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## Use of ICTs in the educational environment of students of a university in North Lima

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### Abstract

This study aims to determine the use of Information and Communication Technologies (ICTs) in the educational environment of university students in North Lima. It explores how ICTs influence students' academic performance and engagement in learning activities. The research employs a quantitative approach, using a survey to collect data from university students. A structured questionnaire was administered to assess the frequency, purpose, and effectiveness of ICT use in academic activities. The results indicate that ICTs play a significant role in students' academic development by facilitating access to educational resources, improving communication, and enhancing interactive learning experiences. However, challenges such as digital literacy gaps and internet access limitations were also identified. The study confirms that ICTs are essential tools in higher education, contributing positively to students' learning processes. However, it highlights the need for institutional support in bridging digital divides and ensuring the effective integration of ICTs into academic curricula. The findings suggest that universities should implement policies to enhance digital literacy among students and provide reliable technological infrastructure. Educators should also adopt innovative teaching strategies that maximize the benefits of ICTs in the learning process.

**Keywords:** Academic performance, Higher education, ICTs, Educational environment, North Lima, Digital learning, Technology in education, University students.

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**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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## **1. Introduction**

The dizzying advance of Information and Communication Technologies (ICTs) has improved different aspects today within the educational field [1]. However, no matter how many technological advances there are, significant challenges still exist in the effective integration of these digital tools in the educational field [2].

In this sense, the use of ICTs at the higher education level is presented as a problem that is considerably relevant in an ascending manner, given that different digital devices and internet connections are widely accessible [3]. However, there is still a gap between technological availability and use in the teaching-learning process; this existing gap is due to various factors, both in technological infrastructure and its application in higher education, raising questions about the quality and effectiveness of education using ICTs [4, 5].

That is why the lack of concise and coherent strategies for the integration of ICTs in university education leads to several specific problems [6]. Among these problems are the inequality of access to digital resources among students, influenced by socioeconomic factors, and the resistance of many teachers to adopt new methodological strategies that could improve their teaching through the use of technology [7]. In addition, the low use of digital tools that could enrich the student experience and enhance learning in a more participatory and inclusive way is a significant obstacle [8].

This lack of effective integration can also result in a digital skills gap between students and insufficient preparation for the world of work, where technological competence is increasingly essential [9]. On the other hand, the lack of adequate infrastructure and insufficient continuous training for teachers limits the potential of ICTs to transform learning [10].

In addition to this, today's rapid technological evolution presents several additional challenges in terms of teacher training, updating digital resources, and curricular adaptation [11]. These issues can create significant barriers to the effective implementation of ICT in the university educational environment [12].

In this context, by identifying both the obstacles and opportunities linked to the integration of technology in higher education, this research aims to inform educational policies and practices that promote more efficient and equitable use of ICTs, benefiting all university students [13, 14].

In a study carried out in Colombia, evidence of the use of ICTs was shown in a higher student population, where it was evidenced in its results that 91% of the participants had a positive perception of ICTs in the field of learning for their knowledge, while 9% had a negative perception. In conclusion, the use of ICTs in the academic field will depend on the learning that the student presents in the use and adaptation of technology [15].

In another study carried out in Ecuador, evidence of the use of ICTs was shown in higher education students, where they presented in their results that most students use technologies to carry out their academic activities, allowing them to utilize different digital programs aimed at the creation of documents or academic electronic presentations, concluding that ICTs are tools that allow them to adapt to educational needs [16].

Finally, in a study carried out in Peru, evidence of the use of ICTs in higher education students was shown, where they interpreted in their results that 92% of the participants use ICTs to search and process information online, 78% to participate in forums, and 65% are students who collaborate in research projects, concluding that the use of ICTs has a fundamental role in students' academic performance [17].

Therefore, this research study aims to determine the use of ICTs in the educational environment of students at a university in North Lima.

## **2. Methodology**

### **2.1 Research Type and Design**

In the study, according to its properties is quantitative, with respect to its methodology it is descriptive-cross-sectional non-experimental [18].

### **2.2 Population**

The total population is made up of 152 students from a university in North Lima. Since this study was based on an anonymous survey, it was not necessary to obtain informed consent from the participants.

### **2.3 Inclusion Criteria**

- Education Career Participants
- Participants of both sexes
- Participants who have voluntarily agreed to be present in the study

### **2.4. Techniques and Instruments**

The data collection technique was the survey, where sociodemographic data and the ICT Use Questionnaire were presented.

