Texila International Journal of Management
ISSN: 2520-310X
DOI: 10.21522/TIJMG.2015.11.02.Art014

Adoption and Utilization of ICT for Decision-Making in Guyana's Education System: An Assessment of Administrators' Practices

Fazal Ali[1*], S. P. Sreekala[2]
[1]*College of Business Management, Texila American University, Lot 2442, Plantation Providence, East Bank Demerara (EBD), Guyana, South America*
[2]*KPR College of Arts Science and Research, Coimbatore, Tamil Nadu, India*

Abstract

This study assesses the adoption and utilization of Information and Communication Technology (ICT) for decision-making among administrators in Guyana's education system. Through a comprehensive survey, the study investigates the extent of the adoption and utilization of ICT tools among educational administrators in Guyana for decision-making processes. The research seeks to identify the specific ICT tools employed, the frequency of their use, and their perceived impact on the efficiency and effectiveness of decision-making. The findings highlight the critical factors influencing ICT adoption and utilization, providing insights into the challenges and opportunities associated with integrating technology into educational administration. Recommendations are offered to enhance ICT infrastructure, training, and policy frameworks to foster a more digitally empowered educational environment in Guyana, ultimately improving the quality and effectiveness of education administration and decision-making.

Keywords: *Digital Divide, Educational Administration, Evidence-Based Decision-Making, ICT Integration.*

Introduction

ICTs have become indispensable tools for enhancing educational quality and expanding its reach, particularly in developing nations [9]. The integration of ICT in education holds the potential to revolutionize pedagogical methodologies, streamline administrative processes, and equip students with crucial digital competencies, thereby fostering a more dynamic and effective learning environment [16, 18]. The successful integration of ICT in education transcends mere technological availability, hinging significantly on the proficiency and disposition of educators and administrators who steer its implementation and management [20]. Administrators play a pivotal role in championing the integration of education and technology within educational institutions, cultivating an environment conducive to its widespread adoption among teachers and students alike [19]. Their leadership in this domain is critical for ensuring that ICT resources are deployed effectively to achieve educational objectives, bridging the digital divide, and preparing students for the demands of the 21st-century workforce. It is imperative to evaluate the current state of ICT adoption and utilization within Guyana's education system, with a particular focus on the practices of administrators in leveraging these technologies for decision-making processes.

Literature Review

ICT in Education: Enhancing Teaching, Learning and Administration

A growing body of research shows that ICTs have the capacity to transform multiple dimensions of education, enhancing

Received: 02.05.2025 ***Accepted: 12.05.2025*** ***Published on: 29.08.2025***
****Corresponding Author: fazal.fali@gmail.com***

instructional methods, streamlining administrative processes, and improving student learning outcomes [14, 11]. Studies have shown that technological integration can lead to increased student engagement, improved learning outcomes, personalized instruction, fostering a more dynamic and interactive learning environment [2]. ICTs are powerful tools for delivering customized learning experiences that cater to individual student needs and learning styles [21].

A teacher's disposition toward technology, including their perceived self-efficacy and beliefs about its value, significantly shapes their willingness to experiment with and effectively integrate ICT tools into their instructional design and classroom activities [4]. Moreover, ICT tools can be utilized to promote inclusive education and facilitate differentiated instruction in diverse classrooms [3].

Systematic reviews of the literature emphasize the critical importance of professional development in supporting effective ICT integration [13]. Such programs should go beyond basic technical training to include curriculum integration, pedagogical innovation, and assessment techniques that maximize the capabilities of ICTs [10]. The creation of multimedia content, interactive simulations, and adaptive assessments can help cater to different learning preferences and optimize the learning experience [12].

In addition to pedagogical applications, the implementation of ICTs has yielded measurable improvements in administrative efficiency. Automation of routine tasks, enhanced communication channels, and the use of data for informed decision-making are key areas where ICTs support strategic educational management. However, successful ICT integration extends beyond access to technology—it requires a comprehensive approach that addresses infrastructure, capacity building, and cultural factors [24]. As emphasized by Kibor and Tumuti [15], the integration of technology into education is both inevitable and essential. Supporting this view, Titus [26] affirms that ICTs significantly aid in maximizing administrative efficiency.

