Evaluating the Effectiveness of ICT Integration in Teaching and Learning: An Analysis of Perspectives and Effective Elements

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Abstract:- This study investigates the effectiveness of integrating Information and Communication Technology (ICT) in the teaching and learning process. A survey questionnaire was used to assess the impact of ICT integration and identify key elements contributing to its success. Convenient sampling was employed, involving 15 participants.

The findings reveal that integrating ICT positively impacts the teaching-learning process, enhancing interactivity, student interest, and engagement. It fosters critical thinking and creativity among students. Based on the results, recommendations are made to prioritize ICT inclusion in the curriculum, provide sufficient ICT facilities and support, and offer training for teachers.

This study contributes to the understanding of the benefits of ICT integration in education. It emphasizes the need for educational institutions to embrace and promote the effective use of ICT to enhance teaching practices and improve student learning outcomes. Future research should focus on assessing the long-term impact of ICT integration and further exploring its effectiveness in different educational contexts.

By implementing the recommendations and advancing research on ICT integration, educational stakeholders can create an environment that maximizes the potential of technology to transform the teaching-learning experience. Embracing ICT in education empowers students, fosters critical skills, and prepares them for the challenges of the digital age.

Keywords: ICT, integration, teaching, learning, effectiveness

I.   INTRODUCTION

Information and Communication Technology (ICT) has proven to be effective in facilitating administrative tasks and enhancing skills for both teachers and students. The use of technology, such as computers, digital cameras, projectors, and audio-visual equipment, has become an integral part of daily classroom activities. Lal (2014) emphasizes the importance for teachers to keep up with technology in the classroom, as it not only streamlines their tasks but also provides opportunities for professional development. Teaching with ICT allows for more time dedicated to the learning process, student activities, discussions, and correlation with other subjects. Furthermore, ICT has the potential to revitalize education by actively engaging students and developing their skills.

As educational institutions continue to embrace technology, the role of ICT in the instructional process has shifted from a traditional to a constructivist approach. Its integration brings comfort and ease to daily tasks while serving as a valuable learning aid for both teachers and students. Educational videos, simulations, data storage, databases, mind-mapping, guided discovery, and access to the World Wide Web offer diverse and meaningful ways of learning. ICT has a significant impact on teachers, students, and administrators within the educational system.

In today's technologically driven world, computer literacy and proficiency have become essential requirements for teachers seeking employment. The integration of ICT is now a mandatory aspect in smart schools, necessitating teachers to possess the necessary knowledge and skills. ICT empowers teachers and learners by facilitating communication, interaction, and transforming teaching and learning processes. Its benefits range from instructional testing and assessment to cultural education, assisting students in learning academic content, and fostering critical thinking skills.

➢ *Objectives:*
The primary objective of this study is to thoroughly examine the effectiveness of ICT integration. Specifically, the study aims to achieve the following objectives:
- Assess the effectiveness of ICT integration from the perspectives of teaching and learning.
- Identify the key elements that contribute to the effectiveness of ICT integration in teaching.

By analyzing these specific objectives, this study seeks to provide valuable insights into the impact of ICT integration on teaching and learning processes, as well as identify the essential components that lead to successful integration of ICT in teaching practices.

II. METHODOLOGY

In this study, a survey-questionnaire was employed, adapted from the research conducted by Simin Ghavifekr and Wan Athirah Wan Rosdy. The participants were selected using a convenient sampling method, resulting in a sample size of fifteen (15) respondents. The data analysis involved the use of frequency distribution and weighted mean calculations. The research was conducted at Dr. Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology (DEBESMSCAT) in Cabitan, Mandaon, Masbate.

III. RESULTS AND DISCUSSION

Table 1 presents the perceptions of teachers regarding the integration of ICT in the teaching process. The data indicates that most teachers feel confident in learning new computer skills and believe that ICT can help improve teaching with more updated materials, as evidenced by the highest weighted mean of 3.87. These results suggest a positive perception of ICT's potential to enhance teacher efficacy and efficiency in delivering quality education to students.

