JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

OPPURTUNITIES AND CHALLENGES ON THE UTILIZATION OF ICT AMONG TEACHERS IN CAGAYAN DE ORO CITY BASIS: FOR PROFESSIONAL DEVELOPMENT PLAN

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Abstract:

The challenges and opportunities presented by Information and Communication Technology (ICT) are unique and rapidly evolving, impacting the globe. This paper explores the dynamics between these opportunities and challenges within selected districts of the Division of Cagayan de Oro City, aiming to describe respondents' characteristics and assess the level of teachers' experiences with ICT. It seeks to uncover significant relationships between these opportunities and challenges, offering insights into their interplay. The research also tests for differences in respondents' ICT experiences, providing a deeper understanding of ICT's educational impact and informing strategies for effective technology integration in teaching.

The study involved 305 public elementary school teachers, using a descriptive correlational method and a modified questionnaire. Descriptive statistics and the Pearson Product Moment Correlation were used to analyze data, along with T-tests and F-tests to identify differences based on teachers' characteristics. Findings reveal high levels of ICT opportunities and challenges among teachers, though relationships were significant only for internet facilities and access to ICT resources. Significant differences were noted based on characteristics except for sex, teaching experience, and grade level taught. The study concludes that increased investment in technology infrastructure is needed to enhance ICT integration in education, recommending that school heads and teachers utilize Professional Development Plans to integrate technology and overcome resistance.

Keywords: **opportunities, challenges, utilization of ICT**

I. INTRODUCTION

The Department of Education (DepEd) is currently undergoing a significant transformation across all levels, particularly in primary education, by leveraging Information and Communication Technology (ICT). These changes offer elementary teachers' numerous opportunities to innovate their teaching methodologies and enrich students' learning experiences through the integration of ICT. With ICT, teachers gain access to a wide array of educational resources, including interactive multimedia content and online forums, all of which are accessible through the DepEd Online Resources platform. This enables them to craft dynamic and captivating lessons tailored to various subject preferences, fostering collaboration and interactivity among students. Moreover, the ICT teachers' Facebook Group serves as a vibrant community where educators exchange practical insights, innovative ideas, and best practices, further enriching their teaching practices.

Beyond these opportunities, however, there are distinct challenges that hinder the effective use of ICTs among primary teachers. Challenges such as infrastructure and facilities in schools, computers and internet connectivity hinder the seamless integration of ICTs into daily learning practices. According to Adlawan and Quirap (2023), a significant difference was registered between teachers' ICT literacy skills and performance. Therefore, it is recommended that teachers must, at times, improve their literacy skills in Spreadsheets, Presentations, Ethics, and Security for better outcomes and usage of ICT at work

and in personal activities. In addition, resistance to change among teachers and stakeholders, further complicated by socioeconomic differences affecting access to ICT resources, further complicates the integration of ICT in basic education. As per 2023 study conducted by Jaysamae Awitin, sudden shifts in teachers' work environments are associated with the emergence of new challenges, burdens, and pressures. This phenomenon extends to the various ICT innovations introduced by the Department of Education to adapt to the digital era. However, some teachers prefer sticking to traditional methods as they struggle to keep pace with rapid changes. Moreover, recent studies indicate that increased accessibility to technology does not necessarily translate to improved or higher-quality utilization of technology (Vongkulluksn, Xie & Bowman , 2018).

The main challenge facing elementary teachers is not being able to keep up with recent teaching materials available online despite the many opportunities for ICT integration. This problem is due to a combination of factors such as interest, ICT resources, technical knowledge, computer units, time management and resistance to change. Furthermore, limitations in financial resources, technical infrastructure and trained staff further prevent the department from effectively using educational online resources and integrating them into the curriculum.