Moreover, education itself plays a critical role in enabling technological advances [5]. Despite promising developments, persistent challenges remain in addressing the digital divide and ensuring equitable access, especially in underserved regions. These challenges are intertwined with broader economic, social, and psychological factors that must be considered in the development of ICT strategies [1].

ICT and Decision Making in Education

Beyond classroom instruction, the integration of ICT has significantly impacted administrative decision-making. ICT tools provide access to real-time data, enhance communication capabilities, and offer advanced analytical functions that support evidence-based decisions [23]. Management Information Systems (MIS), which once served merely as data storage solutions, have evolved to support high-level analysis across various administrative functions [22].

Through data visualization tools, administrators can identify patterns and trends that inform program evaluation, resource allocation, and strategic planning. ICTs also enhance communication among stakeholders, allowing school leaders to engage with teachers, parents, students, and the wider community in a more participatory decision-making process [26, 6]. In leveraging these technologies, educational leaders can cultivate environments that prioritize transparency, accountability, and continuous improvement.

The Central Role of Administrators in ICT Integration

Administrators play a central role in the successful adoption and integration of ICT within schools. They are not merely implementers of technology policy but act as change agents who influence institutional culture, vision, and strategic direction. Their

leadership is critical in aligning technology initiatives with broader educational goals and in ensuring that ICT supports teaching, learning, and management functions effectively.

Formulating a clear and inclusive ICT vision, conducting needs assessments, engaging stakeholders, and setting evaluation metrics are among the key responsibilities administrators undertake. They are also instrumental in fostering a culture that encourages innovation and supports continuous learning. Administrators help design and deliver professional development programs that go beyond technical skills to focus on pedagogical integration and student-centered approaches to technology use [8, 7]. These programs empower educators to effectively use ICT for fostering creativity, collaboration, and critical thinking in the classroom.

Barriers to ICT Adoption in Education

Despite the recognized potential of ICT, several persistent barriers hinder its widespread and effective use in educational contexts. Among the most significant are infrastructural limitations—such as inadequate access to reliable internet connectivity, hardware, and software—particularly in remote and underserved areas [4]. These issues require targeted investment to ensure equitable access to ICT tools across all regions and school types.

Curriculum integration of ICT also poses challenges. Educators often struggle to meaningfully align technology with pedagogical goals and learning outcomes, risking superficial or ineffective use of digital tools [17]. For ICT to be transformative, integration must be thoughtfully planned and contextually relevant. Equally important is the provision of comprehensive, ongoing professional development that prepares teachers to design, implement, and assess learning activities in technology-rich environments [23].

The attitudes and beliefs of educators and administrators significantly affect ICT adoption. Resistance to change, lack of confidence, or limited exposure to successful ICT applications can impede integration efforts. Overcoming these attitudinal barriers requires building a school culture that values experimentation, encourages collaboration, and recognizes the transformative potential of technology [21].

Materials and Methodology

This study adopted a mixed-methods research design to comprehensively investigate the adoption and utilization of Information and Communication Technology (ICT) for decision-making within Guyana's education system. By combining both quantitative and qualitative approaches, the research aimed to capture not only measurable trends and patterns but also the contextual experiences and perceptions of educational administrators.

Quantitative Phase

The quantitative component involved the administration of structured surveys to a representative sample of school administrators across Guyana's diverse regions and educational levels, including primary, secondary, and technical and vocational education and training (TVET) institutions. Administrators from the central Ministry of Education were also included, given their pivotal roles in policy development and system-wide implementation. A stratified random sampling technique was employed to ensure proportional representation across regions, school types, and levels of administration. The survey instrument was designed to assess the levels of ICT adoption and utilization, as well as identify common tools, frequency of use, and perceived impacts on administrative and instructional decision-making.

Qualitative Phase

To complement the survey findings, the study incorporated a qualitative phase consisting of semi-structured interviews with a selected group of administrators. These

interviews aimed to provide deeper insights into participants' lived experiences, challenges, and perceptions regarding the use of ICT in decision-making. The qualitative data enriched the quantitative results by uncovering contextual nuances, such as barriers related to infrastructure, digital literacy, and support systems. This triangulation of data enhanced the study's validity and reliability, offering a more holistic understanding of ICT integration in education management.