Table 1 Teacher's Perception of ICT Integration in Teaching

ITEMS	1	2	3	4	WM
I feel confident learning new computer skills.	0	0	2	13	**3.87**
I find it easier to teach by using ICT	0	0	5	10	**3.67**
I am aware of the great opportunities that ICT offers for effective teaching.	0	0	4	11	**3.73**
I think that ICT supported teaching makes learning more effective.	0	0	4	11	**3.73**
The use of ICT helps teachers to improve teaching with more updated materials.	0	0	2	13	**3.87**
I think the use of ICT improves the quality of teaching.	0	0	6	9	**3.60**
I think the use of ICT helps to prepare teaching resources and materials.	0	0	4	11	**3.73**
The use of ICT enables the students' to be more active and engaging in the lesson.	0	0	5	10	**3.67**
I have more time to cater to students' need if ICT is used in teaching.	0	0	9	6	**3.40**
I can still have an effective teaching without the use of ICT.	0	1	12	2	**3.07**
I think the use of ICT in teaching is a waste of time.	5	9	1	0	**1.73**
I am confident that my students' learn best without the help of ICT.	2	10	3	0	**2.07**
The classroom management is out of control if ICT is used in teaching.	5	10	0	0	**1.67**
Students' pay less attention when ICT is used in teaching.	5	9	0	1	**1.80**
Students' makes no effort for their lesson if ICT is used in teaching.	4	8	3	0	**1.93**

Furthermore, the openness of teachers to adopt new trends and innovations in education, their awareness of the opportunities offered by ICT for effective teaching, and their views on the usefulness of ICT in preparing teaching resources and materials significantly influence their perceptions of integrating ICT. The data reveals a shared mean of 3.73, indicating that integrating ICT in the teaching process can contribute to the enhancement and development of teaching methods, making them more effective and efficient. It also allows for the implementation of varied teaching strategies and differentiated activities to cater to individual learners.

Additionally, the majority of teachers find it easier to teach using ICT, as indicated by a weighted mean of 3.60. This could be attributed to their familiarity with ICT tools and the ability to employ interactive presentations and instant delivery of information, enhancing their instructional practices.

However, it is worth noting that some teachers expressed disagreement with the statement that the use of ICT in teaching is a waste of time, as evidenced by a weighted mean of 1.73. They recognize the vast opportunities ICT integration offers in improving teaching quality, indicating a rejection of the notion that ICT is not valuable or time-consuming.

Regarding concerns, some teachers expressed negative perceptions about classroom management when ICT is used, with a mean of 1.67. Additionally, concerns were raised about students paying less attention (mean = 1.80) and making no effort in their lessons (mean = 1.93) when ICT is used. However, most teachers disagreed with these concerns, emphasizing that technology is an attention-getter that can enhance student engagement and participation during class sessions.

Overall, the results highlight the generally positive perceptions of teachers regarding the integration of ICT in teaching. However, some concerns and variations in perceptions exist, suggesting the need for further exploration and the development of strategies to address challenges related to classroom management, student attention, and effort when utilizing ICT in the teaching process.

Table 2 Effectiveness of ICT Integration for Student's Learning

ITEMS	1	2	3	4	WM
ICT allows students' to be more creative and imaginative.	0	1	7	7	**3.40**
The use of ICT helps students to find related knowledge and information for learning.	0	0	7	8	**3.53**
The use of ICT encourages students to communicate more with their classmates.	0	2	8	5	**3.20**
The use of ICT increases students' confidence to participate actively in the class.	0	1	8	6	**3.33**
I think students learn more effectively with the use of ICT.	0	1	7	7	**3.40**
I think the use of ICT helps to broaden students' knowledge paradigm.	0	0	8	7	**3.47**
I think the use of ICT helps to improve students' ability specifically in reading, writing.	0	1	9	5	**3.27**
The students are more behaved and under control with the use of ICT.	0	5	9	1	**2.73**
The use of ICT enables students to express their ideas and thoughts better.	0	1	8	6	**3.33**
The use of ICT promotes active and engaging lesson for students' best learning experience.	0	0	9	6	**3.40**

Table 2 presents the findings on the effectiveness of integrating ICT in students' learning. The data indicates that the use of ICT has several positive effects on students' learning experiences. The highest mean score of 3.53 was obtained for the statement "The use of ICT helps students to find related knowledge and information for learning." This result highlights the role of ICT in facilitating access to relevant information and resources, enabling students to explore and gather knowledge more effectively. Additionally, with a mean score of 3.47, respondents recognized that ICT can broaden students' knowledge paradigm by providing opportunities to engage with diverse perspectives and ideas in the virtual world.

