

Proposed Concept for Utilizing E-Learning in Teaching at the Primary Education Level in Omdurman Locality

تصور مقترح لاستثمار التعلم الإلكتروني في التدريس بمستوى التعليم الأساسي في محلية أم درمان

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Abstract:

Objectives: The research aimed to identify the technical requirements needed to implement e-learning for teaching at the primary education level in public schools in Omdurman.

Methods: The researchers adopted a descriptive methodology, with the study population consisting of primary school teachers in Omdurman. A stratified random sample of 300 teachers was selected, representing 11.6% of the study population.

Results: The research yielded several key findings, including the development of a proposed framework for implementing e-learning in primary education in Omdurman, positive attitudes among teachers towards using e-learning for teaching in public schools, and the curriculum's appropriateness for integrating e-learning in primary education. Based on these results.

Conclusions: The researchers recommended conducting training courses for teachers and non-specialist educators on how to use e-learning strategies, as well as training sessions for students on educational platforms and tools and how to use them in the learning process.

Keywords: e-learning; primary education; Omdurman.

الملخص:

الأهداف: هدفت الدراسة إلى التعرف على التجهيزات التقنية المطلوبة لتوظيف التعليم الإلكتروني للتدريس في مرحلة التعليم الابتدائي بالمدارس الحكومية بمحلية أم درمان.

المنهجية: استخدم الباحثان المنهج الوصفي، وتكون مجتمع البحث من معلمي ومعلمات مرحلة التعليم الابتدائي بمحلية أم درمان حيث تم اختيار عينة طبقية بطريقة عشوائية، قوامها 300 معلم ومعلمة بحيث تمثل 11.6% من مجتمع البحث.

النتائج: توصل البحث لمجموعة من النتائج أهمها: خرج البحث ببناء تصور مقترح لتوظيف التعليم الإلكتروني للتدريس في مرحلة التعليم الابتدائي بمحلية أم درمان، للمعلمين اتجاهات إيجابية نحو توظيف التعليم الإلكتروني للتدريس في مرحلة التعليم الابتدائي بالمدارس الحكومية، وأن المنهج ملائم لتوظيف التعليم الإلكتروني للتدريس في مرحلة التعليم الابتدائي بالمدارس الحكومية.

الخلاصة: في ضوء تلك النتائج أوصى الباحثان بعقد دورات تدريبية للمعلمين والمعلمين غير المختصين تدريباً لكيفية استخدام استراتيجيات التعليم الإلكتروني، وعقد دورات تدريبية للطلاب عن المنصات التعليمية الإلكترونية وأدائها وكيفية استخدامها في العملية التعليمية.

الكلمات المفتاحية: التعليم الإلكتروني؛ مرحلة التعليم الابتدائي؛ أم درمان.

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1 Introduction

The world is currently experiencing a cognitive, scientific, and technological revolution across various fields, encompassing all sectors, especially education. Education is the fundamental pillar upon which the culture and development of nations are built. The use of modern technology has become a hallmark of this era, prompting educational institutions to rapidly develop their educational systems to keep pace with the ongoing and rapid developments in technology. This shift has created a constant need for those involved in education to seek new teaching methods that align with the traits of this evolution and assist learners in their education (Maqdadi, 2020).

The emergence of e-learning and distance education is a genuine response from educational institutions to the wave of technological advancement that has swept the globe. Technology plays a significant role in students' lives, facilitating effective learning while simultaneously sparking their curiosity and desire for exploration. As a result, most students are interested in technology in all its forms and tools (Al-Yousfi, 2015).

The transition from traditional education systems to integrated e-learning systems is a complex and challenging process that requires thorough preparation, including the provision of appropriate resources and tools for this transformation. Additionally, it involves selecting the best means and methods for communicating with students and choosing suitable evaluation tools that align with the electronic nature of the curriculum, in accordance with established policies aimed at achieving educational objectives.

This transformation was not previously considered critical in most countries; rather, it was one of the future options that educational institutions might adopt one day. However, with the emergence and spread of the Coronavirus (COVID-19) globally, this transformation has become imperative, necessitating that educational institutions worldwide take it into account.

The COVID-19 pandemic has compelled educational institutions in various countries to develop suitable and innovative alternatives to address the realities imposed by the pandemic, the most significant of which is the shift to distance learning and how to leverage e-learning as a viable alternative in light of the pandemic's spread (Wattafa, 2021). Therefore, this research aims to present a proposed framework for employing e-learning in primary education in Omdurman locality.