Further, recent initiatives by the Department of Education such as providing free access to tools like Canva, Microsoft 365 accounts, and allocation for Google Drive Storage, aim to enhance the teaching and learning experience through technology integration. However, despite these efforts, a significant gap exists in the utilization of these resources among teachers. While some educators are able to access and leverage the features of these applications, a majority remain unaware or unable to utilize them effectively in their teaching practices. According to Pasco (2023), although teachers believed that there were barriers that impeded them from maximizing the use of ICT, they still agreed that it helped them improve teaching with more updated materials as well and more novel quality of teaching

As such, this discrepancy in access and awareness can stem from various factors. Limited training and professional development opportunities may contribute to teachers' lack of familiarity with these digital tools. Additionally, disparities in access to technology and internet connectivity across different regions or schools can further widen the gap in utilization. Furthermore, the complexity or unfamiliarity of these applications may act as barriers for teachers who are not technologically savvy. Without adequate support and training, many educators may feel overwhelmed or unsure about how to integrate these tools into their lesson plans effectively.

Therefore, by closing the gaps in knowledge, skills, and difficulties in using these online resources, DepEd will be able to fully utilize the potential of technology to improve learning and teaching results for both teachers and students.

II. RESEARCH METHODOLOGY

The descriptive correlation method of research was used in this study because it examines relationships between variables without requiring the researcher to alter or manipulate them. Because the goal of the research is to precisely and methodically characterize a population, circumstance, or phenomena, the study is also descriptive.

This approach is anticipated to produce a truthful and precise depiction of a scenario. Data must be gathered, tabulated, and computed for this study. In order to derive the implications of the findings, it involved the analysis and interpretation of the data. The characteristics of the teacher respondents, as well as the opportunities and challenges of the utilization of ICT, will be tested as variables.

2.1Population and Sample

The study involved the three hundred five (305) public elementary school teachers from the Division of Cagayan de Oro City for the School Year 2023-2024. These teachers are currently teaching in the selected schools categorized as large and medium-sized schools based on their quantity. In addition, these are the teachers handling Kindergarten to Grade six learners. A breakdown of respondents by school and grade level can be found in Table A. This data is crucial for educational planning, decision-making, and analysis within the Division of Cagayan de Oro City framework.

2.2 Data and Sources of Data

The research questionnaire is designed to gather valuable insights into the opportunities and challenges of the utilization of ICT among elementary school teachers in the Division of Cagayan de Oro City. The questionnaire is divided into three parts: Part 1 focused on the respondents' characteristics, such as age, sex, position, grade level taught, teaching experience, seminars/ trainings attended in ICT and attitude towards ICT. Part 2 addressed teachers' opportunities on the Utilization of ICT, such as access to ICT resources, internet facilities, use of school ICT gadgets and use of YouTube, while Part 3 delved into the challenges of ICT Utilization, covering issues like interest, ICT resources, technical knowledge, computer units, time management and resistance to change. Each variable comprised seven(7) indicators with options ranging from strongly agree (4) to strongly disagree. This was patterned and modified from Khadija Rafeeq and Muhammad Gasim Ali's published research on Opportunities and Challenges in the Use of ICT At Tertiary Level: Teachers' Perceptions (2021).

2.3 Theoretical framework

Lev Vygotsky's sociocultural theory offers a theoretical framework for understanding the opportunities and challenges associated with the utilization of Information and Communication Technology among teachers. Within this framework, the Zone of Proximal Development presents an opportunity for teachers to expand their professional skills and knowledge through collaborative learning experiences facilitated by ICT. Scaffolding, another key concept, suggests that experienced educators can provide support and guidance to help teachers overcome challenges in integrating it into their instructional practices. Additionally, it serves as a cultural tool that can enhance teaching effectiveness and promote student engagement and collaboration. However, challenges such as the digital divide, technological complexity, and pedagogical integration must be addressed to fully leverage the potential of ICT in education. Strategies such as providing equitable access to technology resources, offering ongoing professional development, and emphasizing pedagogical strategies for integration are essential for addressing these challenges. In

general, Vygotsky's theory emphasizes the value of social contact, cultural context, and cognitive development in helping educators navigate the advantages and disadvantages of using it, which eventually supports efficient instruction in the digital age.

