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Information and Communication Technologies Integration and Usage Patterns Among University Students

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Abstract

This article analyzes the use of information & communication technologies among students from various universities. It explores how students from different academic institutions engage with information & communication technologies for their educational activities, communication, and personal development. The study delves into the extent to which information & communication technologies is integrated into their learning processes, the frequency of use, and the types of technologies most commonly employed. By comparing the usage patterns across different universities, the article aims to identify trends, benefits, and potential challenges faced by students in leveraging information & communication technologies for their academic and personal growth. Data for this study was collected using a questionnaire specifically designed to capture the relevant information. The data collection took place during two distinct time periods: the first from January 2017 to September 2017, and the second throughout the year 2019. This approach allowed for a comparative analysis of information & communication technologies usage among students over time, providing insights into how their engagement with information and communication technologies may have evolved between these periods. The analysis compares the data from the two periods, revealing that information and communication technologies have become integral to the lives of both students and their families. This comparison highlights the increasing role of information & communication technologies in daily activities, suggesting a growing reliance on these technologies across different aspects of life over time. The findings underscore how deeply embedded information & communication technologies has become in the social and educational spheres, reflecting broader trends in digital adoption and usage. While some technologies, such as mobile phones, are already widely adopted by students, others, like the Internet, are still not as accessible or integrated into their daily lives. This disparity indicates a digital divide that needs to be addressed. Therefore, the paper suggests that it is necessary to develop specific policies aimed at improving access to and the effective use of Internet technologies. These policies could help bridge the gap, ensuring that all students can fully benefit from the educational and social opportunities that information & communication technologies offer.

Keywords: Information and Communication Technologies, Higher Education, Digital Divide

JEL Codes: I23, O33, L86

1. INTRODUCTION

Information and communication technology (ICT) is advancing rapidly and has become a crucial factor in the development of countries. The swift progress in ICT not only drives economic growth but also enhances social development by improving access to information, education, and services. As ICT continues to evolve, its role in shaping the infrastructure, governance, and overall development trajectory of nations becomes increasingly significant, making it a key area of focus for policymakers and stakeholders aiming to boost national progress. The impact of information and communication technology (ICT) extends across various aspects of society, influencing the structures of state and civil society institutions, economic and social sectors, science and education, culture, and the overall way of life. ICT's influence can be seen in how governments operate, how businesses conduct their activities, and how individuals interact with one another and access information. However, it is important to recognize that each country experiences the development and integration of ICT differently. Factors such as infrastructure, education, economic status, and governmental policies play significant roles in shaping how ICT is adopted and utilized within a nation, leading to varying levels of progress and impact.

In recent years, the rapid development of science and technology has significantly influenced various sectors, with the application of information and communication technology (ICT) serving as a key indicator of a country's intellectual and scientific advancement. The extent to which a nation adopts and integrates ICT into its daily operations reflects its ability to address and resolve socio-economic challenges. ICT enables countries to improve efficiency, enhance communication, and foster innovation, thereby playing a crucial role in driving economic growth and social progress. By leveraging ICT, countries can better manage resources, improve public services, and create new opportunities for education, employment, and overall societal development.

The term "information technology" (IT) is often referred to as a sophisticated or modern name for data processing. This perspective, by Newton, suggests that at its core, IT revolves around the systematic handling, manipulation, and management of data to support various business processes, decision-making, and communication. While data processing remains a fundamental aspect of IT, the field has expanded significantly to encompass a broad range of technologies and

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practices, including networking, cybersecurity, software development, and cloud computing, all of which contribute to the complex and interconnected digital landscape of today. Information and Communication Technologies (ICT) encompass a range of hardware, processes, and systems designed for storing, managing, communicating, and sharing information. These technologies are increasingly recognized by developing countries as essential tools in their initiatives to combat poverty and advance development. The comprehensive guidebook "ICT Policy Formulation and e-Strategy Development" highlights the crucial role that ICT plays in these efforts, providing frameworks and strategies that can empower nations to leverage technological advancements for socio-economic progress. Sein and Harindranath (2004) offer several conceptualizations of how ICT is used in national development based on literature. One perspective views ICT as a commodity, treating it as a product that is bought, sold, and traded within the global market. This approach emphasizes the value of ICT as an economic good. Another perspective considers ICT as a supportive tool for development activities, where it enhances and aids various initiatives aimed at achieving social and economic progress. In this context, ICT is seen as an enabler that provides essential support to development efforts.

