ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

The Integration of ICT in Education: Youth Perceptions of Digital Teaching Quality in Angola

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Publication Date: 2026/01/01

Abstract: This article examines the integration of Information and Communication Technologies (ICT) within the Angolan educational process, focusing on young people's perceptions of the quality of digital teaching. The study was conducted in two institutions with distinct realities: Colégio Bom Pastor (a public school popularly known as *Escola do Comité*) and Complexo Escolar Huambo Calunga 2 (a private school). Using a descriptive mixed-methods approach, semi-structured questionnaires were administered to students aged 15 to 20, complemented by interviews with teachers. The results indicate that, although young people acknowledge the potential of ICT to enrich pedagogical practices, they identify significant gaps in access to technological resources, teacher training and connectivity, particularly in the public school context. In contrast, students from the private school express greater satisfaction with the quality of digital education, due to more robust infrastructure and innovative methodologies. It is concluded that the success of ICT integration in Angolan education depends on strategic investments, inclusive public policies and training programmes that can reduce technological inequalities between schools.

Keywords: *Information and Communication Technologies; Digital Education; Youth; Secondary Education; Angola.*

How to Cite: Altino Dias Sacawe; Arlindo João Catchongo Caiombe (2025) The Integration of ICT in Education: Youth Perceptions of Digital Teaching Quality in Angola. *International Journal of Innovative Science and Research Technology*, 10(12), 2045-2051. https://doi.org/10.38124/ijisrt/25dec1422

I. INTRODUCTION

In recent decades, Information and Communication Technologies (ICT) have played a decisive role in the modernization of educational systems globally, promoting new ways of teaching, learning, and interacting in the school environment (Castells, 2010). The growing digitalization of education has driven the development of innovative pedagogical methodologies that seek to respond to the cognitive demands of new generations and the demands of the knowledge society (Selwyn, 2016). In this context, young people emerge as protagonists in an educational process that aims to be increasingly inclusive, dynamic, and sustained by the critical use of ICT as tools for producing, sharing, and constructing knowledge (UNESCO, 2022).

In Angola, in particular, the debate on the effective integration of ICT in education has intensified as the country seeks to rebuild and modernize its educational infrastructure in the post-conflict period, aiming to promote quality education aligned with the Sustainable Development Goals (SDGs), especially SDG 4, which focuses on inclusive and equitable education (Governo da República de Angola, 2021). However, significant disparities persist between public and private education, both in access to technological resources and in ongoing teacher training, which directly impacts students' experience with digital learning (Tang, 2025). Therefore, it is crucial to understand how young people, as the primary users of this system, perceive the quality and effectiveness of ICT-mediated education in the country's diverse school settings.

This article analyzes the young people's perceptions of the integration of ICT into the educational process, drawing on a comparative study between two educational institutions in Huambo province: Colégio Bom Pastor, a public school also known as Escola do Comité, and Complexo Escolar Huambo Calunga 2, a private school. Considering that the quality of digital education depends on factors such as technological infrastructure, connectivity, pedagogical methodologies, and the digital skills of teachers and students, it is assumed that these dimensions may be experienced differently by students depending on the type of institution they attend (van de Werfhorst, 2022; Miah, 2024). Thus, the

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

research also aims to contribute to the scientific debate on digital transformation in Angolan education, offering empirical evidence that can support more equitable, sustainable, and targeted public education policies tailored to the real needs of young people.

The imperative need to incorporate Information and Communication Technologies (ICT) into education reflects a global trend toward transforming pedagogical practices, aiming to promote innovation, inclusion, and the development of digital skills in students (Almeida & Valente, 2020). In developing country like Angola, this integration is particularly relevant, as it relates not only to the modernization of the education system but also to reducing the social and technological inequalities that have historically characterized the public education sector (Favinha, 2012). From this perspective, ICTs are understood as strategic tools to stimulate the active participation of young people in the learning process, foster student-centered methodologies, and respond to the demands of a networked society characterized by the rapid circulation of information and the need for new cognitive skills (Castells, 2010).