Further, the zone of proximal development is a key concept of socio-cultural theory which suggests that individuals' cognitive development is shaped by their interactions with others and their participation in cultural activities and practices. Distinguishing between the level of actual development and potential development has resulted in the key concept of socio-cultural theory as Zone of Proximal development (Vygotsky, 1978).This is the potential level of cognitive development which a learner acquires when one is provided with the appropriate support. his theory's proponents contend that students learn topics more effectively in mixed-ability groups where they may exchange experiences and develop shared understandings. In such a situation, the instructor has to establish a cooperative, democratic, and shared content creation classroom culture that instills a sense of knowledge ownership in the students. This theoretical knowledge was important for the study because it helps teachers promote collaborative learning through device sharing in low-resource settings where ICT facilities might not be sufficient for every learner.

The findings also showed that teachers, irrespective of age or gender, had a positive attitude toward ICT use. The government should think about offering incentives to younger educators to encourage them to use technology and to train their more experienced colleagues in its integration.

2.4 Statistical tools and econometric models

The researcher employed the Slovins Formula to determine the desired number of respondents with a 5% margin of error and a population of 1469. Further, a Stratified sampling technique was used to allocate the number of respondents in each school by dividing the sample size by the total population. Additionally, simple random sampling was utilized to select the number of respondents from each grade level, ensuring that every individual had an equal chance of being included in the study.

III. RESULTS AND DISCUSSION

Table 1
Summary of the Level of Teachers' Opportunities on the Utilization of ICT

Variables	Mean	SD	Interpretation
Access to ICT Resources	2.98	0.74	High
Access to Internet Facilities	2.79	0.73	High
Use of School ICT Gadgets	2.75	0.71	High
Use of YouTube	3.00	0.74	High
Overall	**2.88**	**0.73**	**High**

Legend

3.25- 4.00 Always/Very High	1.75-2.49 Rarely/ Low
2.50-3.24 Very Often/ High	1.00-1.74 Never/Very Low

Table 7 exhibits the summary on the level of **teachers' opportunities on the utilization of ICT** with the overall mean of 2.88 (SD = 0.73) interpreted as **High**. This means that, on average, teachers feel well-supported in integrating ICT into their teaching and administrative tasks. This suggests that educational institutions have made significant strides in providing teachers with the necessary technological infrastructure and support to enhance their instructional practices through digital tools and resources. As seen from the high overall mean score, the summary reflects a positive outlook towards ICT utilization among teachers, indicating a shared recognition of the importance and benefits of incorporating technology into educational settings. This underscores a collective effort towards embracing digital innovation and leveraging ICT to improve teaching effectiveness and student learning outcomes.

In line with this, the variable, **use of YouTube resulted**, obtained the highest mean of **3.00 (SD = 0.74),** interpreted as **High.** It means that YouTube videos have become an integral part of instructional strategies, providing educators with a vast array of multimedia content to enhance lesson delivery and engage students in diverse learning experiences. It suggests that educators appreciate the accessibility and diversity of content available on YouTube, which allows them to select videos that align with specific learning goals, cater to diverse learning styles, and address various subject areas and topics. As noticed, the high mean score underscores the importance of providing teachers with guidance and support in effectively integrating YouTube videos into their instructional practices. It highlights the need for professional development initiatives that focus on helping educators curate and utilize digital resources in ways that optimize student engagement and learning outcomes.