A different view positions ICT as a driver of the economy, highlighting its role as a significant engine for economic growth. This conceptualization underscores how ICT contributes to economic development by fostering innovation, increasing productivity, and enhancing competitiveness. Lastly, ICT can be directed at specific development activities, where it is applied to targeted goals such as improving education, healthcare, or governance. In this capacity, ICT addresses particular developmental challenges, aiming to make a direct impact on specific areas of need. Each of these perspectives highlights the varied roles that ICT can play in fostering national development.

2. METHODOLOGY

For both phases of the study, several key principles guided the survey process. Firstly, ensuring a correct representation of the university student environment was crucial. This principle aimed to capture a comprehensive and accurate picture of the student population across various universities. Secondly, the survey was conducted in successive waves over a six-month period, which helped in obtaining a well-rounded perspective and capturing any changes or trends over time. Lastly, the content of the survey was designed to closely reflect the actual situation, ensuring that the questions and topics addressed were relevant and representative of the current state of affairs. These principles collectively contributed to the robustness and validity of the study's findings. In the study, a total of 1,200 students from various universities were surveyed. The representation of the sample maintained proportionality, with the number of students surveyed corresponding to the data provided by the university secretary. At the university level, representation was achieved by considering different study programs and years of study, ensuring that a diverse range of student experiences and academic stages were included. The data collection process was conducted individually, allowing for an in-depth understanding of each student's role and recognition of Information and Communication Technology (ICT) in their everyday life.

Additionally, the study collected data on various aspects of technology usage among students, including their knowledge of and access to home computers, mobile phones, televisions, landline phones, scanners, printers, CD writers, and other devices. Students were surveyed about their familiarity with and usage of the Internet, the purposes for which they use it, their views on having an Internet connection at home, and their assessments of both central and local policies related to Internet development and state support. This comprehensive analysis covered a total of 87 variables, providing a detailed understanding of students' interactions with and attitudes towards ICT.

3. ANALYSIS OF RESULTS

In Albanian, Information and Communication Technology (ICT) is translated as "Teknologjia e Informimit dhe Komunikimit" with the acronym TIK. During the year 2017, only 25% of the students in universities were reported to have access to or used ICT resources. In 2017, 35% of students indicated that they had seen the term "TIK" but did not fully understand it. Consequently, about 60% of students were either aware of the acronym or had encountered it. Of these students, approximately 72% viewed ICT as a necessity, 24% considered it important but not essential, and only 3% regarded it as of secondary importance. By 2019, awareness among university students had significantly improved, with nearly 100% recognizing the meaning of ICT and understanding its importance in their daily lives. In 2017, the survey highlighted that just 30% of students owned a computer at home, which was below the national average for this demographic group. This statistic reflects a broader issue of limited access to essential technology among students. Furthermore, among those who did have a computer, a significant proportion did not have internet access, which exacerbated the challenges faced by students in fully utilizing their computers for educational and personal purposes. The survey also revealed that a considerable number of students found computer usage to be challenging. Specifically, around 40% of students reported that they perceived using a computer as either difficult or very complicated. This difficulty in using computers may contribute to lower levels of digital engagement and hinder the ability of students to leverage technology effectively in their studies and daily lives. The computer is still an emerging technology for many students, as most of them have only had access to one for less than a year. For the substantial number of students who do not have a computer at home, the predominant issue is the high cost of these devices. A significant 82% of students report that the expense of purchasing a computer is the main obstacle preventing them from having one. This indicates that the financial burden of acquiring technology is a major barrier. In comparison, the challenge of mastering the complexity of computer use is relatively less significant, suggesting that if the financial barrier were addressed, students might more readily overcome any technical difficulties. Therefore, there is a clear need for initiatives that could make computers more affordable and accessible to students. Reducing costs through subsidies, financial assistance, or providing affordable