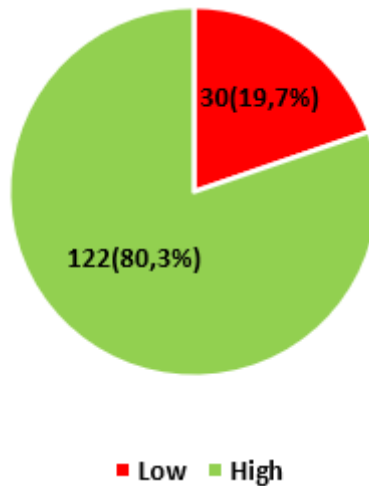
The ICT Use Questionnaire is an instrument made up of 23 items from the original instrument; however, in this study, it has been adapted to include 17 items in the same adequate way across 3 dimensions as the original: information or virtual education presents 8 items, communication or mediated interaction includes 5 items, and entertainment or leisure comprises 4 items. The answer options are provided through a Likert-type scale where: "1 = almost never", "2 = very little", "3 = frequent", and "4 = very frequent". The final score is 68 points, with a higher score indicating a greater frequency of ICT use by the students [19, 20].

The reliability of the instrument was determined based on Cronbach's alpha statistical test, which obtained a coefficient of 0.795 ( $\alpha > 0.6$ ) for all items ( $i = 17$ ).

### 2.5. Place and Application of the Instrument

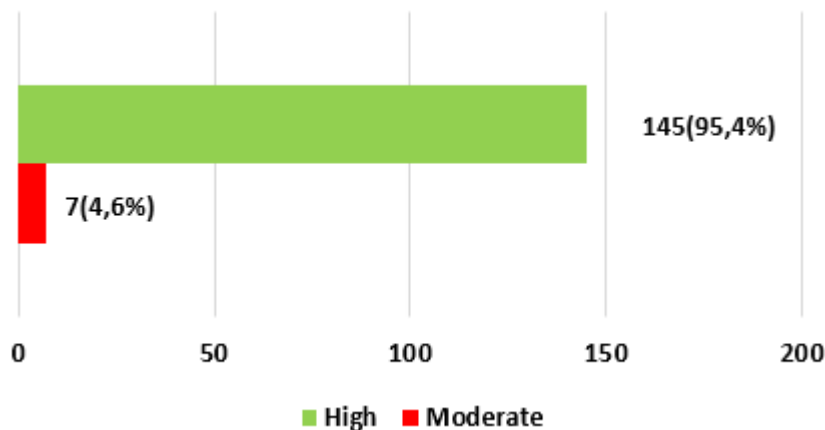
First, prior coordination was carried out with the Faculty of Education to conduct surveys with the students, where they were provided with the necessary information regarding the research being conducted. The surveys took between 10 to 15 minutes for each student from different semesters and were carried out in the month of April 2024.

## 3. Results



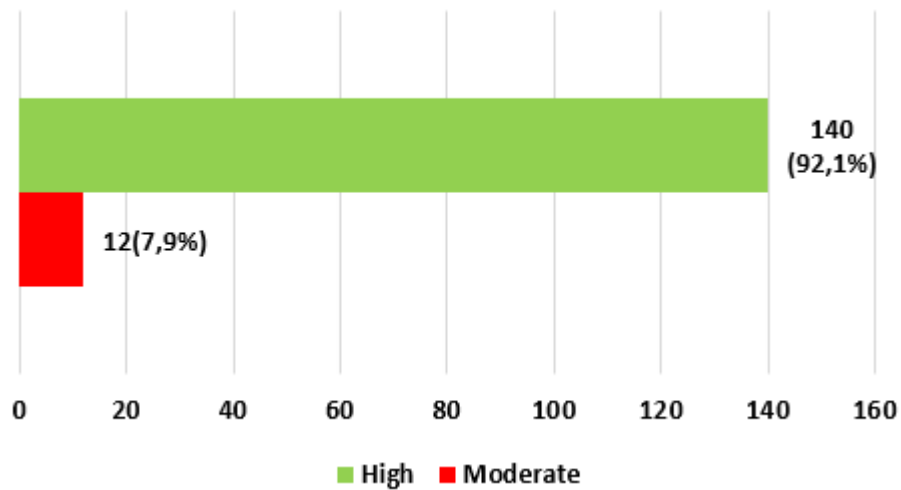
**Figure 1.**  
Use of ICTs in the educational environment of students of a university in Lima Norte.

Figure 1 shows that 80.3% of the participants report a high use of ICTs for their academic education, while 19.7% demonstrate a low usage level. This indicates that most students actively integrate ICTs into their learning process, leveraging digital tools for research, assignments, and online collaboration. The significant adoption of ICTs suggests a growing dependence on technology for academic success, potentially enhancing learning efficiency and accessibility. However, 19.7% of students with low ICT usage may face challenges related to digital literacy, access to technology, or personal learning preferences. These findings highlight the need for targeted strategies to bridge the digital divide and ensure that all students benefit equally from technological advancements in education.



**Figure 2.**  
Use of ICTs in their information or virtual education dimension in the educational environment of students of a university in Lima Norte.