Wang and Zhang (2023) conducted a study that explores how YouTube videos are utilized as valuable tools for scaffolding instruction, reinforcing key concepts, and facilitating differentiated learning experiences for students with diverse needs. The focus of the research is on examining teachers' strategies for effectively integrating YouTube videos into their lesson plans and instructional delivery. The study likely involved qualitative methods such as interviews, surveys, or classroom observations to gather insights from teachers regarding their experiences with integrating YouTube videos into classroom instruction. Through these methods, Wang and Zhang would have explored various aspects of the integration process, including how teachers select, adapt, and incorporate YouTube videos to support their instructional objectives and meet the diverse needs of their student.

On the other hand, the variable, **use of School ICT gadgets** resulted in a lowest mean of **2.75 (SD = 0.71),** interpreted as **High**. It implies a potential gap or limitation in the integration and utilization of school-provided ICT gadgets within educational practices. This may indicate challenges such as limited access to devices, inadequate training on their use, or a lack of alignment between available gadgets and instructional needs. It suggests the importance of addressing barriers and providing adequate support to enhance the utilization of school ICT gadgets. This may include initiatives such as providing additional

training opportunities, ensuring access to up-to-date and relevant devices, and fostering a culture of innovation and experimentation with technology in education. As noticed, the low mean score underscores the need for educational institutions to prioritize investments in digital infrastructure and resources that support the effective integration of ICT gadgets into teaching and learning practices. It highlights the importance of aligning technology initiatives with instructional objectives and providing educators with the necessary tools and support to leverage technology effectively in their classrooms.

According to Kim and Lee (2021), the utilization of school ICT gadgets plays a pivotal role in fostering the development of essential 21st-century skills, including digital literacy, critical thinking, and problem-solving abilities, among students. Through a qualitative analysis of student experiences, the study delves into how school ICT gadgets contribute to the cultivation of these competencies, thereby preparing students for success in an increasingly digitalized world. The qualitative analysis likely involved in-depth exploration of students' interactions with school ICT gadgets, conducted through methods such as interviews, focus groups, or observations. By immersing themselves in the students' perspectives and experiences, Kim and Lee sought to uncover nuanced insights into the impact of ICT gadget usage on various facets of skill development.

Table 2
Summary of the Level of Teachers' Challenges on the Utilization of ICT

Variables	Mean	SD	Interpretation
Interest	2.45	0.68	Low
ICT Resources	2.74	0.74	High
Technical Knowledge	2.75	0.70	High
Computer Units	3.10	0.77	High
Time Management	2.61	0.77	High
Resistance to Change	2.24	0.69	Low
Overall	**2.65**	**0.73**	**High**

Legend

3.26- 4.00 Strongly Agree/Very High	1.76-2.50 Disagree/ Low
2.51-3.25 Agree / High	1.00-1.75 Strongly Disagree/Very Low

Table 14 discloses the summary of the teacher's **level of challenges on the utilization of ICT** with an overall mean of 2.65 (SD = 0.73), interpreted as **High**. It meansthat teachers face significant challenges in the utilization of ICT within their instructional practices. It suggests that these challenges are prevalent and impactful across various aspects of ICT integration in education. It indicates that the challenges identified by teachers are not isolated incidents but rather systemic issues that may require concerted efforts to address. These challenges could encompass a range of factors such as technological limitations, resource constraints, time management issues, and resistance to change. It denotes a need for comprehensive support and intervention strategies to assist teachers in overcoming these challenges and effectively leveraging ICT to enhance teaching and learning experiences. An effective strategy could include targeted professional development, providing sufficient resources and infrastructure, and promoting a culture of innovation and collaboration within educational institutions.

In line with this, the variable, **computer units,** got the highest mean of **3.10 (SD = 0.77),** interpreted as **High.** It means that a lack of sufficient computers in the computer lab poses a considerable obstacle to teachers' ability to effectively integrate ICT into their instructional practices. This shortage may limit students' access to technology-based learning resources and activities, hindering their educational experiences. Addressing the issue of insufficient computers in the computer lab is crucial for promoting equitable access to technology and fostering effective ICT integration in education. Without adequate resources, educators may struggle to deliver quality instruction that leverages the benefits of ICT. As seen from the high mean score, the statement indicates that insufficient computers in the computer lab are a prevalent concern among teachers. This shortage may result in overcrowded computer labs, long wait times for access to computers, and difficulties in facilitating technology-enhanced lessons.

