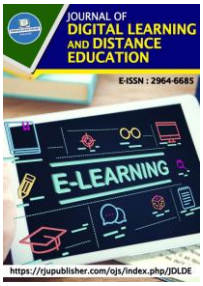

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E-Learning in Elementary Education: An Analytical Study on Its Effectiveness

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Abstract

This study aims to assess the effectiveness of electronic learning (e-learning) as perceived by Elementary Teachers in Tubod, Lanao Del Norte. The research addresses the growing role of e-learning in education and its impact on teaching practices and student outcomes. A descriptive research design was utilized, with data collected through surveys administered to a sample of Elementary Teachers. The analysis focused on the teachers' perceptions of how e-learning influenced their teaching methods, classroom engagement, and resource access. The results indicate that e-learning significantly enhances instructional quality, allowing for greater flexibility in lesson delivery and fostering improved engagement with students/pupils. Teachers also reported that e-learning promotes a more personalized learning experience, adapting to various student needs and learning styles. Additionally, the study found e-learning to be cost-effective, reducing reliance on physical resources and travel. These findings suggest that e-learning is a valuable tool in modern education, contributing to more innovative and efficient teaching practices. The implications of this study highlight the importance of continued investment in e-learning technologies to support educators in adapting to evolving educational demands. The study underscores the growing need for technology integration in education to optimize teaching effectiveness and improve learning outcomes.

Keywords: e-learning, teaching effectiveness, technology integration, education, elementary teachers

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Introduction

Technology has become an indispensable part of everyday life in the contemporary world, profoundly transforming various sectors, including education. As Anderson (2020) states,

"Technology is no longer a luxury in education but a fundamental tool for delivering knowledge in a dynamic global landscape." One of the most significant advancements in this realm is electronic learning (e-learning), which has emerged as a key educational method. E-learning offers students flexible access to learning resources and materials, enabling personalized learning experiences tailored to diverse learning styles. As Bates (2021) emphasizes, "e-learning fosters an environment where learners can progress at their own pace, promoting autonomy and self-directed learning." Unlike traditional educational approaches, e-learning leverages the power of the internet, multimedia technologies, and digital platforms to facilitate remote learning and enhance interaction between teachers and students. According to Siemens (2022), "digital platforms have expanded the learning space beyond the walls of the classroom, allowing for continuous connectivity, collaboration, and engagement."

As technology continues to advance, the demand for teaching methods that effectively integrate these innovations becomes increasingly vital. Not only does e-learning enhance the quality of education, but it also provides cost-effective solutions by reducing the time and resources required for traditional classroom settings. UNESCO (2023) highlights this shift, noting that "e-learning presents a scalable, flexible, and affordable educational solution, particularly in regions with limited infrastructure and resources. Additionally, the rise of student-centered learning approaches emphasizes the need for educational strategies that prioritize individual learning preferences.

Finally, the primary objective of this study is to evaluate the effectiveness of e-learning from the perspective of selected Elementary Teachers in Tubod, Lanao Del Norte. This research aims to explore how e-learning influences teaching methodologies, student engagement, and overall educational outcomes. By gathering insights from educators who utilize e-learning in their classrooms, the study seeks to identify best practices and potential challenges associated with its implementation. The findings will provide valuable recommendations for enhancing the integration of technology in teaching and learning, ultimately contributing to improved educational experiences for both teachers and students.

Theoretical Framing and Research Hypotheses

E-Learning

This is the delivery of educational content through the internet or intranet. It allows learners to access courses and materials remotely, providing greater flexibility and accessibility compared to traditional classroom settings (Hashemi-Pour, 2024). This method supports self-paced learning and is widely used in both academic and professional training contexts. Building on this foundation, this study is grounded in several key theories that explain the effectiveness of e-learning for selected Elementary Teachers in Tubod, Lanao Del Norte. One foundational theory is the E-learning Theory, which integrates principles from cognitive science to inform how electronic educational technologies can be designed and implemented to facilitate effective learning. Central to this theory is Cognitive Load Theory (CLT), which posits that the mental effort required for learning is finite and can be categorized into three types: intrinsic, extraneous, and germane (David, 2015).