Data Analysis and Ethical Considerations

Quantitative data were analyzed using descriptive and inferential statistics to identify patterns and correlations across respondent groups. For the qualitative data, a thematic analysis approach was applied to open-ended responses and interview transcripts, allowing for the identification of recurring themes and key narratives related to ICT use in educational decision-making.

The study was conducted in strict accordance with established ethical guidelines. Participation was voluntary, and all respondents provided informed consent. Measures were taken to ensure confidentiality and anonymity, safeguarding the identities and privacy of all participants throughout the research process.

Results

Demographic Characteristics of Respondents

The findings of this study provided significant insights into the demographic composition of education administrators within Guyana's education system. indicated varied levels of ICT integration among administrators in Guyana's educational system. The demographic data provided critical context for interpreting ICT adoption and utilization patterns. Most of the respondents identified as female (77.3%), while 22.7% were male. The most represented age group was 45–55 years (64.4%), followed by 36–45 years (26.4%).

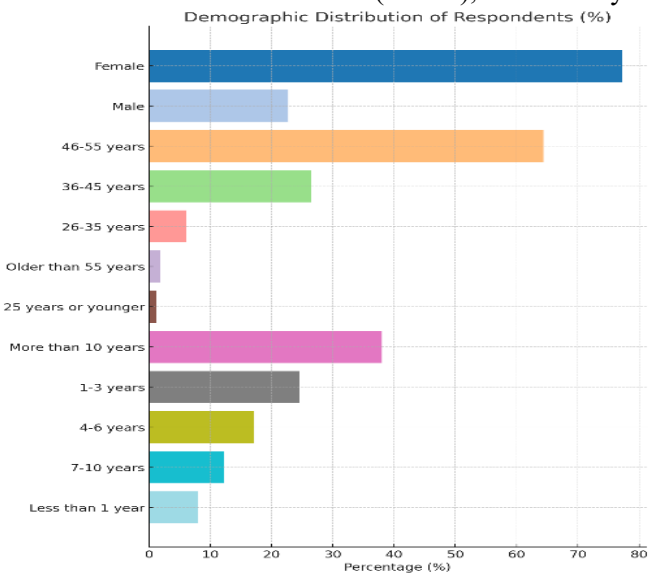

Figure 1. Distribution of Respondents According to Gender, Age and Length of Service

Figure 1 reveals that the respondent pool is dominated by mid-career female administrators. Women constitute 77.3% of the sample, whereas men represent only 22.7%. Age-wise, the majority of participants (64.4%) are between 46 and 55 years old, with an additional 26.4% aged 36–45; the remaining respondents are distributed across younger and older brackets (6.1% aged 26–35, 1.8% over 55, and 1.2% aged 25 or below). A similar pattern emerges in tenure: 38.0% have held their current position for more than ten years, 24.5% for one to three years, 17.2% for four to six years, and 12.3% for seven to ten years, leaving

just 8.0% with under one year of service. Collectively, these figures portray a highly experienced leadership group, predominantly female, most of whom are in their late forties to early fifties and boast substantial institutional longevity.

In terms of professional roles, over half (52%) of the participants were headteachers of primary schools. This was followed by headteachers of secondary schools (15.3%) and senior education officers (8%).

Geographical representation across Guyana's regions was diverse. Georgetown accounted for the highest proportion of respondents (17.2%), followed by Region 5 (15.3%) and Region 9 (11.7%). Regions 6, 1, 3, and 10 had moderate participation (8.0%–10.4%), while Regions 4 and 7 each accounted for 7.4%. Region 2 had 5.5% representation, and Region 8 had the lowest (0.6%).

These demographics reflect a diverse and regionally representative sample, reinforcing the credibility and generalizability of the findings.

ICT Proficiency and Frequency of Use

The study found varied levels of ICT proficiency among education administrators. Over half (54.0%) rated their proficiency as average, while 28.2% considered themselves above average. A small percentage rated their proficiency as excellent (8.6%), while others rated it as below average (8.0%) or very poor (1.2%).