Recognizing this transformative potential, the Angolan government has included ICT as a priority pillar of its education policies. The National Education Sector Development Plan 2018-2022 and the Integrated Education Development Program advocate for the progressive distribution of computer equipment in schools, the expansion of internet connectivity, and the ongoing training of teachers in the pedagogical use of technologies (Governo da República de Angola, 2021). However, despite strategic guidelines at the government level, the implementation process proves uneven across provinces and, especially, between the public and private subsystems, as many public schools face infrastructure deficiencies, problems with access to electricity, and a lack of computer labs (Digital Equity and Inclusion in Education, 2023).

This disparity compromises the delivery of quality digital education, creating contexts in which young people have very different experiences with ICT during their schooling. While private institutions are already seeing frequent use of digital learning platforms, multimedia classes, and educational projects based on gamification and online research, public schools still rely on traditional methodologies that are poorly integrated with available technologies (Akram, Ahmad, & Cheema, 2025). This dichotomy gives rise to new forms of exclusion in schools, which involve not only physical access to devices but also the digital skills, teacher training, and pedagogical support necessary for ICT to effectively contribute to improving young people's academic outcomes (Fernandes & Mendonça, 2022).

Therefore, it is essential to analyze how young people, as central actors in the educational process, perceive the integration of ICT into teaching, especially in the Angolan context, where public policies seek to consolidate a system aligned with the Sustainable Development Goals (SDGs), specifically SDG 4, which aims for quality, inclusive, and equitable education. By understanding the perceptions of students from different backgrounds, such as those attending Colégio Bom Pastor (Escola do Comité), in the public sector, and those attending Complexo Escolar Huambo Calunga 2, in the private sector, it will be possible to generate empirical evidence that contributes to improving ICT implementation strategies in schools, reinforcing the Angolan State's commitment to a more equitable, modern, and accessible digital education for all.

Young folks, as the primary users of school environments, perceive the influence of ICT on learning differently, depending on the available infrastructure, teacher training, and methodologies adopted. In public schools, challenges such as a shortage of equipment, low connectivity, and the absence of digital platforms predominate, weakening digital learning (Akram, Ahmad, & Cheema, 2025). In some private institutions, however, greater pedagogical innovation is observed, with more effective use of educational technologies, creating more interactive learning experiences. Faced with this dichotomy, the question arises:

How do young people perceive the quality of digital education in different Angolan school settings?

II. LITERATURE REVIEW

➢ *ICT in Contemporary Education*

Educational technology is defined as the integration of ICT into teaching, not as an end in itself, but as a means to facilitate learning processes through appropriate techniques and resources (Polegatch, 2013; in Educational Technology, 2024). This approach implies that education professionals must be able to use technology as a cross-cutting component of pedagogy, going beyond the simple automation of traditional tasks (Moran & Masetto, 2006; in Educational Technology, 2024). According to Miala (2022), in Angola, teachers need to develop solid training, both technical and methodological, so that ICT can truly transform pedagogical practices. In this sense, frameworks such as TPACK reinforce that effective teacher preparation requires integrated knowledge of content, pedagogy, and technology (Koehler & Mishra, 2006).

➢ *Digital Education in Africa/Angolan Context*

In the African context, the trajectory of ICT incorporation in schools began with programs based on educational radio and television, followed by the distribution of computers and the promotion of mobile learning—although limited connectivity and infrastructure still hinder full digital adoption (Filho et al., 2021). In Angola, research conducted by Victor (2015) indicates that despite the availability of computers, internet access, and interactive whiteboards in certain schools, these tools were inadequate in fostering meaningful changes in teaching methods, as the conventional teacher-centered approach persisted (Gil, 2008).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

➢ *Youths' Perceptions of Digital Education*

In the Angolan school context, students' perceptions of digital learning are shaped by multiple factors, such as the availability of technological resources, internet accessibility, the relevance of the tools used, and, above all, how teachers integrate these resources into their teaching practices. Victor (2015) emphasizes that, even in institutions with computers, interactive whiteboards, and occasional internet access, the lack of regular and methodologically guided use of these resources prevents them from translating into significant learning gains. In many cases, the use of ICT remains limited to occasional or administrative tasks, with no direct impact on the development of digital skills or improved understanding of the content.