Cognitive Load Theory posits that working memory has limited capacity, meaning excessive information can hinder effective learning (Clark et al., 2005). Balancing cognitive loads is essential for optimal outcomes. Mayer, Sweller, and Moreno (2015) proposed design principles to minimize extraneous cognitive load, while Connectivism underscores technology's role in enhancing learning opportunities, enabling educators to manage intrinsic loads through gradual content delivery and multimedia integration. Based

on the theoretical frameworks and objective of this study, the following hypotheses are proposed to assess the effectiveness of electronic learning (e-learning) as perceived by Elementary Teachers in Tubod, Lanao Del Norte:

H1: Elementary Teachers aged 41 and older show greater effectiveness in using e-learning tools for information sharing than their younger peers.

H2: Female Elementary Teachers demonstrate greater proficiency in attending e-learning seminars and training sessions than male Elementary Teachers.

Method

Study site and Sample

This study was conducted in Tubod, Lanao Del Norte, selected for its accessibility and the ease of identifying appropriate respondents. The participants consisted of Forty-nine (49) Elementary Teachers from Tubod, chosen specifically for their relevance to the study's focus on the effectiveness of e-learning. These respondents were well-positioned to evaluate the implementation of e-learning and to assess its impact on educational outcomes.

Table 1. Demographic characteristics of elementary teacher respondents (% = f/n x 100)

Age	**F**	**n**
22-25 years old	10	20.4
26-30 years old	4	8.5
31-35 years old	12	24.5
36-40 years old	10	20.4
41 and above	13	26.5
Total	**49**	**100.0**
Gender		
Male	8	16.3
Female	41	83.7
Total	**49**	**100.0**
Civil Status		
Single	17	34.7
Married	24	49
Separated	3	6.1
Widow	5	10.2
Total	**49**	**100**

Table 1 shows the demographic analysis revealed that a significant portion of respondents were aged 41 and above, with a notable representation of female teachers. This gender disparity may reflect broader trends in the teaching profession, where women are often overrepresented. Additionally, a limited number of respondents held advanced degrees in education, highlighting potential areas for professional development. The marital status of the participants indicated that many educators juggle both professional and personal responsibilities, which could impact their engagement with e-learning tools.

Research design

The researcher utilized a descriptive survey method in this study. This method focuses on describing, analyzing, and interpreting current conditions. It often involves comparative analysis to investigate the implementation and impact of e-learning. By employing this approach, the research aims to provide a comprehensive understanding of the effectiveness of e-learning in educational contexts.

Data measures

The researcher employed a survey questionnaire as the primary research instrument. This questionnaire collected demographic information and evaluated the effectiveness of e-learning across several dimensions, including education, training, and teaching methodologies. This approach was crucial for obtaining pertinent data for the study.

Data gathering procedure

In this study, data was collected through a comprehensive process that involved utilizing various reading materials, including books, journals, and theses pertinent to the research topic. Before administering the questionnaire, the researcher sought and received permission from the heads of several selected schools in Tubod, Lanao del Norte to ensure compliance with institutional protocols. Once approval was granted, the questionnaires were distributed to the selected respondents. After completion, the questionnaires were collected, tallied, and analyzed to draw meaningful interpretations from the data.

Data analysis and ethical consideration

This study utilized a mixed-methods approach, combining descriptive statistics to analyze quantitative data and thematic analysis to derive qualitative insights. This methodology enabled a comprehensive exploration of the effectiveness of e-learning in education, examining its impact on various educational practices and training methodologies.

This research undertaking strictly follows the Data Privacy Act. The researcher secured the parents and students' consent in the study. The data that will be gathered in this research will be treated with utmost confidentiality. The data will only be used as a basis in the data collection to generate the results of the study.

Results and Discussion

The results of this study provide valuable insights into the demographics and perceptions of Elementary Teachers regarding the effectiveness of e-learning in Tubod, Lanao Del Norte.