Distribution of Respondents' Proficiency with ICT Tools

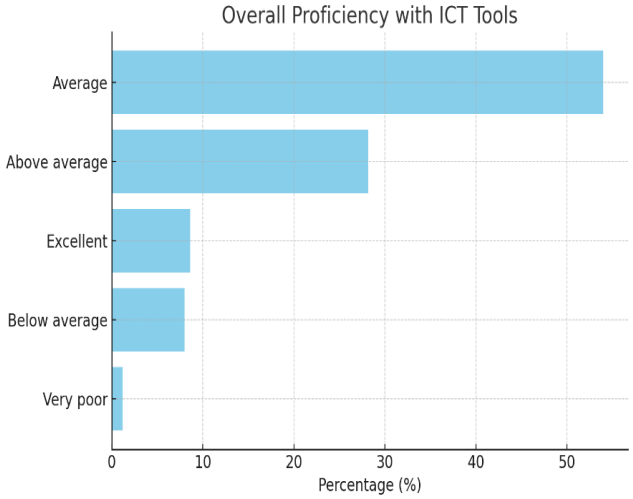

Figure 2. Distribution of Respondents' Proficiency with ICT Tools

Figure 2 displays the distribution of ICT-tool proficiency among respondents revealing that a clear majority rate themselves at or above competency. Just over half (54.0%) describe their skills as "Average," indicating functional but improvable familiarity. Another significant share (28.2%) consider their abilities "Above average," suggesting strong confidence in using digital tools. Smaller proportions report "Excellent" proficiency (8.6%) or fall "Below average" (8.0%), revealing a modest gap between high and low-skill users. Only a very small minority (1.2%) characterize their ICT skills as "very poor." Overall, while most administrators feel capable with essential technologies, there remains room to elevate a combined 16.6% of users who are below the "Above average" threshold.

For some technologies, daily usage of ICT tools was high: 96.3% of respondents reported using smartphones daily, 74.2% used laptops, and 20.2% used tablets. These tools were most commonly employed for administrative tasks such as communication, data management, and information retrieval.

ICT Utilization for Administrative and Instructional Tasks

ICT usage was strongly associated with communication practices. A significant majority (67.5%) reported always using ICT to communicate, and 29.4% said they often do so. Only a small portion used ICT for communication sometimes (0.6%), rarely (0.6%), or never (1.8%).

Regarding the use of ICT to prepare teaching and learning materials, 45.4% of administrators did so often, and 21.5% always. However, 24.5% used ICT sometimes for this purpose, while smaller groups used it rarely (5.5%) or never (3.1%).

For student performance analysis, 43.6% of respondents used ICT often, and 20.2% always. Meanwhile, 26.4% used it sometimes, 6.1% rarely, and 3.7% never. These findings suggest that while ICT is widely adopted for routine communication, its use for more analytical or pedagogical functions varies considerably.

Perceptions of Policy and Institutional Support

A large portion of respondents perceived that government policies and initiatives have positively influenced ICT adoption. Specifically, 47.9% rated the impact of policies as high, and 45.4% rated it as moderate. Only 6.7% viewed the policy impact as low. This reflects general support for governmental efforts but indicates room for policy enhancement and localized implementation.

In terms of infrastructure and resource availability, 47.9% saw a moderate impact, 27% a high impact, and 24.5% a low impact. A minimal fraction (0.6%) felt there was no impact. This highlights persistent disparities in access to infrastructure, especially between urban and rural areas.

Training and Technical Support

Respondents emphasized the importance of training in promoting ICT adoption. Nearly half (48.5%) viewed the training's impact as moderate, while 31.3% rated it as high. About 19.0% perceived low impact, and only 1.2% reported no impact.

When asked about the effectiveness of enhanced training programs, 64.4% described them as extremely effective, and 30.7% rated them as very effective. Only 4.9% viewed training as moderately effective. This overwhelming support (95.1%) for training initiatives underscores the central role of professional development in improving ICT use. Provision of technical support was also seen as crucial. A significant majority rated its impact positively, reinforcing its role in sustaining ICT integration across institutions.

