we must not fall into negative thinking but look for the positive situation of this evolution and understand that AI is an opportunity that makes our life easier. Therefore, we must be part of it and not be isolated from its imminent growth.

Appendix A. Consent

Dear Participant:

Before proceeding with the survey, we ask that you carefully read the following information. Your participation in this survey is completely voluntary, and your consent is essential for us to collect your answers confidentially and anonymously. Your participation in the survey is risk-free, and no personally identifiable information will be collected. Your responses will be treated confidentially and used only for academic and research purposes. Please be advised that you have the right to refuse to participate or stop your participation at any time without negative consequences.

By continuing with this survey, we understand that:

- You have read and understood the information provided.
- Your participation is voluntary, and you may withdraw without penalty.
- Your responses will be treated confidentially and anonymously.
- You authorize the use of your answers for academic research purposes.
- If you agree to the above terms and wish to participate in the survey, we thank you for your cooperation. If you have any questions or concerns about the study or your participation, you may contact the principal investigator at [contact information].

Thank you for your time and support in this study.

Signature: _____ Date: _____
(Participant's name)

Appendix B. Questionnaire for the variables Artificial Intelligence and Job Opportunities

This survey evaluates the impact of artificial intelligence on job opportunities for university students in North Lima, specifically for students of the PFA program. Please fill out the following survey so that we can develop our research and help more professionals find the ideal job. This survey will take approximately 10 minutes to complete. We appreciate your participation. This questionnaire is anonymous; please indicate your organization's frequency of action by marking with an "X," considering the following scale for each statement:

Always (A)	Almost always (AA)	Sometimes (S)	Rarely (R)	Never (N)
5	4	3	2	1

Statement	A	AA	S	R	N
	5	4	3	2	1
Dimension 1: Optimizing the production process					
How often do you use AI at work?					
Could AI optimize the productive process?					
Dimension 2: Time spent on work development					
The time invested in developing your work could be improved by implementing AI.					
Dimension 3: Actual time spent on the job					
Would the effective time invested in your work be better for implementing AI?					
Dimension 4: Shrinkage reduction					
Would reducing wastage be much more efficient with implementing AI in your work?					
Dimension 5: Product return rate (rework)					
Would the return rate of defective products or rework in your production process be lower with the implementation of AI?					
Dimension 6: Carbon footprint reduction					
Do you consider that AI could reduce the carbon footprint (greenhouse gases - GHG produced by human economic and daily activities)?					
Dimension 7: Environmental impact measurement and monitoring systems					
In their work center, they manage systems for measuring and monitoring environmental impacts based on AI.					
Dimension 8: Updates					
How often do you perform updates (courses, use of programs, applications)?					
Dimension 9: Application of programs or applications at work.					
How often do you use programs or applications to perform your work?					
Dimension 10: Knowledge of mathematical logic and statistics.					
How much do you know about the areas of mathematical logic and statistics?					
Dimension 11: Knowledge of the process.					
Does the company where you work appreciate your knowledge of the process?					
Dimension 12: Level of knowledge of programming language.					
Do you personally participate in AI training courses?					
Dimension 13: Participation in courses on a personal basis.					
Do you participate in AI training courses personally?					
Dimension 14: Company support for training courses					
Does the company where you work invest in you for AI training?					
Dimension 15: Face-to-face and virtual work hours					
How often do you do virtual work?					
Dimension 16: Job position					
Is there an area designated to research or development of AI applied to your production process in your workplace?					
What is your level of knowledge of programming language?					

Thank you for completing our survey; your responses are valuable to our research.

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