Table 2. Mean and standard deviation of respondent's perception of the effectiveness of e-learning

Dimensions	Mean	SD
Use online tools and sites to search or share information.	1.43	0.58
Attend various seminars and training	1.59	0.65
Joined a team of competent and skilled teachers.	1.57	0.71
Engage my classes and make students actively involve in everyday practice.	1.61	0.73
Create multiple online course modules.	1.65	0.63

Table 2 Illustrates that respondents are not only adapting to e-learning but are also effectively leveraging various strategies to improve their teaching practices. The high mean scores

across all items indicate a strong belief in the effectiveness of e-learning as a transformative tool in education, emphasizing the importance of continuous professional development and collaboration in enhancing teaching competencies.

Table 3. Mean and standard deviation of respondent's perception of the effectiveness of e-learning according to the improvement of the teaching and learning process

Dimensions	Mean	SD
Implement Virtual Reality (VR)	1.55	0.61
Make flexible lesson plans	1.45	0.61
Use a learning Management System (LMS) and other E-learning tools	1.65	0.66
Design interactive and exercises.	1.63	0.67
Use multimedia and game-based learning	1.78	0.65

As displayed in Table 3 the results indicate a strong consensus among respondents regarding the effectiveness of various e-learning strategies, particularly the use of innovative technologies like Virtual Reality (VR), flexible lesson planning, and interactive exercises in enhancing the learning process.

Table 4. Mean and standard deviation of respondent's perception of the effectiveness of e-learning

Dimensions	Mean	SD
Make my expectations clear.	1.63	0.64
Recognize students' accomplishments and respond appropriately	1.69	0.58
Draw a connection between the course material and its real-world application	1.61	0.67
Supplement learning with hands-on activities.	1.53	0.54
Provide motivation and rewards for student's accomplishments.	1.49	0.65

As shown in Table 4, the data indicate a positive perception among respondents regarding various strategies that enhance teaching and learning through e-learning. These findings underscore the importance of clear expectations, recognition of accomplishments, real-world relevance, hands-on learning, and motivation in creating an effective educational experience. Ultimately, teachers demonstrated a generally positive perception of e-learning effectiveness. Many respondents expressed high confidence in their ability to utilize online tools and resources for information sharing, reflecting strong digital literacy skills. Additionally, educators reported feeling effective in attending seminars and training, engaging students actively in the learning process, and developing multiple online course modules.

These findings indicate that educators are not only adapting to new technologies but are also proactively enhancing their pedagogical strategies through continuous professional development. The majority of respondents recognized the effectiveness of implementing virtual reality technology, underscoring the growing integration of such innovations in educational settings. Furthermore, the positive response to creating flexible lesson plans tailored to individual student needs highlights the importance of personalized learning experiences.

Overall, the findings reveal a strong commitment among educators to embrace e-learning as a viable method for enhancing educational practices. This study underscores the necessity for ongoing support and training to maximize the benefits of e-learning, ensuring that teachers are well-prepared to meet the evolving demands of the educational landscape. The positive attitudes reflected in the data suggest a readiness among educators to leverage e-learning tools to improve teaching and learning outcomes.

Conclusion

This study concludes that e-learning has a positive impact on elementary teachers. Tools like virtual reality, learning management systems, interactive exercises, and multimedia not only enhance teaching and learning but also improve student engagement and educational outcomes. The majority of respondents, primarily females aged 41 and older, demonstrated confidence in their ability to use e-learning tools effectively. The demographic analysis revealed a notable gender disparity, with many participants being female. A limited number of respondents held advanced degrees, indicating potential areas for professional development. Many educators also balance personal and professional responsibilities, which may influence their engagement with e-learning.

Overall, the findings suggest that Elementary Teachers are embracing e-learning as an effective educational approach. Their positive attitudes indicate readiness to leverage these technologies to improve teaching practices. To maximize these benefits, ongoing support and training are essential. Future research could focus on the long-term effects of e-learning and strategies for integrating these tools into teacher training programs, fostering continuous improvement in education.

Conflicts of Interest

The author declares no conflict of interest.

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