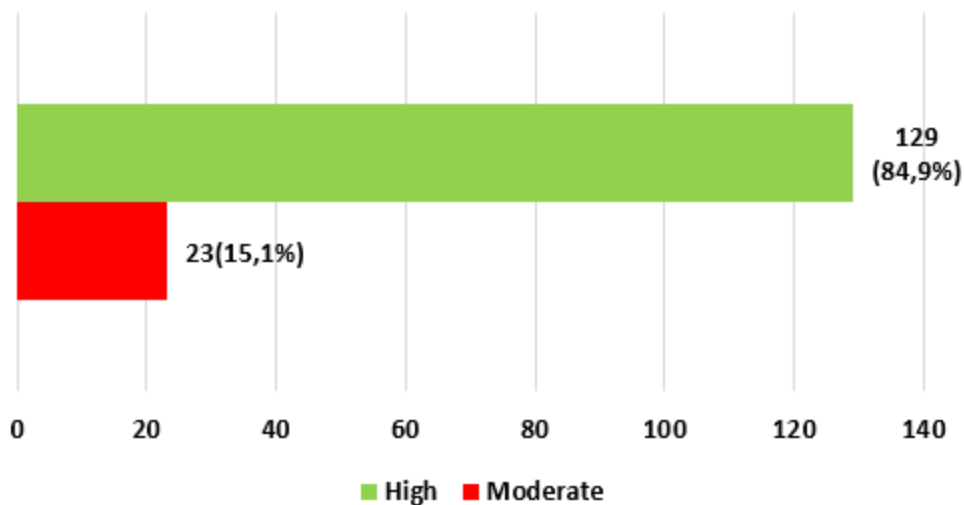
Figure 2 illustrates the utilization of ICTs in the information and virtual education dimension. The results indicate that 95.4% of the participants exhibit a high use of ICTs in this context, while only 4.6% demonstrate a moderate use. These findings suggest that most students rely heavily on ICTs for accessing academic information and engaging in virtual learning environments. This high percentage may reflect the increasing integration of digital platforms, online resources, and virtual communication tools in higher education, reinforcing the essential role of ICTs in modern academic settings.



**Figure 3.**

Use of ICTs in their dimension communication or mediated interaction in the educational environment of students of a university in Lima Norte.

Figure 3 illustrates the use of ICTs in the communication and mediated interaction dimension. The findings reveal that 92.1% of the participants report high use of ICTs in this aspect, while only 7.9% use them moderately. This suggests that most students rely on ICTs as essential tools for communication, collaboration, and interaction in academic settings. The high percentage may indicate a strong dependence on digital platforms, such as emails, discussion forums, video conferencing, and instant messaging, to facilitate academic engagement and peer collaboration. The relatively low percentage of moderate users could imply limited access, preference for traditional communication methods, or lower digital literacy levels among certain students.



**Figure 4.**

Use of ICTs in their entertainment or leisure dimension in the educational environment of students of a university in Lima Norte.

Figure 4 presents data on the use of ICTs in the training and leisure dimension. The results indicate that 84.9% of the participants report high use of ICTs, while 15.1% use them moderately. This suggests that most students integrate ICTs not only for academic training but also for recreational and self-learning purposes. The significant use of ICTs in this dimension highlights their role in facilitating access to diverse educational and entertainment resources, contributing to both cognitive development and digital literacy. These findings reinforce the growing dependency on digital tools for both structured learning and informal educational activities among university students.

#### 4. Discussions

According to the results in Figure 1, most participants report a high use of ICTs in their academic education, reaching 80.3%. This demonstrates a positive trend towards the adoption of digital technologies in the university environment. This high percentage suggests that a portion of students are already taking advantage of the benefits of digital tools to improve their learning and academic performance. ICTs facilitate access to a wide range of educational resources, promote autonomous and collaborative learning, and prepare students for an increasingly digitized work environment. However, 19.7% of participants who report a low use of ICTs reveal a persistent digital divide. This difference can be attributed to

factors such as a lack of access to technological devices and resources, a lack of digital skills, or resistance to change by both students and teachers. Likewise, Mejía [16] mentions that students with less ICT use are likely to face economic, social, or geographic barriers that limit their ability to take advantage of these technologies.

Regarding the results of Figure 2, it is shown that in the dimension of information or virtual education, 95.4% of the participants have a high use of ICTs, while only 4.6% use them moderately. This high percentage of use indicates a strong inclination towards the adoption of digital tools for virtual education, reflecting the growing importance of these technologies in academia. The fact that almost all students are using ICTs intensively suggests that these tools are being widely accepted and used to access educational materials, participate in virtual classes, conduct research, and collaborate with peers and teachers. This positive trend could be facilitating more flexible, accessible, and personalized learning, adapting to students' individual needs, and allowing them to learn at their own pace and from anywhere. On the other hand, 4.6% of the participants who report a moderate use of ICTs show that there are still barriers that prevent more extensive use. Similarly, Agüero and collaborators [17] report that these barriers could include limitations in access to a high-quality internet connection, lack of adequate devices, or less familiarity with digital platforms and educational tools. In addition, some students may face challenges in self-regulation and motivation when using virtual learning environments, which could limit their intensive use of ICTs.