1.1 Research Problem

Countries around the world have faced an unprecedented challenge in the educational process due to the COVID-19 pandemic. The precautionary measures taken in response to the pandemic, such as social distancing, lockdowns, and restrictions, have directly impacted 1.6 billion students across all educational levels (UNESCO, 2020).

An examination of educational systems throughout various eras and regions shows that education is not isolated from its surrounding circumstances. It is always influenced by societal conditions, events, and social, health, economic, and political changes. In the context of the COVID-19 outbreak, which affected countries worldwide—including Sudan—the precautionary measures led to the suspension of studies in educational institutions for a significant period. The repeated extensions of the lockdown resulted in school closures lasting nearly a year. This situation arose because the education system in Sudan, particularly in public schools, is entirely traditional, relying on physical interaction between teachers and students within the classroom. Consequently, thousands of students were deprived of their right to education during this period. Therefore, there was an urgent need to shift to e-learning as an alternative to traditional education.

The researchers reviewed several studies in this area, including studies by Al-Muzain (2016), Ruba'i (2017), Al-Awadi (2017), Al-Sayed (2018), Hamouda & Hadi (2019), Al-Salmi (2020), and Al-Muhannawi (2021). Based on these insights, it is essential to propose a framework for employing e-learning in general education, particularly in primary government education. Accordingly, the researchers pose the following main question: *How can e-learning be utilized for teaching in primary education within government schools in Omdurman locality?*

1.2 Research Questions

- What are the essential technical requirements for implementing e-learning in teaching primary education in government schools in Omdurman locality?
- To what extent do teachers possess the necessary competencies to implementing e-learning in primary education in government schools in Omdurman locality?

- How suitable is the curriculum for utilizing e-learning in teaching primary education in government schools in Omdurman locality?
- What is the proposed framework for utilizing e-learning for teaching in primary education in government schools in Omdurman locality?

1.3 Research Objectives

- To identify the technical requirements needed to implement e-learning for teaching primary education in government schools in Omdurman locality.
- To assess the availability of the necessary competencies for teachers to implement e-learning in primary education in government schools in Omdurman locality.
- To evaluate the suitability of the curriculum for employing e-learning in teaching primary education in government schools in Omdurman locality.
- To propose a framework for utilizing e-learning in teaching primary education in government schools in Omdurman locality.

1.4 Importance of the Research

Theoretical Importance:

- This research may provide useful information for university professors and graduate students in conducting related studies and research.
- It will supply public libraries and particularly the libraries of colleges of education with new studies in the field of e-learning.
- It will assist policymakers by providing additional information about e-learning and its implementation mechanisms.
- It will help identify the requirements for e-learning and the necessary tools for its application in light of the COVID-19 pandemic to aid decision-makers in providing these requirements.
- It aims to develop a proposed framework for employing e-learning in primary education in Omdurman locality, which can benefit other educational stages.

Applied Importance:

- This research may assist the Ministry of Education in employing e-learning for teaching primary education in government schools in Sudan in the future.
- It can help decision-makers provide more effective training courses and workshops for teachers across different educational stages.
- This research may contribute to solving issues related to geographical distance, including costs and problems associated with transporting students and fuel shortages.

1.5 Research Delimitation

- **Subjective delimitation:** The researchers aim, through this study, to establish mechanisms for employing e-learning in primary education within government schools in Omdurman locality.
- **Spatial delimitation:** Primary education schools in government institutions in Omdurman locality.
- **Temporal delimitation:** The academic year (2021-2022).
- **Human delimitation:** A stratified random sample of male and female teachers in primary education at government schools in Omdurman locality.

1.6 Research Terminology

• E-Learning

Terminologically

E-learning refers to a system for delivering educational or training programs to learners at any time and in any place using information and communication technologies that facilitate interactive communication between the teacher and the learner (Aqla, 2016).

Operationally:

It is defined as the use of modern communication mechanisms in education through computers, their programs, and networks, utilizing internet gateways to activate distance learning.

• Employment of E-Learning

Operationally:

The employment of e-learning is defined as the effective use of e-learning to enhance the quality and effectiveness of education.

- **Primary Education Stage**

Operationally:

This stage is defined as the level that provides the amount of education and knowledge that each society considers a right for its citizens. It represents the essential knowledge, cognitive skills, spiritual education, and the attitudes and abilities that an individual should acquire.