Moreover, the data reveals that students' learning is enhanced through the use of ICT. The statement "I think students learn more effectively with the use of ICT" obtained a mean score of 3.40. This finding suggests that the availability of various instructional software and digital resources empowers students to improve critical thinking skills, creativity, and the ability to produce original work. By leveraging ICT tools, students can engage with interactive content and engage in hands-on learning experiences that promote effective learning outcomes.

Furthermore, the data indicates that integrating ICT supports the development of specific skills. The statement "The use of ICT helps to improve students' ability specifically in reading and writing" received a mean score of 3.27. This result implies that ICT offers educational software and applications that aid in improving students' literacy skills, allowing them to engage in reading and writing activities in more engaging and interactive ways. Additionally, the statement "The use of ICT encourages students to communicate more with their classmates" received a mean score of 3.20, highlighting the role of ICT in facilitating communication and collaboration among students. Through online platforms and tools, students can exchange ideas, collaborate on projects, and develop their communication skills.

Overall, the findings from Table 2 indicate a positive perception of the effectiveness of integrating ICT in students' learning. The data suggests that ICT enhances students' access to information, promotes creativity and imagination, supports the development of specific skills such as reading and writing, and fosters communication and collaboration among students. These findings emphasize the potential of ICT as a valuable tool in promoting effective and engaging learning experiences for students.

Table 3 Effective Elements in ICT Integration in Teaching and Learning in Schools

ITEMS	1	2	3	4	WM
The ICT facilities in my school are well-functioning and can be used.	1	4	7	2	**3.80**
The technical supports are provided if teachers are faced with difficulties.	0	4	9	2	**4.30**
Little access to ICT prevents me from using it in teaching.	0	3	11	1	**4.30**
Lack of supports from the school top management discourages me from using ICT.	2	9	3	1	**3.30**
Teaching time are not enough for me to use the ICT for teaching and learning purposes.	2	11	2	0	**3.00**
There is enough training and professional development provided for teachers about ICT use in teaching.	0	8	6	1	**3.80**
All ICT tools in my school go to waste and less used by teachers.	3	10	2	0	**2.90**
Teachers are given more time to learn and be comfortable with the use of ICT in teaching.	1	3	7	4	**4.40**
There is computer lab in my school in which I can bring students there to watch educational videos.	2	7	6	0	**3.40**
Teachers' are given the freedom to design their own teaching with the helps from the ICT.	1	1	7	6	**4.80**

Table 3 presents the effective elements in ICT integration in teaching and learning in schools. The data reveals various factors that influence the successful integration of ICT in the educational setting.

One key finding is that teachers' freedom in designing their own teaching with the help of ICT significantly impacts the integration process, with a mean score of 3.20. When teachers are given the autonomy to leverage ICT tools and incorporate them into their teaching methodologies, they feel empowered and motivated to embrace technology in the classroom. This flexibility allows them to tailor their lessons to meet the specific needs of their students and enhance the learning experience.

Furthermore, the data indicates that providing teachers with sufficient time to learn and become comfortable with the use of ICT in teaching is crucial. This finding is supported by a mean score of 2.93 for the statement "Teachers are given more time to learn and be comfortable with the use of ICT in teaching." When teachers are given dedicated time and resources to enhance their technical skills and proficiency with ICT, they are better equipped to integrate technology effectively into their teaching practices.

Additionally, the availability of training and professional development opportunities related to ICT integration in teaching is another important element. The statement "There is enough training and professional development provided for teachers about ICT use in teaching" received a mean score of 2.53. This result suggests that teachers benefit from formal training sessions and workshops that enhance their knowledge and understanding of ICT tools and their application in educational contexts. By providing ongoing professional development, schools can support teachers in effectively integrating ICT into their teaching practices.

Technical support also plays a significant role in facilitating the integration process. The data shows that the availability of technical support when teachers face difficulties with ICT received a mean score of 2.87. This finding highlights the importance of providing timely assistance and guidance to teachers when they encounter technical challenges. Adequate technical support enables teachers to overcome obstacles and promotes their confidence in utilizing ICT effectively in the classroom.