When young people interact with the digital environment outside of school through social media, educational videos, and mobile applications, they develop expectations for more interactive, visual, and collaborative learning. However, when these expectations are not met in the school environment, feelings of frustration and demotivation arise, leading many to perceive digital learning as ineffective or distant from their daily reality (Fernandes & Mendonça, 2022). This discrepancy between digital experiences outside of school and the reality of school reveals a gap between educational policy and its practical implementation.

The situation became even more evident during the COVID-19 pandemic, when the adoption of emergency remote learning methodologies exposed the technological and logistical limitations of Angolan schools and homes. Filho et al. (2021) point out that, for many students, free access to Facebook Zero or WhatsApp messaging constituted the primary, and sometimes only, means of communication with teachers and peers. Although these tools partially mitigated the interruption of school activities, they did not replace structured educational platforms, nor did they guarantee quality pedagogical support.

Furthermore, young people's perceptions are strongly associated with the type of school they attend. In private institutions, where there is greater availability of equipment, more stable connectivity, and innovative methodologies, perceptions tend to be more positive, reflecting an environment closer to the concept of "digital education" advocated by global policies. On the other hand, in public schools, infrastructural limitations and the lack of ongoing training for teachers compromise the experience, reinforcing existing educational inequalities (Bunga, 2020). Therefore, understanding these perceptions becomes essential to identify barriers and guide public policies that seek more equitable and effective integration of ICT in Angolan education.

➢ *Other Relevant Previous Studies (The State of the Art)*

A study conducted by Victor (2015) concludes that the impact of ICT in various institutions of Angola, including teacher training schools in Luanda and Lubango was not effective because the available technological resources such as computers, internet, and interactive boards did not turn into meaningful change in the educational process, as there was no adaptation of pedagogical practices to the digital paradigm.

Likewise, Julião (2020), in his study "the challenges faced by Angolan teachers on the use of technology education during the pandemic COVID19" published by *Revista Angolana de Ciências*, highlights that it necessary to train teachers first on the use of ICT before its implementation in teaching process.

Finally, Ferreira (2022) asserts that studies in the Angolan higher education demonstrate that digital transformation requires not only infrastructure, but also institutional and pedagogic changes. Moreover, the author adds that investing in teacher training and curricular integration of ICT is crucial to reach sustainable outcomes.

III. METHODOLOGY

This article is a qualitative, exploratory, and descriptive study, seeking to understand young people's perceptions of the use of Information and Communication Technologies (ICT) in the teaching-learning process, considering their experiences, interpretations, and meanings attributed to digital educational practices. According to Gil (2017), exploratory studies are appropriate when the aim is to gain greater familiarity with a little-studied phenomenon, which is consistent with the objective of this work. A descriptive approach, on the other hand, allows for in-depth reporting of the characteristics of a given social or educational group, without manipulating variables (Minayo, 2022).

The choice of the qualitative approach is based on the premise that the phenomenon investigated the perception of young people about digital education, requires a subjective, interpretative and contextualized analysis, and cannot be adequately captured through purely statistical techniques (Creswell, 2014).

The target population of this study was constituted of forty-eight 9th grade primary secondary school students, aged between 15 and 17, enrolled in two different educational institutions in the province of Huambo, Angola: the Complexo Escolar Huambo Calunga 2 (private institution) and the Escola do Comité, also known as Colégio Bom Pastor (public institution).

The sample was defined by convenience, with two specific classes selected: Class A of the 9th grade at the Complexo Escolar Huambo Calunga 2 and Class 9.7 of Escola do Comité. This selection aims to enable a comparison between distinct educational realities regarding technological infrastructure and digital pedagogical practices, based on the contrast between the public and private sectors.

The participants' age range, between 15 and 17, represents a group with increasing familiarity with digital technologies and a critical capacity to evaluate the pedagogical strategies used.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

Data collection was conducted through semi-structured questionnaires and individual in-person interviews, aiming to capture both quantifiable information and subjective accounts that would allow for a deeper understanding of the young people's perceptions.

The questionnaires contained both closed- and open-ended questions, allowing students to express their opinions on the use of ICT in school, the digital resources available, teacher training, and their own familiarity with technological tools. The interviews were administered to a subgroup of volunteer participants and followed a previously developed script, with open-ended questions that explored the students' digital experience, their expectations, and criticisms of the teaching model in place.