computing solutions could significantly increase the number of students with home computers, potentially enhancing their educational opportunities and technological engagement.
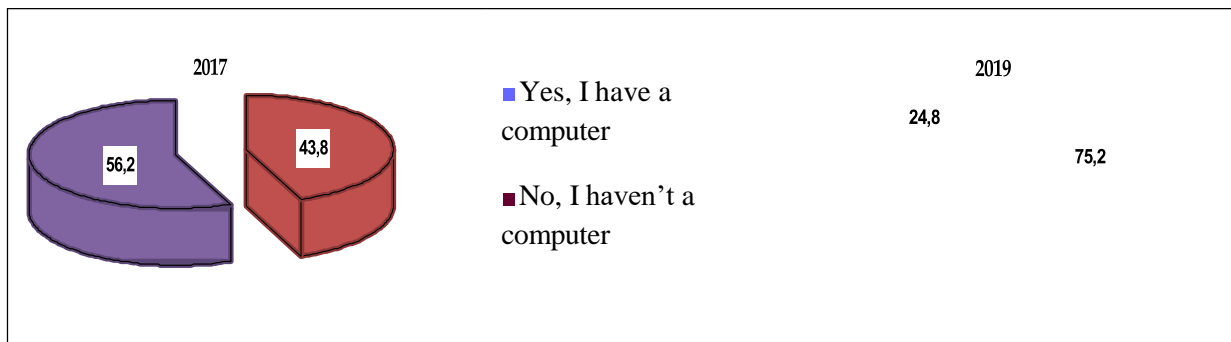

Figure 1: The use of computer

By 2019, there was a notable improvement in the availability of computers among students. Approximately 75.2% of students reported having a computer at home, a significant increase from previous years. Furthermore, 31.7% of these students also had an Internet connection in their homes, which reflects a growing access to digital resources and connectivity. The perception of computer usage has also shifted. Only 4% of students now consider using a computer to be complicated, indicating that advancements in technology or increased familiarity have made it more user-friendly. The issue of high expense remains a concern for some, with 23% of students still without a computer due to cost barriers. This suggests that while progress has been made, financial constraints continue to impact access to technology for a portion of the student population. Overall, the data indicates a positive trend in the adoption of computers and the Internet among students, though there is still work to be done to ensure that technological access is equitable and that financial barriers are addressed. Mobile telephony among students shows a high level of adoption, with approximately 93% of students using a cell phone. This usage rate is notably high within the universities, though it is slightly lower compared to the national average. Most students possess a prepaid mobile phone, and those who do not express a strong desire to acquire one, indicating a high demand for mobile connectivity.

The average monthly cost for a student's mobile phone use is around 1,600 leks. Messaging is a prominent activity among students, with about 18% sending at least one message nearly every day. The prevalence of mobile phones extends beyond the students themselves, as mobile phones are also widely used within their families. There are only a few family members who do not own a mobile phone, highlighting the extensive integration of mobile technology into both the personal and family lives of students. In comparing the results from 2017 with those of 2019, it is evident that mobile phone usage among students has remained consistently high. In 2017, the data revealed that all students surveyed used a mobile phone. Furthermore, a significant portion of these students, specifically 41%, sent at least one message each day. This indicates that mobile phones have become an integral part of students' daily routines, not only for communication but also as a primary means of staying connected.
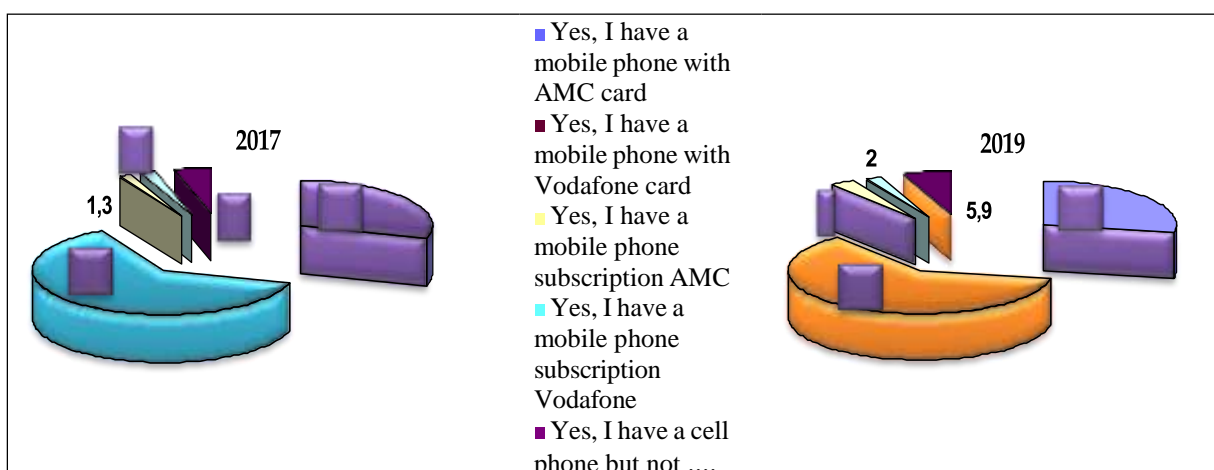