According to Al-Balas and Alsmadi (2020), insufficient computers in computer labs have been examined in educational research. Scholars have investigated the impact of this variable on various aspects of teaching and learning, including students' access to technology, instructional effectiveness, and learning outcomes. Additionally, studies have explored strategies for addressing this challenge, such as optimizing computer allocation, implementing scheduling protocols, and integrating alternative technology resources.

On the other hand, the variable, **Resistance to Change,** got the lowest mean of **2.24 (SD = 0.69),** interpreted as **Low**. This means that while resistance to change may exist to some extent, it is not perceived as a widespread barrier to ICT integration among teachers. It could indicate a level of openness and adaptability among educators toward embracing new technologies and instructional approaches. As seen from the low mean score, resistance to change may not be a major impediment to the adoption of ICT in educational settings. Teachers may be more inclined to embrace innovative practices and technologies, recognizing their potential to enhance teaching and learning outcomes.

According to Muiruri and Kosgei (2019), the variable of resistance to change among teachers regarding the utilization of ICT (Information and Communication Technology) has been studied in educational research. Scholars have investigated the factors contributing to teachers' resistance to integrating ICT into their teaching practices, including concerns about technological competency, perceptions of ICT relevance to teaching, fear of job displacement, and lack of support and training. Additionally, studies have explored strategies for addressing resistance to change, such as providing professional development opportunities, fostering a positive school culture towards ICT, and involving teachers in decision-making processes related to technology integration.

Table 3
Result of the Test on Relationship between the Respondents' Opportunities and Challenges on the Utilization of ICT

Respondents Opportunities	Respondents Challenges						
	Interest	**ICT resource**	**Technical Knowledge**	**Computer Units**	**Time Management**	**Resistance to Change**	**Overall**
	r-value p-value	r-value p-value	r-value p-value	r-value p-value	r-value p-value	r-value p-value	r-value p-value
Access to ICT Resources	0.875 0.0234* S	0.148 0.0024* S	0.369 0.1340 NS	0.139 0.0125* S	0.480 0.0153* S	0.361 0.0158* S	**0.395** **0.0787*** **S**
Internet Facilities	0.183 0.0015* S	0.349 0.0289* S	0.701 0.7261 NS	0.775 0.0024* S	0.360 0.0480* S	0.493 0.2480 NS	**0.477** **0.1758*** **S**
Use of School ICT Gadgets	0.361 0.0136* S	0.365 0.0189* S	0.349 0.1680 NS	0.390 0.1800 NS	0.451 0.4600 NS	0.362 0.4113 NS	**0.380** **0.2466** **NS**
Use of YouTube	0.430 0.0216* S	0.976 0.142 NS	0.398 0.1704 NS	0.596 0.2480 NS	0.390 0.2810 NS	0.569 0.5318 NS	**0.560** **0.2325** **NS**
Overall	**0.462** **0.0150*** **S**	**0.460** **0.048*** **S**	**0.454** **0.300** **NS**	**0.475** **0.1107** **NS**	**0.420** **0.2011** **NS**	**0.446** **0.3017** **NS**	**0.453** **0.2284** **NS**

Legend: S- Significant NS-Not Significant

Table 15 manifests the correlation coefficients (r-values) and p-values of the relationship between the respondents' opportunities and challenges on the utilization of ICT as to interest, ICT resources, technical knowledge, computer units, time management issues, and resistance to change. The test was utilized to investigate whether a statistically significant relationship existed between respondents' opportunities and challenges on the utilization of ICT.