- **Framework**

Terminologically:

A framework is a forward-looking plan based on actual field results obtained through quantitative or qualitative methodological tools to construct a general conceptual framework adopted by groups of researchers or educators (Zain Al-Din, 2013).

Operationally:

It refers to the educational and training programs that can be developed according to suitable conditions and resources to make education more effective.

2 Theoretical Framework and Previous Studies

2.1 Definition of E-Learning

E-learning is defined as "a modern educational method that utilizes modern communication tools such as computers, multimedia mechanisms, networks, graphics, search engines, and electronic libraries, whether before, during, or after the lesson. It includes two patterns: synchronous interaction during the presentation of the material and asynchronous interaction outside the instructional time" (Ali, 2020).

The educational literature contains several definitions attempting to provide a clear understanding of e-learning. In this context, Fatima Al-Baghdadi defines it as "education that combines distance learning and classroom instruction through modern communication tools such as computers, networks, and multimedia, integrating sound, image, graphics, search mechanisms, and digital libraries to reach the learner in the shortest time, with the least effort, and the greatest benefit" (Al-Baghdadi, 2020).

In this context, Taysir Al-Alousi offers a definition that emphasizes the methodology of e-learning and its ability to break the rigidity of traditional education. He states, "E-learning combines forms of education and electronic learning by relying on computers, storage media, and their networks, opening its bridges to all forms of constantly evolving technology." He adds that "this educational system requires a fundamental activation to transform the learner from merely being a repository of information for memorization and rote learning to establishing independent or self-directed learning, where action, perception, and interaction are based on individual capacity or energy, and thus within the limits of experiences, skills, and the potential to overcome obstacles" (Al-Alousi, 2020).

From this review of definitions, it is evident that e-learning is not a rigid, hollow form of education; rather, it is a strategic definition with modern implications and principles that focus on critical thinking, exploitation, appreciation, freedom, and democratic links between teacher and learner. What we want to convey in this context is that e-learning is a comprehensive and systematic educational system grounded in the principles of psychology and the most prominent new educational values in the world of education (Wattafa, 2021).

This emphasis on the educational and psychological content of e-learning is also reflected in, which defines it as "a means that supports the educational process and transforms it from rote learning to creativity, interaction, and skill development. It encompasses all electronic forms of education and learning, utilizing the latest methods in new fields of teaching and learning." This has reinforced the concept of individualized or self-directed learning, where the learner follows their learning according to their energy, ability, and pace, based on their previous experiences and skills. There is no doubt that "e-learning is one of the developed patterns known as distance learning in general, as it relies primarily on computers and networks to transmit knowledge and skills. Its applications include web-based learning, computer-based learning, virtual classrooms, and digital collaboration, with lesson content delivered via the internet, audio tapes, videos, and CDs" <https://ar.wikipedia.org/wiki/>

Regarding the tools, methods, and techniques that establish a new integrated vision, e-learning represents a modern revolution in educational methods and techniques, harnessing the latest technological advancements in devices and software for the educational process. This ranges from using electronic presentation tools to deliver lessons in traditional classrooms to creating virtual classrooms and various interactive environments, most of which have proven effective in education (Mujahid, 2020).

In conclusion, it can be said that e-learning is characterized by a high degree of complexity in its formation landscape, as it stems from philosophy, strategies, and objectives, and is connected to a complex digital environment. It cannot be a product of just days or even a few months, as it is a modern and advanced educational system that results only from long-term and continuous investment in media and communication technology in education (Tayeih, 2020).

2.2 Advantages of E-Learning

One of the positive aspects of e-learning is that it enables older students to take control of their learning, understand what they want to learn, recognize their interests, and identify the type of support they need. Online educational platforms also allow these students to learn at their own pace, providing them with greater flexibility and the ability to learn effectively. However, it is important to note that these advantages may diminish for younger learners who require the environment of traditional schooling.

A wide range of empirical research provides detailed evidence of the importance and feasibility of using distance learning as a modern educational approach that takes various forms and methods, which can be employed for different purposes. Many reputable universities have adopted distance learning systems to expand participation and reach many students whose circumstances do not allow them to engage in traditional education within university settings. However, these experiences were planned and designed for conditions different from our current situation. In this context, researcher Hassan Ahmed argues that the structured interaction provided by distance learning platforms not only facilitates the transmission of knowledge but also encourages learners to build their self-reliance and become seekers of truth. Simultaneously, in this mode of e-learning, the learner can access a vast flow of information at the click of a button. Here, the role of the learner is to choose the accurate information and the satisfactory answers they are searching for. Undoubtedly, digital technology has developed advanced methodologies for participation and interaction in education (Wattafa, 2021).