Google Forms was used to administer the questionnaires because it is accessible, free, intuitive, and mobile-friendly, making it easy for students to complete. Quantitative data extracted from Google Forms were processed using SPSS (Statistical Package for the Social Sciences), version 25, which generated descriptive tables and graphs showing the distribution of responses.

The interviews were transcribed and analyzed using NVivo software, which enables the coding of emerging themes and categories based on content analysis, following the procedures suggested by (Bardin, 2016). This methodological combination enabled a cross-referencing of objective data with subjective perceptions, enriching the final analysis.

Quantitative data from the closed-ended questionnaire questions were subjected to descriptive statistical analysis, including absolute and relative frequencies, using SPSS. This analysis allowed us to identify trends in student responses regarding frequency of ICT use, preferred platforms, and degree of satisfaction with the available digital tools.

Qualitative data from interviews and open-ended questionnaire questions were analyzed using thematic content analysis, as described by Bardin (2016), using NVivo to organize, categorize, and interpret the textual information. The main categories that emerged were: access to ICT, effectiveness of digital teaching, role of the teacher, challenges, and suggestions for improvement.

Despite the methodological care adopted, this study has some limitations. First, the sample was restricted to two specific classes, which limits the generalizability of the results to other school settings in Huambo province or Angola as a whole. Second, the disparity in conditions between the schools analyzed may introduce perceptual biases that reflect structural conditions more than pedagogical effectiveness per se. Furthermore, some students demonstrated limitations in oral and written expression during the interviews, which may have affected the depth of some responses. Finally, the reliance on technological resources such as Google Forms and NVivo presupposes some technical familiarity on the part of the researchers, as well as stable connectivity, which can pose a challenge in contexts with precarious infrastructure.

IV. RESULTS

Forty-eight students participated in this study: 24 from Class A of Complexo Escolar Huambo Calunga 2 and 24 from Class 9.7 of Escola do Comité. The sample was gender-balanced (52% female and 48% male), and the ages ranged from 15 to 17.

Below is a summary of the data obtained through questionnaires administered via Google Forms and interviews analyzed in NVivo.

Table 1 – Frequency of Use of Digital Resources for School Purposes

Frequency	Complexo Escolar Huambo Calunga 2	Colégio Bom Pastor
Daily	62,5%	20,8%
Weekly	29,2%	37,5%
Rarely	8,3%	41,7%

The higher frequency of daily use at Complexo Escolar Huambo Calunga 2 highlights better infrastructure and pedagogical integration of ICT, while at Colégio Bom Pastor, students experience more obvious access difficulties due to the lack of an equipped computer room.

Table 2 – Digital Platforms Most Used by Students

Platform	General %
WhatsApp	70,8%
YouTube	62,5%
Google Classroom	43,7%
Moodle	12,5%
Facebook and others	27,1%

Note: The choice of WhatsApp and YouTube as the main channels for learning highlights the adapted use of informal platforms to the detriment of institutional virtual environments, especially at Escola do Comité.

Table 3 – Emerging Categories from Qualitative Analysis (NVivo)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

Category	Citation Frequency	Example of Students' Speeches
Access difficulty	High	At our school we don't have internet to research.
Interest in digital classes	Average	Video classes help us to understand better.
Lack of teacher training	Average	Many teachers also don't have computers, as for ICT, they only talk.
Improvement proposals	Average	If there was internet and computers, it would be better.

V. DISCUSSION OF THE RESULTS

The data highlight significant disparities between private and public education in terms of the integration of Information and Communication Technologies (ICT) into the educational context. At Complexo Escolar Huambo Calunga 2, students demonstrate high familiarity and frequent use of digital tools, facilitated by the inclusion of Basic Computing in the curriculum. In contrast, at Escola do Comité, the absence of this subject, the lack of a classroom equipped with computers, and limited teacher training in the pedagogical use of ICT represent significant structural obstacles to the adoption of digital educational practices.

This reality echoes the findings of Hennessy, Harrison et al (2010) in their analysis of ICT integration in schools in Sub-Saharan Africa. The authors highlight that, despite teachers' enthusiasm, the lack of appropriate training, both in pre-service and in-service training, remains one of the main barriers to the effective use of technologies in the classroom, resulting in low proficiency and insufficient knowledge about these pedagogical tools.