Figure 2: The use of mobile phones

In 2017, television ownership among students was nearly universal, with almost all having a TV at home. Most of these students relied on standard TV antennas to receive signals. However, a quarter of them had upgraded to satellite TV with parabolic antennas. Additionally, newer alternatives like cable TV, both paid and free, were becoming increasingly common among students. Fixed-line telephony also had a solid presence, indicating that traditional telephone services were well-distributed among this demographic. The distribution of certain other technological equipment among students

revealed varied levels of penetration. Fax machines were notably absent as common home equipment. Printers were somewhat more prevalent, with around 15% of student households owning one. Similarly, CD-writers were found in approximately 14% of student homes. Scanners, however, were less common and had a minimal presence among the students. Digital cameras, despite being relatively new to the market, were found to be in use by more than 29% of student families. This adoption rate surpasses that of other equipment mentioned earlier. Similarly, DVDs were present in the same percentage of student households, indicating a significant level of engagement with these technologies.

In 2019, while awareness of the Internet among students was high, actual usage was reported at 69%. The frequency of use varied, with 14% of students accessing the Internet daily and 24% using it several times a week. This indicates a notable gap between awareness and regular engagement with online resources. By 2019, the adoption of the Internet among students had dramatically increased, with 96% of them utilizing it. Daily usage was reported by 62.4% of students, indicating a strong integration of the Internet into their daily routines. Despite this high level of usage, the venues for accessing the Internet varied significantly. Internet cafés emerged as the primary location for students to connect online, reflecting their popularity and perhaps the lack of sufficient Internet access at other venues. In contrast, the use of Internet resources at schools and homes was notably lower. This suggests a significant gap in the provision of Internet facilities within educational institutions, which ideally should serve as a key source of online access for students. The underutilization of Internet access in schools highlights an area for potential improvement. Schools are expected to provide adequate Internet resources to support students' educational needs. However, the fact that students rely more heavily on external locations such as Internet cafés indicates a shortfall in the integration of digital resources within the school environment. This situation underscores the need for enhanced investment in school-based Internet infrastructure to ensure that students can benefit from consistent and reliable online access as part of their educational experience.

In 2017, the proportion of university students with home internet access was notably low, with only 9% of students reporting such access. This limited availability of home internet was indicative of broader connectivity issues faced by the student population at the time. Additionally, about 57% of students had their own personal email addresses, while 14% relied on the email accounts of friends, reflecting a dependence on shared resources for communication and academic activities. By 2019, there was a substantial improvement in internet access among students. The percentage of students with home internet access had risen significantly to 53.5%, demonstrating progress in connectivity and potentially enhancing students' ability to engage in online activities from their residences. Concurrently, the ownership of personal email addresses among students had increased dramatically, with 89.1% of students now possessing their own email accounts. This shift suggests a growing trend toward individual digital communication tools and greater integration of internet resources into students' daily lives. These changes highlight a positive trend in the digital infrastructure available to students, though challenges remain. The increased access to personal email and home internet points to improvements in students' ability to manage their academic and personal communications independently. However, continued efforts are necessary to further enhance internet access and digital resources within educational institutions to support students' needs fully. Yahoo and Google were the most frequently used platforms for online navigation among students. Their popularity underscores their significant role in providing access to information and resources on the internet. Both Yahoo and Google offer a range of services including search engines, email, news, and various other online tools, which contribute to their widespread use. Google, in particular, has established itself as the dominant search engine, widely recognized for its efficiency and comprehensive search capabilities. Yahoo, while also popular, has a broader range of services, including news aggregation and email, which appeal to users looking for a variety of online resources. The prevalence of these programs among students reflects their integral role in facilitating online research, communication, and information retrieval. This widespread adoption highlights the importance of search engines in students' academic and personal internet use, as they play a crucial role in navigating and accessing information online. The findings indicate a strong interest among students in having internet access at home. Approximately 68% of students cited the primary obstacles as the absence of a home computer and high internet tariffs. These factors are the main barriers to obtaining home internet access, while other reasons such as lack of coverage, perceived lack of necessity, absence of a fixed phone line, lack of knowledge about using the internet, unfamiliarity with English, and lack of computer skills are not significant deterrents.