Another advantage of e-learning is the ease of accessing educational content. E-learning has enabled students to easily access all study materials through official digital educational platforms. By using social media and various available technological tools, students can effortlessly access courses, lectures, lessons, and the data they need, with unparalleled flexibility compared to traditional schooling, which relies on textbooks. This has also allowed them to participate in their lectures quickly and conveniently through the platform at appropriate times, applying equally to both students and teachers (Wattafa, 2021).

2.3 Objectives of E-Learning

Upon examining the comprehensive concept of e-learning, we find that it achieves the following objectives (Al-Hila, 2004):

- Increasing the effectiveness of teachers and raising the number of students in classrooms.
- Assisting teachers in preparing the required educational materials and compensating for the lack of experience among some of them.
- Providing educational packages in electronic format for both teachers and students, with ease of centralized updates by curriculum development administrations.
- Compensating for the shortage of academic and teaching staff in universities and secondary schools through virtual classes.
- Offering a system for admission to colleges and institutes, along with comprehensive and varied exams in universities remotely, in a highly credible manner without wasting much time for students and employees, as **occurs** in traditional methods.
- Promoting technology in society and providing a broader concept of continuous education.
- Providing supportive services in the educational process at universities, such as early course registration, building and distributing class schedules to teachers, and assessment and evaluation systems through dedicated portals.

2.4 Characteristics of E-Learning

E-learning is characterized by being an open electronic school (E-school) available 24 hours a day, seven days a week, including holidays. It does not restrict attendance by time or place, allowing students to engage anytime, day or night, from anywhere in the world. This school does not require physical classrooms, and it is not necessary to have computers at the university or school, as students can access it from home. Additionally, students can continuously access the course materials and lectures, which enhances interaction

and communication between teachers and students. In this environment, the student plays an active and positive role, contributing to the preparation of educational materials for the course, sharing opinions, and commenting on the work of other students. The electronic school provides students with access to a vast amount of information (Mohammed, 2001).

Regarding learning through the internet and networks, the traditional role of the teacher has shifted from being the sole source of information to becoming a facilitator of the learning process while also being a learner. This change has increased collaboration between teachers and students regarding e-learning mechanisms, leading to numerous advantages of this type of education, such as being a powerful tool for teaching and training, integrating education and training into a unified organizational structure, and providing comprehensive solutions to many problems faced by traditional education (Ibrahim, 2022).

In this regard, Musa (2002) notes several specific advantages of using e-learning for distance education, including:

- Rapid and accurate transmission and updating of information.
- Freedom for the learner to choose the appropriate time and place to receive and exchange information.
- Addressing the issue of large numbers in theoretical colleges.
- Guiding learners toward self-directed learning instead of imposing learning on them.
- Ease of updating programs, information, and topics.
- Facilitating self-assessment and feedback.

The success of the e-learning system depends on the level of interaction and activities, as well as the flexibility achieved by the design of the courses and their dissemination on the network. It should also meet the learner's needs for communication and interaction with the teacher, the educational institution, and the available electronic learning resources, along with the course content and navigation capabilities. Simply publishing the courses or their content on educational sites is not enough without an interactive design that engages the elements of this system (Abdulhamid, 2005).

2.5 Characteristics of E-Learning

There are several characteristics associated with e-learning. Al-Rawahi (2003) notes that the Web-based Education Commission in the United States has identified the most important characteristics of e-learning as follows:

- **Interactivity:** E-learning creates an interactive learning environment that allows learners to engage with real-world experiences and events, providing means to connect with other learners or teachers.
- **Adaptiveness:** It allows for the diversification and modification of content and methods presented to each learner based on their abilities and potential.
- **Learner-Centered:** The focus is on the needs of learners rather than the abilities of the teacher.
- **Up-to-Date:** It provides the most current information to participating learners.