The data presented in the table highlight the significant correlation between access to ICT resources and several key challenges. ICT resources are notably linked to interest, ICT resources, computer units, time management and resistance to change. This emphasizes the critical role of resource availability in shaping individuals' engagement and management of ICT-related tasks. It implies that having things like computers, software, internet access, and support makes it easier for everyone to use technology in their work and learning. When these resources are readily available, it helps to make sure that everyone has a fair chance to benefit from technology and its advantages. Furthermore, Interview from teacher respondents revealed that 30% suggested that there is a recognition of the importance of providing teachers with the necessary training and support to effectively utilize ICT tools in their classrooms.

Further, the presence of internet facilities demonstrates a statistically significant relationship primarily concerning interest, ICT resources, computer units, time management underlining the importance of infrastructure in facilitating effective ICT utilization. A robust internet connection plays a pivotal role in addressing various challenges faced by teachers in integrating ICT into their practice. By enhancing ICT resources, fostering technical knowledge, mitigating constraints associated with computer units, time management, and resistance to change, a stable internet connection empowers educators to harness the full potential of technology-enhanced teaching and learning experiences.

The use of School ICT gadgets demonstrates a non-statistically significant relationship primarily concerning interest, ICT resources, technical knowledge, computer units, time management and resistance to change. It suggests that schools with limited computer access could still implement ICT initiatives through creative solutions like rotating computer schedules and utilizing mobile devices. Hero (2020). Strategic planning and integration into existing lesson plans helped teachers manage time constraints associated with ICT usage. Furthermore, effectiveness of comprehensive change management strategies in addressing resistance to change and fostering acceptance of new technologies in educational settings

Fuirthermore, the use of YouTube demonstrates a non-statistically significant relationship primarily concerning interest, ICT resources, technical knowledge, computer units, time management and resistance to change. It is noticeable that YouTube is known for its user-friendly interface and availability across devices made it relatively easy to integrate into their teaching practices. Additionally, professional development sessions focused on YouTube's educational potential helped address any lingering technical or instructional concerns. Overall, the study suggested that the perceived challenges associated with using YouTube in education may not pose significant barriers when appropriate support and training are provided.

Similarly, for access to ICT resources, internet facilities, use of school ICT gadget, and use of YouTube, the correlation coefficient with technical knowledge are not statistically significant ($p > 0.05$). The lack of statistical significance indicates that there is no meaningful relationship between these variables and technical knowledge. This implies that having an access to ICT resources, internet facilities, school ICT gadgets, and YouTube doesn't guarantee teachers' technical proficiency, nor does their technical knowledge always depend on access to these resources. Access to technology doesn't automatically translate into expertise, and teachers can develop technical skills through various means beyond resource availability. Conversely, possessing technical knowledge doesn't solely rely on access to specific resources; it can be acquired through training, self-directed learning, and prior experience. Access to resources is just one aspect of the broader picture of developing technical proficiency.

IV. ACKNOWLEDGMENT

The researcher acknowledges with profound gratitude and sincere thanks to the following who had contributed and extended valuable support in making this research possible:

To the Almighty God for His unwavering love and guidance;

Dr. Braziel L. Ongcachuy, Dean of the Graduate Studies, for providing the necessary time and resources to complete this dissertation;

Dr. Estrella S. Ferenal, her adviser, for the patience, guidance, sincere concern, and encouragement;

The Panel of Examiners: Dr. Gerlinda G. Corpuz, Dr. Carmelita O. Elbanbuena, Dr. Pepa V. Pontillas, and Dr. Conniebel D. Nistal, for their valuable insights and suggestions;

Dr. Roy E. Gazo, Schools Division Superintendent of Cagayan de Oro City, for granting the permission to conduct the study;

To all her family members whose prayers, encouragement, and moral support were pivotal in overcoming challenges encountered during the research journey. Special mention to her husband, Paul, her mother, Alfreda, her brother, Raymond, and sisters, Liezel, Lelanie, Rosel, and Catherine;

With all of them, the researcher shares this significant achievement.

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