Financial Constraints and Resource Challenges

The data indicate that financial constraints remain a significant barrier. A combined 81.6% of respondents cited moderate or high financial impact on ICT adoption. This aligns with broader findings from developing countries, where costs related to hardware, software, internet access, and maintenance hinder progress (25; 28; 26). Still, 8.6% rated the financial impact as low, suggesting that while cost is a major factor, it is not the only one limiting ICT adoption.

Influence of Attitudes and Perceptions

Respondents also acknowledged the role of attitudes and perceptions in influencing ICT adoption. A majority (57.1%) cited a moderate impact, while 32.5% perceived a high impact. Only 10.4% reported a low impact. These findings highlight the importance of cultivating a positive mindset and culture toward technology use within the education system.

Insights from Qualitative Data

The qualitative phase of the study provided richer insights into the lived experiences of administrators. Participants consistently praised ICT for its ability to streamline tasks, enhance communication, and support evidence-based decision-making. Several administrators

noted improvements in tracking student performance and allocating resources efficiently through the use of data analytics tools.

However, significant barriers were also identified. Many participants cited insufficient infrastructure, particularly in remote areas, as a key challenge. Others expressed concern over limited digital literacy among teachers and staff, which hampers the effective use of ICT in decision-making processes. These themes underscore the need for context-sensitive interventions and ongoing support to bridge the digital divide across Guyana's educational landscape.

Summary of Findings

The findings of this study highlight a generally positive trend in the adoption and utilization of Information and Communication Technology (ICT) among education administrators in Guyana. Most respondents reported frequent use of smartphones and laptops for administrative tasks such as communication and data management. However, while ICT is commonly used for routine functions, its application in more analytical or instructional areas, such as preparing educational materials and analyzing student performance, was less consistent. Self-assessed ICT proficiency among administrators was mostly average, with fewer respondents reporting high or low skill levels, pointing to a moderate but improvable capacity for ICT-driven decision-making.

Institutional support and policy initiatives were perceived as influential in encouraging ICT adoption. A large majority of participants acknowledged the positive impact of government policies and training programs. Infrastructure and resource availability were also recognized as essential factors, though disparities were evident, especially in rural and remote regions. Respondents emphasized the importance of ongoing technical support and professional development, with training programs viewed as highly effective in building ICT competence. Nevertheless, financial constraints emerged as a significant barrier, limiting schools' abilities to acquire and maintain necessary ICT tools and services.

Qualitative findings provided deeper insight into administrators' lived experiences. Many participants highlighted the benefits of ICT in enhancing communication, collaboration, and evidence-based decision-making. However, they also identified persistent challenges, including insufficient infrastructure, limited digital literacy among educators, and uneven access to training and resources. Attitudinal factors were also influential, with perceptions of technology playing a role in the extent to which ICT tools were embraced. These findings suggest that while significant progress has been made, targeted efforts are still required to ensure more equitable, effective, and sustainable ICT integration across Guyana's education system.

Discussion

Overview of ICT Adoption Trends

The study revealed that ICT adoption among education administrators in Guyana is both widespread and varied in application. The majority of respondents reported daily use of smartphones (96.3%) and laptops (74.2%), reflecting the integration of mobile and computing technologies into routine administrative tasks. These tools are predominantly used for communication, data management, and accessing digital resources. However, utilization for more advanced tasks such as analyzing student performance and preparing teaching materials showed notable inconsistency. For example, while 67.5% of respondents always use ICT to communicate with others, only 20.2% consistently use it for performance analysis. This suggests that although ICT tools are accessible, their potential for informed decision-making remains underutilized.

ICT Proficiency Among Administrators

The self-reported proficiency levels indicate a significant area for development. Over half of the administrators rated their ICT skills as average (54.0%), with only 8.6% claiming excellent proficiency. The limited number of highly proficient users may affect the quality of data interpretation and the ability to engage in more sophisticated ICT-supported decision-making processes. The findings point to a pressing need for tailored professional development programs that target skill-building in data analysis, educational planning software, and evidence-based reporting.

Impact of Government Policies and Initiatives

Respondents generally held favorable views regarding the role of government policies in promoting ICT adoption. With 47.9% rating the impact as high and 45.4% as moderate, there is strong evidence that policy efforts are recognized and appreciated. However, the 6.7% who reported a low impact suggest there are areas for improvement in policy communication, implementation fidelity, and resource delivery. These results emphasize the importance of ensuring that policies are not only well-designed but also effectively operationalized across all regions and education levels.