In this context, Zain Al-Din (2005) outlines a broader set of characteristics related to e-learning, including:

- **Flexibility:** Learners can review their lessons at different times according to their circumstances, allowing access to the course anytime and anywhere.
- **Convenience:** This type of education offers a conducive environment for both teachers and learners, enabling teachers to focus on important ideas while preparing lessons. It also helps students who struggle with concentration by organizing information in a manner that is easy to comprehend.
- **Equity:** Communication tools allow every learner the opportunity to express their opinions freely and without embarrassment, enabling them to share their thoughts with all participants through email, discussion boards, and chat rooms, thereby ensuring equal opportunities for expression.
- **Effectiveness:** E-learning is highly effective, with its efficacy measured by educational outcomes via educational websites. Numerous studies have demonstrated the effectiveness of delivering complete educational courses electronically through networks.
- **Connectivity:** Synchronous communication tools such as discussion boards and chat rooms facilitate the exchange of viewpoints and discussions among participants in educational courses, enhancing collaboration and teamwork for learning.
- **Diversity:** The variety of communication tools is a major advantage that matches the diverse preferences, tendencies, and preparedness of participating learners, allowing each one to find suitable methods to connect with their peers, whether through written text, audio, images, or emails.

- **Non-Presence:** E-learning provides an opportunity to overcome time and space barriers, allowing access to information regardless of its location and facilitating communication with others, whether synchronously or asynchronously.
- **Accessibility:** Learners can reach teachers anytime, enabling them to send inquiries via interactive communication tools without conflicting with the teacher's schedule or delaying important questions.
- **Multi-Sensory:** One of the key features of e-learning is the variety of methods for presenting information, catering to the learning styles preferred by each learner. Learning can occur through static images, videos, animations, text, or audio, allowing learners to choose the methods that suit them best.
- **Multi Evaluation:** E-learning provides immediate assessment tools, offering diverse methods to classify and measure knowledge acquisition quickly, assessing the progress of learners in achieving the objectives of lectures, lessons, or entire courses (Zain Al-Din, 2005).

2.6 Types of E-Learning

Both Salem (2004) and Al-Mousa & Al-Mubarak (2005) have discussed the types of e-learning as follows:

- **Synchronous E-Learning:** This type requires the presence of both learners and the teacher at the same time to facilitate direct interaction. Participants engage in dialogue through chat or receive lessons in virtual classrooms. It is characterized by real-time communication via text, audio, or video. One of the advantages of this type is that students can receive immediate feedback from the teacher.
- **Asynchronous E-Learning:** In this model, the presence of the teacher and learner at the same time is not necessary. Learners can interact with the educational content and communicate through email, such as sending a message to the teacher with a question and receiving a response later. Asynchronous learning allows teachers to place resources and assessment methods on the website, enabling learners to access the site at any time and follow the teacher's guidance without needing simultaneous contact.
- **Blended Learning:** This approach combines various communication methods to learn a specific subject, including a mix of face-to-face meetings in classrooms, online communication, and self-directed learning.
- In addition to these main types, e-learning can also take various forms, including the use of CDs, the internet, and e-books.

2.7 Requirements for Transitioning from Traditional to E-Learning

Transitioning from traditional education to e-learning involves several requirements, as outlined by Al-Halfawi (2006):

- **Shift from Behavioral Learning Theories to Constructivist Theories:** The learner should be an active participant, constructing their own learning rather than passively receiving it from the teacher.
- **Change in Educational Philosophy:** Transition from teacher-centered education to learner-centered education, where the learner is responsible for their own learning.
- **From Teacher Control to Learner Control:** The learner should have control over their own learning paths and activities.
- **Outcomes of Learning:** Move from rote memorization to understanding, creativity, and problem-solving.
- **Persuasion Over Coercion:** Encourage positive reactions from teachers and learners to reduce resistance to change.
- **Gradual Transition:** The shift should be slow rather than rapid, as teachers, learners, and educational administrators need time to change their concepts and attitudes and to practice new skills and activities.
- **Provision of Necessary Physical and Human Resources:** Establish the required infrastructure and support systems.
- **Preparation of Suitable Electronic Programs and Courses:** Additionally, training for educational stakeholders to navigate the electronic environment is essential.
- **Detailed Planning:** Develop a comprehensive phased implementation plan, gradually expanding and adjusting plans based on the results of each phase.
- **Comprehensive Evaluation and Continuous Improvement:** Assess the quality of projects and identify objectives achieved efficiently and effectively.