Additionally, some students expressed uncertainty about how to acquire internet service for their homes. This suggests a need for better information and guidance on how to obtain and set up internet access, which could help address the gaps in home internet availability among students. Overall, addressing these obstacles, particularly the cost and availability of technology, could significantly enhance students' ability to access the internet from home. The data reveals a strong confidence among students regarding their future use of the internet. In 2017, 65% of students expressed the belief that their internet usage would increase over time. Only a small fraction anticipated using the internet less in the future. By 2019, this trend is even more pronounced, with 96% of students actively using the internet and 100% expressing a belief that their usage will continue to grow. This shift reflects a significant increase in both the adoption and anticipated reliance on internet technology among students, highlighting its growing importance in their lives. The findings reveal a significant gap in student engagement with online resources related to government and institutional websites. In 2017, a substantial majority, about 71%, of students indicated that they had never visited the websites of central or local government bodies. This level of disengagement becomes even more pronounced when accounting for students who do not use the internet at all, bringing the total percentage of those who do not visit government websites to approximately 84%. This highlights a widespread lack of interaction with digital platforms that provide essential information and services.

Among those who do engage with government websites, the frequency is notably low. Only 10% of students access these sites occasionally, while just 4% visit them more often. A mere 1% of students reported regularly visiting government

websites. This low engagement could point to a lack of awareness about the resources available online or a perceived lack of relevance to their daily lives. Furthermore, a significant portion of students, around 65%, are unaware of whether their university has an official website. This lack of awareness suggests that students may not be fully informed about the digital tools and resources that their institutions provide. It underscores the need for universities and government bodies to improve communication and enhance the visibility of their online resources. Overall, these results suggest that while internet usage among students is widespread, their engagement with online government and institutional sites is limited. This indicates a potential area for development in promoting the relevance and accessibility of digital resources, ensuring that students are better informed and able to utilize these platforms effectively.

The current state of the university website reflects a gap in its functionality and relevance for students. It is not perceived as a valuable tool for finding information or for communication purposes. This suggests that the website may not be effectively meeting the needs of the student body or fulfilling its role as a resource for university-related information. When it comes to the university's engagement with information and communication technology (ICT), students are largely unsure about the level of attention and focus that university leaders and academic staff dedicate to ICT development. Approximately 64% of students are uncertain or do not provide a response regarding the university's commitment to ICT. This ambiguity points to a potential disconnect between the administration's ICT initiatives and the students' awareness or perception of those efforts. On the other hand, about 30% of students believe that the university is indeed concerned about the advancement of ICT. However, there is a notable portion of students who perceive the interest in ICT as either insufficient or driven merely by obligatory tasks rather than genuine commitment. Despite these perceptions, a significant majority of students, around 89%, acknowledge the importance of ICT. They view it either as a necessity or as something important but not essential. This widespread recognition of the value of ICT underscores a need for the university to enhance its ICT infrastructure and communication strategies to better align with students' expectations and to utilize technology more effectively in its operations and interactions. In 2019, there is a notable shift in students' perceptions regarding the university's efforts in developing information and communication technology (ICT). A significant majority of students now view these efforts positively, recognizing them as beneficial to the university's policies and overall development. This positive shift indicates an improvement in how students perceive the university's commitment to integrating and advancing ICT within its operations and academic environment.