Infrastructure and Resource Availability

The perceived impact of infrastructure and resources on ICT adoption varied. While 47.9% saw a moderate impact and 27% reported a high impact, nearly a quarter of respondents (24.5%) rated the impact as low. These differences may reflect the geographical and infrastructural disparities across Guyana, especially between urban and rural or hinterland areas. The qualitative data supported this, with administrators from remote regions reporting limited internet access and insufficient devices. This underlines the importance of targeted infrastructural investments to ensure equitable access to technology.

Role of Training and Technical Support

Training and ongoing support were consistently recognized as critical factors in effective ICT integration. A majority of respondents (95.1%) rated training programs as extremely or very effective in supporting ICT adoption. Similarly, technical support was identified as having a positive influence. These findings align with prior research (3), which emphasizes the link between professional development and ICT competency. The study suggests that expanding access to high-quality, contextually relevant training, particularly in data-driven decision-making, could significantly boost ICT utilization among administrators.

Financial Constraints and Funding Gaps

Financial limitations emerged as a significant barrier to ICT integration. With 81.6% of respondents identifying moderate to high financial impact, the cost of acquiring and maintaining ICT infrastructure, along with software and internet services, continues to impede full-scale adoption. These findings resonate with challenges observed in other developing contexts, where budget constraints often slow the pace of technological advancement in education (25; 28; 26). Addressing this issue may require both increased government funding and public-private partnerships.

Attitudes and Perceptions Toward ICT

Attitudes and perceptions were shown to play a significant role in ICT adoption. While 57.1% rated their impact as moderate, 32.5% considered them highly influential. These results suggest that, beyond resources and skills, cultural and psychological readiness to embrace digital transformation is critical. Therefore, strategies aimed at changing mindsets, through awareness campaigns, success stories, and leadership engagement

may be essential to increase buy-in and promote a more technology-positive culture across the education system.

Insights from the Qualitative Phase

The qualitative interviews added depth and nuance to the quantitative data. Administrators emphasized the value of ICT tools in streamlining communication, tracking student performance, and supporting evidence-based interventions. However, they also expressed concerns about digital literacy gaps, infrastructure limitations, and the need for consistent support. These narratives reveal that while ICT is perceived as a transformative tool, its full potential is yet to be realized due to systemic constraints and uneven support structures.

Demographic Considerations and Context

The demographic profile of the respondents, dominated by headteachers of primary schools and female administrators aged 45–55, highlights the particular groups most engaged with ICT adoption. Regional participation rates varied, with Georgetown and Regions 5 and 9 most represented. These factors are important for contextualizing the findings and should inform the design and targeting of ICT training and policy interventions.

Conclusion

The findings of this study highlight the transformative potential of ICT in enhancing decision-making within Guyana's education system. Both the survey and interview data demonstrate that while ICT is already playing a vital role, particularly in communication and administrative tasks, its full potential remains untapped due to persistent challenges. These include limited infrastructure, uneven digital literacy, financial constraints, and varying attitudes toward technology adoption. Addressing these barriers is essential for creating a more data-driven, responsive, and effective education system. With strategic investments and sustained policy efforts, ICT can serve as a powerful tool to improve the efficiency, transparency, and quality of educational planning and administration across the country.

To realise this vision, the study recommends a multi-faceted approach. This includes investing in targeted training programs that equip administrators with the practical skills necessary for data analysis and technology integration; expanding access to ICT infrastructure and resources across all regions and school types; and fostering a culture of collaboration and knowledge sharing among education leaders. These steps are not only necessary to strengthen ICT adoption but also to build a more inclusive and innovative educational environment. By implementing these recommendations, Guyana stands to significantly enhance its decision-making capabilities and ultimately improve educational outcomes for students nationwide.

Conflict of Interest

The authors declare that there are no conflicts of interest associated with this study. All data were collected, analyzed, and presented with academic integrity and objectivity, and no external influence or funding biased the research process or its outcomes. The research was conducted in compliance with ethical guidelines, ensuring the privacy and confidentiality of all participants.