2.8 Previous Studies

- **Study by Al-Anzi (2022)** this study aimed to assess the availability of e-learning competencies among faculty members at Northern Borders University after the COVID-19 pandemic. Utilizing a descriptive

approach, the study found that faculty members possessed high levels of e-learning competencies, except for the first domain, where cognitive competencies related to e-learning culture were found to be at a high level. Additionally, there were no statistically significant differences in e-learning competencies based on gender (male-female). The study recommended specialized training courses for faculty members on designing electronic courses.

- **Study by Al-Harbi (2022)** this study aimed to identify the technological training needs of science teachers in primary education and to develop a proposed training program based on blended learning to enhance technological skills among science teachers. A quasi-experimental single-group design was employed to evaluate the program's effectiveness. The findings revealed 40 electronic teaching skills representing the training needs of science teachers, distributed across five domains. The study also found significant statistical differences between the pre-test and post-test scores of science teachers in terms of technological skills, favoring the post-test. The study recommended further research on blended learning and its impact on developing technological skills among science teachers.
- **Study by Ibrahim (2021)** this study aimed to explore the attitudes of education students at Kassala University toward e-learning. Utilizing a descriptive analytical approach, the study revealed several findings, including positive attitudes toward e-learning among students, although they expressed dissatisfaction with the current state of e-learning at the university. Most students preferred e-learning to be generalized across all departments, and there were no significant differences in attitudes based on specialization, gender, or academic level.
- **Study by Qunaibi et al. (2020)** this study aimed to examine the reality of e-learning in Palestine during the COVID-19 pandemic from the teachers' perspective. Following a descriptive approach, the study found that the Palestinian curriculum needs significant development to align with e-learning, and the degree of teachers' engagement in e-learning practices was moderate.
- **Study by Ali and Al-Dhalai (2017)** this Study aimed to investigate the attitudes of students and faculty members towards e-learning. Using a descriptive approach, the results indicated positive attitudes from both students and faculty towards increased e-learning and academic achievement. However, neutral attitudes were observed regarding listening to lectures delivered electronically and encouraging peers to use e-learning systems. Some negative attitudes were noted concerning the neglect of educational aspects in e-learning and its lack of credibility. The study also found statistically significant differences in attitudes based on the experience of using Blackboard and the academic year of students, while no significant differences were found based on gender or academic qualifications.
- **Study by Ahmed and Al-Badih (2013)** this study aimed to assess the availability of e-learning competencies among faculty members at Al-Majma'a University. It sought to gather scientific results that could inform a set of proposals and practical measures to improve the skills and competencies of faculty members in using e-learning, including computer usage, internet usage, electronic course design, and virtual laboratories. The descriptive approach revealed that e-learning competencies among faculty members were available at moderate levels, with no statistically significant differences related to gender, age, specialization, academic rank, or training courses.
- **Study by Al-Ajrami (2012)** this study aimed to develop a list of necessary competencies for technology teachers in the context of e-learning and to assess the level of e-learning competencies among technology teachers in Gaza schools. It also sought to examine the competencies in light of variables such as specialization, experience, and educational level. Using a descriptive approach, the results indicated that teachers possessed competencies in basic computer skills, information network services, and electronic course design and management. No significant statistical differences were found in the level of competency related to specialization and years of experience, though significant differences were identified based on educational level across all domains except for basic computer skills.

2.9 Commentary on Previous Studies

Relationship Between the Current Study and Previous Studies

Similarities:

The current research shares methodological similarities with Al-Anzi (2022) and Ibrahim (2021), both of which employed a descriptive approach. It also aligns with the studies by Qunaibi et al. (2020), Ali and Al-Dhalai (2017), Ahmed and Al-Badih (2013), and Al-Ajrami (2012), all of which used descriptive methodologies. Furthermore, the current study's sample aligns with that of Qunaibi and Al-Ajrami (2012), as all involved samples from teachers.

Differences:

In contrast, this research differs from Al-Harbi (2022), which used a quasi-experimental design, while the current study utilized a descriptive approach. Regarding the sample, this research differs from Al-Anzi (2022) and Ahmed and Al-Badiah (2013), which both focused on university faculty, as well as Ibrahim (2021) and Ali and Al-Dhalai (2017), which included university students. Notably, this research proposes a specific framework for integrating e-learning in primary education in Omdurman.