However, a portion of students, about 23%, remains either unaware of or uninterested in the university's ICT initiatives or holds opposing views regarding the effectiveness of these efforts. This suggests that while there is general support, there is still a segment of the student body that either lacks information or remains skeptical about the university's ICT endeavors. Comparing this with the situation in 2017, there has been an improvement in the perception of the university's commitment to ICT. In 2017, approximately 75% of students believed that the university was making significant efforts in this area, while 23% thought the efforts were present but insufficient. By 2019, this positive perception has increased, with 85% of students acknowledging the university's efforts in ICT development, and only 13% expressing doubt or disbelief in the university's commitment. This change reflects a growing recognition of the value and impact of ICT initiatives at the university and suggests progress in aligning ICT development with students' needs and expectations.

4. CONCLUSIONS

The level of ICT application stands as a crucial indicator of a country's intellectual and scientific potential. Global experience underscores that widespread adoption of ICT significantly contributes to national development. By integrating these technologies into various sectors, countries can enhance their economic growth, improve educational outcomes, and advance their scientific capabilities. ICT serves as a powerful tool in addressing and alleviating poverty. It provides new opportunities for economic participation, facilitates access to information and services, and supports innovation. Furthermore, ICT can play a pivotal role in solving complex socio-economic issues by enabling more efficient communication, fostering educational and professional development, and promoting transparency and accountability in governance. Overall, the effective implementation of ICT not only drives technological and scientific progress but also plays a vital role in improving the quality of life and reducing inequalities within the population. As such, advancing ICT infrastructure and ensuring its accessibility can have a profound and transformative impact on a country's development trajectory. The results of this study reveal that information and communication technologies (ICT) have begun to establish a presence within the university environment. A comparative analysis of the data from the two study periods indicates a notable difference in the adoption of various technologies. Specifically, mobile phone usage among students is more advanced compared to the use of computers. In the earlier study period, mobile phones were already a prevalent part of students' lives, with a significant proportion using them regularly. This trend continues to be strong, highlighting mobile phones' role as a widely accepted and integral technology in personal and academic settings. Conversely, computer usage has lagged behind. Despite its potential for academic and personal development, the penetration of computers in the university environment has been slower. Factors such as cost and accessibility have contributed to this disparity. Many students reported challenges related to the affordability of computers and limited access to home internet, which have hindered more widespread adoption. This shift emphasizes the need for targeted interventions to enhance computer and internet access within academic settings, ensuring that students can fully leverage ICT for their educational and personal growth. One of the most critical factors affecting the adoption of computers and related technologies among students is their high cost. The price remains a significant barrier, making it difficult for many students to acquire computers for personal use. This financial constraint has led to limited development and utilization of these technologies within the home environment. As a result, while mobile phones have become more accessible and widely used, the advancement in home technology infrastructure, particularly computers and internet access, has been slow. The disparity between the

adoption of mobile phones and computers highlights the need for policies and initiatives aimed at making technology more affordable and accessible to students. Addressing these economic barriers is essential for improving technology integration and enhancing educational opportunities. Despite a significant number of students using the Internet, it is not yet a widespread tool for communication and education within their daily lives. The use of Internet services remains limited, with students primarily accessing the Internet in places such as Internet cafés rather than from home. The school environment also provides minimal opportunities for Internet use, especially when compared to the broader market. The majority of students lack Internet access at home, which underscores a critical gap in their ability to fully leverage digital resources for academic and personal development. This limitation affects their engagement with online learning tools and hinders the broader integration of Internet technology into their educational experience. Thus, improving home Internet access and expanding Internet facilities within educational institutions are essential steps toward enhancing digital connectivity and communication for students. In conclusion, students recognize the significant role that information and communication technologies (ICT) will play in their future. They are keenly aware of the benefits that these technologies can offer and advocate for increased support from local and national governments. They urge for more substantial investments to accelerate the introduction and adoption of ICT. This investment is seen as crucial for improving access to technology and ensuring that students can fully benefit from the advancements in digital tools and resources.

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