Acknowledgement

I extend my heartfelt gratitude to Dr. S. P. Sreekala, my research supervisor, for her unwavering support, insightful guidance, and continuous encouragement throughout the course of this study. Her expertise and thoughtful feedback have been instrumental in shaping the direction and depth of this research. I am especially thankful for her patience, dedication, and commitment, which greatly contributed to the successful completion of this

project. It has been a privilege to work under her mentorship, and I am truly grateful for the opportunity to learn from her wealth of knowledge and experience.

References

[1]. Amaniampong, A., & Hartmann, H., 2023, Factors Affecting Technology Integration in Colleges of Education. *International Journal of Studies in Education and Science,* 4(2), 176. https://doi.org/10.46328/ijses.69

[2]. Asad, M. M., Aftab, K., Sherwani, F., Churi, P., Guerrero, A. J. M., & Pourshahian, B., 2021, Techno-Pedagogical Skills for 21st Century Digital Classrooms: An Extensive Literature Review. *Education Research International*, 2021, 1. https://doi.org/10.1155/2021/8160084

[3]. Bagon, Š., Gačnik, M., & Starčič, A. I., 2018, Information Communication Technology Use among Students in Inclusive Classrooms. *International Journal of Emerging Technologies in Learning (iJET),* 13(6), 56. https://doi.org/10.3991/ijet.v13i06.8051

[4]. Bingimlas, K., 2009, Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature [Review of Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature]. *Eurasia Journal of Mathematics Science and Technology Education,* 5(3). Modestum Limited. https://doi.org/10.12973/ejmste/75275

[5]. Bore, Y. H., & Gudura, D. M., 2023, Factors Affecting the Effective Utilization of Information and Communication Technology (ICT); The Case of Hawassa City Administration Secondary School, Sidama Regional State, Ethiopia. *International Journal of Social Science and Economic Research,* 8(3), 548. https://doi.org/10.46609/ijsser.2023.v08i03.015

[6]. Chaiban, T., & Oweini, A., 2024, Assessing Post-Covid-19 Lebanese Teachers' Attitudes Towards ICT and Their Level of Integration in the Classroom in Relation to Their Years of Experience. *Heliyon,* 10(18). https://doi.org/10.1016/j.heliyon.2024.e38266

[7]. Chisunka-Mwila, B., Daka, Mulauzi, & Njobvu, F., 2010, Integration of ICTs in education: the level at which ICT training should be introduced in Zambian education. 25, 85. https://journals.co.za/content/zambia/25/1-2/AJA0049853X_519

[8]. David, K. M., Tanui, E., & Oruta, F., 2019, The Role of School Administration in Implementation of ICT in Human Resources Administration in Public Secondary Schools. *Journal of Advances in Education and Philosophy,* 3(10), 364. https://doi.org/10.36348/jaep.2019.v03i10.004

[9]. Dodson, L., & DaSilva, D. A., 2011, Enhancing education delivery in Guyana at the general secondary school level: Opportunities for the use of computer-assisted instruction. *World Journal of Science Technology and Sustainable Development,* 8(1), 55. https://doi.org/10.1108/20425945201100004

[10]. Ertmer, P. A., 2005, Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development,* 53(4), 25. https://doi.org/10.1007/bf02504683

[11]. Hambira, N., Lim, C. K., & Tan, K. L., 2017, Emotional and cultural impacts of ICT on learners: A case study of Opuwo, Namibia. *AIP Conference Proceedings*, 1891, 20048. https://doi.org/10.1063/1.5005381

[12]. Journal, A. W. E., & Kalra, R., 2018, Experienced and Novice Teachers' Awareness and Attitudes towards ICT in Language Classroom: A study conducted in a Thai context. https://doi.org/10.31235/osf.io/q9wkx

[13]. Kaminskienė, L., Järvelä, S., & Lehtinen, E., 2022, How does technology challenge teacher education? *International Journal of Educational Technology in Higher Education*, 19(1). https://doi.org/10.1186/s41239-022-00375-1

[14]. Katukula, K. M., Set, B., & Nyambe, J., 2023, Language Ideologies and the Use of Mother Tongues as the Medium of Instruction and Learning in Junior Primary Schools: A Case Study of Parents and Teachers in a Namibian School. *Innovare*