The strong presence of informal platforms such as WhatsApp and YouTube reinforces a phenomenon observed by Costa et al. (2021), according to which African students, faced with structural limitations, adapt to using accessible means to continue learning, even outside institutional settings. The authors also point out that digital learning in African contexts tends to be structured around social media, due to their accessibility and familiarity.

The interviews highlighted two major challenges: digital exclusion and inadequate teacher training in digital tools. This is consistent with Mbodila & Muhandji (2020), who emphasize the urgent need for continuing education programs for teachers in African contexts to ensure meaningful and sustainable digital inclusion.

It was found that students demonstrate significant interest in using digital resources in the learning process; however, they identified the lack of internet access, the lack of electronic devices, and the limited availability of digital educational content as concrete obstacles to educational development.

The results obtained in this study resonate with various African and Portuguese-speaking studies. According to Lopes et al. (2022), in Portuguese-speaking African countries such as Angola and Mozambique, the digitalization of education faces persistent structural obstacles, such as a lack of robust public policies, limited infrastructure, and unequal access to technology.

In the specific case of Angola, a study by Fernandes (2021) on the impact of ICT on secondary education revealed that, despite increasing digitalization in urban areas, the lack of technological equipment and connectivity limits the effective implementation of digital education in public schools. This reinforces the data obtained at Escola do Comité, where students report a complete lack of devices and connectivity.

On the other hand, the intensive use of digital resources at Complexo Escolar Huambo Calunga 2 aligns with what Oliveira et al. (2023) observed in Angolan private schools, where ICT is more integrated into the curriculum, thanks to financial autonomy and greater access to training and equipment.

This chapter demonstrated that, although students value and recognize the educational potential of ICT, structural, training, and social gaps persist that impede the full and equitable adoption of digital education. The private school, Complexo Escolar Huambo Calunga 2, has more favorable conditions, while the public one, Escola do Comité, face significant challenges.

The analysis reinforces the need for public policies focused on digital inclusion, ongoing teacher training, and investment in technological infrastructure to guarantee the right to quality education in digital environments for all young Angolans.

VI. CONCLUSION

This study identified significant disparities in the adoption of Information and Communication Technologies (ICT) between public and private schools in Angola. At the Complexo Escolar Huambo Calunga 2, the inclusion of the Computer Science course and continuous access to digital resources foster students' high familiarity with technological environments. In contrast, at Escola do Comité, the lack of IT infrastructure, the internet access, and the limited teacher training, represent concrete obstacles to the introduction of digital educational practices, corroborating evidence from Bunga (2020), who highlighted the presence of structural asymmetries and difficulties in the systematic implementation of ICT policies in Angolan public schools.

The results reinforce the need to strengthen public policies external to digital equity in the education system. Above all, it is imperative that the current government equip public schools with computer laboratories, promote stable internet access, and guarantee ongoing teacher training actions highlighted by Júnior (2013) as central components of policies aimed at fostering the Information Society in Angola. Furthermore, international initiatives such as One

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25dec1422

Laptop per Child, which seek to expand access to computers in vulnerable contexts, indicate promising pathways; however, research shows that their impact depends on sustained investment in teacher training, technical support, and equipment maintenance to ensure long-term educational benefits (Trucano, 2010; Warschauer & Ames, 2010).

As for the nature of the research investigation, this article recommends the following crucial features:

- Implement functional computer labs in public schools and ensure adequate connectivity. This will provide effective support for the pedagogical integration of ICT.
- Make the subject of Computer Science mandatory and transversal from primary education, strengthening digital literacy from an early age.
- Invest in regular training programs for teachers, so that they master effective digital methodologies, something highlighted by Bunga (2020) as being fragile in Angolan public schools.
- Develop and make available digital resources aligned with the Angolan curriculum, valuing regional and sociocultural specificities.

In order to continue and develop the current study, we suggest the future researchers to:

- Extend the study to other provinces of Angola to assess whether the observed patterns are consistent in different contexts.
- Conduct longitudinal studies to monitor the evolution of students' perceptions over time and measure the impact of structural interventions.
- Integrate quantitative data (such as academic performance) with in-depth qualitative narratives, involving young people, teachers, and administrators, to build a more comprehensive understanding of digital transformation in education.

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