Likewise, the results of Figure 3, with respect to the dimension of communication or mediated interaction, show that 92.1% of the participants have a high use of ICTs, while only 7.9% use them moderately. This high percentage of ICT use for communication suggests that most students are leveraging these tools to interact effectively in their academic environments. The predominant use of ICTs in this dimension can be attributed to the increasing availability and ease of use of various digital communication platforms, such as emails, social networks, instant messaging applications, and videoconferencing platforms. These tools allow students to maintain constant and fluid communication with their peers and teachers, facilitating collaboration, information sharing, and mutual support. However, 7.9% of participants who use ICTs moderately in this dimension indicate that there are still obstacles that limit fuller participation. These obstacles could include technical difficulties, such as internet connectivity issues or lack of access to suitable devices, as well as personal barriers, such as a lack of digital skills or a preference for traditional communication methods. Likewise, Poveda and collaborators [15] argue that some students may feel less comfortable or less motivated to actively engage in technology-mediated interactions, which can affect their level of engagement and collaboration in the academic environment.

Finally, the results in Figure 4 indicate that, with respect to the training or leisure dimension, 84.9% of the participants have a high use of ICTs, while 15.1% use them moderately. This high percentage of use suggests that a large majority of students are integrating digital technologies into their entertainment and personal training activities. The high use of ICTs in this dimension may be related to the wide availability and attractiveness of digital content accessible through the internet such as streaming platforms, video games, social networks, and educational applications, they offer a variety of options that not only entertain but also educate and promote personal well-being. This indicates that students are not only using ICTs for academic purposes but are also exploiting these tools for their holistic development and recreation, which can contribute to a healthy balance between their academic responsibilities and their personal lives. However, 15.1% of participants who have a moderate use of ICTs in this dimension suggest the existence of certain obstacles. These may include limitations on access to devices and high-speed internet connections, as well as potential personal or family restrictions that affect how long and how students can use digital technologies for leisure and training. In this way, Cardozo [14] in his study, also refers to some students who may prefer non-digital recreational activities or have less interest in the digital options available.

**Table 1.**

Comparative Table: Study Results vs. Literature Findings.

Dimension	Study Results	Findings from Literature
Use of ICTs in academic education	80.3% of students report a high use of ICTs in their academic education.	Prior studies suggest that ICT integration enhances student engagement, self-learning, and academic performance. However, digital literacy varies among students [5].
Information and virtual education	95.4% of students use ICTs extensively for accessing information and virtual education.	Research highlights that virtual learning platforms significantly improve accessibility to educational resources, but challenges remain in digital pedagogy [7].
Communication and mediated interaction	92.1% of students rely on ICTs for academic communication and collaboration.	Studies show that ICTs foster interactive learning and peer collaboration, yet digital fatigue and miscommunication are emerging concerns [18].
Training and leisure	84.9% of students use ICTs for both educational training and leisure, while 15.1% have moderate use.	Literature indicates that while ICTs contribute to skill development, excessive leisure-related use may lead to distractions and reduced academic productivity [15].
Challenges: Digital Divide & Access	Despite high ICT usage, some students face barriers related to equitable access to technology.	Studies confirm that socioeconomic factors impact digital access, creating disparities in the effectiveness of ICT-based education [4].

## 5. Conclusions

In conclusion, the findings indicate that most university students actively use ICTs in their academic environment, enhancing the integration of technology into the teaching-learning process. This widespread adoption suggests that digital tools play a crucial role in facilitating access to information, improving communication, and fostering more dynamic and interactive learning experiences.

Additionally, while ICT usage is considerably high, challenges related to the digital divide persist. Factors such as limited access to technological resources, disparities in digital literacy, and resistance to adopting new educational technologies still hinder the full potential of ICTs in higher education. Addressing these issues requires institutional efforts to ensure equitable access to digital tools and provide adequate training for both students and faculty.

Moreover, the study highlights the importance of ICTs beyond academic purposes, as students frequently utilize them for communication, virtual collaboration, training, and even leisure activities. This indicates a blurring of boundaries between academic and personal use, reinforcing the need for digital competence and responsible usage.

Finally, these findings underscore the necessity for universities to continuously adapt to technological advancements, integrating innovative educational strategies that leverage ICTs effectively. Future research should explore the long-term impact of ICTs on academic performance and student engagement, as well as potential strategies to bridge the digital divide and enhance digital inclusion in higher education.

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