Journal of Education, 70. https://doi.org/10.22159/ijoe.2023v11i4.48164

[15]. Kibor, J., & Tumuti, J., 2020, Information and Communications Technology Integration and Performance of Tertiary Institutions in Nairobi County, Kenya. *East African Journal of Information Technology*, 2(1), 1. https://doi.org/10.37284/eajit.2.1.119

[16]. Kipsoi, E., Chang'ach, J. K., & Sang, H. C., 2012, Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya. *Journal of Sociological Research,* 3(1). https://doi.org/10.5296/jsr.v3i1.1882

[17]. Kumar, P. S., 2023, Transformative Role of ICT in 21st Century Learning: Enhancing Educational Effectiveness and Equitability. *International Journal for Research in Applied Science and Engineering Technology*, 11(12), 91. https://doi.org/10.22214/ijraset.2023.57028

[18]. Mark, V. A., & Emmanuel, A.-N., 2019, Challenges facing information and communication technology implementation at the primary schools. *Educational Research and Reviews,* 14(13), 484. https://doi.org/10.5897/err2019.3751

[19]. Mastul, A.-R. H., Vera, C. T. D., & Jayme, C. B., 2023, Understanding the Use of EduTech in Schools in the Philippines: Recommendations for Effectiveness. *Engineering Science Letter,* 2(2), 37. https://doi.org/10.56741/esl.v2i02.307

[20]. Misra, S., & Bajpai, A., 2010, Role of ICT in Enhancing the Educational Productivity. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.1732645

[21]. Mumtaz, S., 2000, Factors affecting teachers' use of information and communications technology: a review of the literature [Review of Factors affecting teachers' use of information and communications technology: a review of the literature]. *Journal of Information Technology for Teacher Education,* 9(3), 319. *Taylor & Francis*. https://doi.org/10.1080/14759390000200096

[22]. Mwadulo, M. W., & Odoyo, C. O., 2020, ICT Adoption in the Educational Management of Primary Schools in Kenya. *Universal Journal of Communications and Network*, 8(1), 1. https://doi.org/10.13189/ujcn.2020.080101

[23]. Ntorukiri, T. B., Kirugua, J. M., & Kirimi, F., 2022, Policy and infrastructure challenges influencing ICT implementation in universities: a literature review [Review of Policy and infrastructure challenges influencing ICT implementation in universities: a literature review]. Discover Education, 1(1). *Springer Science+Business Media*. https://doi.org/10.1007/s44217-022-00019-6

[24]. Ntorukiri, T. B., Xiong, C., & Boudouaia, A., 2022, Influence of Teachers' Competencies on ICT Implementation in Kenyan Universities. *Education Research International,* 2022, 1. https://doi.org/10.1155/2022/1370052

[25]. Omboto, C. M., Kanga, A. W., & Njageh, A. R. K., 2022, Myth or Reality: Digital Literacy Programme Implementation in Primary Special Schools in Nairobi, Kenya. *European Journal of Education*, 5(2), 51. https://doi.org/10.2478/ejed-2022-0004

[26]. Prabawa, H. W., 2017, A Review of Gamification in Technological Pedagogical Content Knowledge [Review of A Review of Gamification in Technological Pedagogical Content Knowledge]. *Journal of Physics Conference Series,* 812, 12019. IOP Publishing. https://doi.org/10.1088/1742-6596/812/1/012019

[27]. Singh, T. K. R., & Muniandi, K., 2012, Factors Affecting School Administrators' Choices in Adopting ICT Tools in Schools – The Case of Malaysian Schools. *International Education Studies*, 5(4). https://doi.org/10.5539/ies.v5n4p21

[28]. Sunkel, G., & Trucco, D., 2011, New information and communications technologies for education in Latin America: risks and opportunities. *RePEc: Research Papers in Economics.* https://EconPapers.repec.org/RePEc:ecr:col041:6180

[29]. Titus, A. B., 2020, ICT: Vehicle for Educational Development and Social Transformation. *In IntechOpen eBooks. IntechOpen.* https://doi.org/10.5772/intechopen.85945