However, the data also reveals a challenge related to limited access to ICT facilities, as indicated by a mean score of 2.87 for the statement "Little access to ICT prevents me from using it in teaching." Insufficient availability of ICT resources can hinder the integration of technology in teaching and learning. Schools need to ensure equitable access to ICT facilities and resources to enable teachers to fully leverage the potential of technology in their instructional practices.

In conclusion, the findings from Table 3 underscore the importance of teachers' freedom in designing their own teaching, dedicated time for learning and professional development, technical support, and adequate access to ICT facilities. These elements are crucial for successful ICT integration in teaching and learning. By addressing these factors, schools can create an environment that fosters effective and meaningful integration of ICT to enhance teaching and learning experiences.

IV. CONCLUSION

The results of this study highlight the significant role of ICT integration in the teaching and learning process. The findings from Tables 1 to 3 demonstrate the positive impact of ICT on both teachers and students, emphasizing the importance of a holistic approach that encompasses curriculum, hardware, and software to deliver quality education.

In today's generation, technology, particularly computers, has become an integral part of education. The integration of ICT allows teachers to address the diverse needs of learners and facilitate the development of their full potential. By incorporating ICT tools and resources, teachers can enhance the efficiency and effectiveness of lesson delivery, create interactive instructional materials, and promote critical thinking among students.

For students, ICT serves as a platform to expand their knowledge, foster creativity, and develop essential skills. The findings indicate that the use of ICT facilitates access to relevant information, broadens students' knowledge paradigm, and improves their abilities in areas such as reading and writing. Moreover, ICT encourages students to become more active and engaged in the learning process, fostering their confidence and promoting effective communication with their peers.

However, it is essential to recognize that while technology plays a crucial role in education, teachers remain the key drivers of student development and global competitiveness. Teachers play a vital role in molding and shaping students' abilities, ensuring that they are well-prepared to thrive in an increasingly technology-driven world.

In conclusion, the integration of ICT in the teaching and learning process brings significant benefits to both teachers and students. It enhances instructional delivery, fosters critical thinking, expands knowledge, and promotes creativity among students. To achieve optimal results, it is crucial to ensure that curriculum, hardware, and software are aligned and effectively integrated. By embracing ICT and empowering teachers, we can provide quality education that equips students with the skills and competencies they need to succeed in the modern world.

RECOMMENDATIONS

Based on the information presented above, the following recommendations are proposed to further enhance the integration of ICT in the teaching-learning process:

- Curriculum Development: Curriculum developers should prioritize the inclusion of ICT in the curriculum. By integrating ICT into the curriculum, students can benefit from a more engaging and interactive learning experience. It is important for curriculum developers to stay updated with the latest technological advancements and incorporate them effectively into the curriculum to meet the needs and demands of the 21st-century learners.

- Provision of ICT Facilities: Administrators and educators should ensure the availability of sufficient ICT facilities in schools. This includes providing well-functioning hardware and software that can support effective ICT integration. Adequate access to computers, internet connectivity, and educational software is essential for both teachers and students to maximize the benefits of ICT in the teaching-learning process.

- Teacher Training and Professional Development: Teachers play a crucial role in integrating ICT effectively into their teaching practices. Therefore, it is recommended that teachers receive comprehensive training and professional development opportunities on how to utilize ICT tools and resources effectively in the classroom. This training should focus on developing their technical skills, pedagogical approaches, and strategies for integrating ICT in a meaningful and engaging way.

- Continued Research: Further research studies should be conducted to assess and compare the effectiveness of ICT integration in the teaching-learning process. This will help identify best practices, evaluate the impact of ICT on student outcomes, and provide insights for continuous improvement. Research findings can inform policymakers, educators, and administrators in making informed decisions regarding ICT integration and provide guidance for future educational practices.

By implementing these recommendations, educational institutions can create an environment that fosters the positive attitudes of students towards the teaching-learning process. The integration of ICT will not only make learning more interactive and meaningful but also prepare students for the digital era and equip them with the necessary skills to thrive in a technology-driven society.

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