General Commentary on Previous Studies:

Upon reviewing studies directly and indirectly related to the research topic, as well as the noted similarities and differences, the researchers benefited from the following insights:

- **Comprehensive Coverage:** The previous studies helped ensure that the current research addressed all relevant temporal, spatial, and thematic aspects comprehensively.
- **Inspiration for Research Design:** The previous studies provided new ideas and procedures that informed the design of the current research, aiding in the selection of the research methodology, tools, and formulation of research questions.
- **Avoiding Past Pitfalls:** The researchers were able to learn from the challenges and limitations faced by previous researchers, adapting strategies to mitigate similar issues in their study.
- **Leveraging Results and Recommendations:** The findings, recommendations, and proposals from earlier studies served as a foundation for this research, guiding the researchers in shaping their results and conclusions.

3 Research Procedures

3.1 Research Methodology

The researchers employed a descriptive analytical approach to quantitatively and qualitatively describe the studied phenomenon. This involved collecting, classifying, and analyzing data to reveal the relationships among its various dimensions, ultimately aiming to provide adequate interpretations and reach general conclusions that contribute to understanding the present and diagnosing the reality and its causes.

3.2 Research Population

The research population consists of all elements related to the phenomenon under study—specifically, the individuals involved in the research problem. According to Al-Assaf (1995), the research population encompasses anything to which the results can be generalized, including groups, individuals, or literature. For this study, the population included primary education teachers in Omdurman for the academic year 2021/2022.

3.3 Sample Selection

A random sampling method was used, allowing the researchers to freely select individuals that would fulfill the research objectives. A simple random stratified sample of teachers in public primary schools in Omdurman was chosen, comprising 300 teachers, representing 11.6% of the total population of 2,594 teachers. This sample size and selection method were deemed appropriate for achieving the research goals and providing valuable information to address the research problem.

3.4 Research Tools

The researchers developed a questionnaire directed at primary education teachers in public schools in Omdurman.

3.5 Questionnaire Development

The questionnaire was composed of three main sections:

- **Technological Requirements:** This section aims to identify the necessary technological equipment for employing e-learning in primary education, containing 11 items.
- **Teacher Competencies:** This section assesses the availability of competencies required for teachers to utilize e-learning in primary education, consisting of 13 items.
- **Curriculum Suitability:** This section examines the appropriateness of the curriculum for implementing e-learning in primary education, with 11 items.

External validity:

The initial version of the questionnaire was presented to five experts in the field of education for their review. These experts were from various departments, including Curriculum and Instruction, Educational Technology, Special Education, and Educational Administration. Based on their feedback, some questions were rephrased. After incorporating their final observations, the revised questionnaire was adopted in its final form, consisting of the three outlined sections.

Reliability and Validity:

To calculate the reliability coefficient of the questionnaire, Cronbach's alpha (α) was used, according to the following formula:

$$\frac{n}{n-1} \frac{1 - \sum_{i=1}^n \sigma_i^2}{\sigma_T^2}$$

Where:

- α is the reliability coefficient (Cronbach's alpha).
 - n is the number of items in the questionnaire.
 - σ_i^2 is the variance of each item in the questionnaire.
 - σ_T^2 is the total variance of the items
- consistency = $\sqrt{\text{reliability}}$

Table 1: Table of Reliability and Validity Coefficients

Section	Validity Coefficient	Reliability Coefficient
First Section	0.89	0.97
Second Section	0.88	0.98
Third Section	0.87	0.96
Entire Questionnaire	0.88	0.97

From Table 1, it is evident that the questionnaire exhibits high reliability and validity coefficients. This indicates that the items are clearly articulated and suitable for application to the sample population.

4 Presentation, Discussion, and Analysis of Results

4.1 Presentation and Discussion of the First Question's Results

To address the first question, which asks: *What are the required technological preparations for employing e-learning in primary education in public schools in Omdurman?* frequency counts, percentages, and Chi-square and T-tests were utilized. The results are summarized in Table 2.

Table 2: Frequencies and Percentages of Required Technological Preparations

No.	Frequency & %	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Weighted Freq	Mean	Percent	T-Test	Chi-square	Sample	Rank
1	125 (40.3%)	73	23	65	24		3.67	1.38	73.6%	8.62	113.9	Agree	2
2	99 (31.9%)	90	28	70	23		3.55	1.34	71.1%	7.31	78.9	Agree	3
3	9 (2.9%)	9	26	140	126		1.82	0.92	36.5%	-	275.7	Disagree	8
4	140 (45.2%)	101	29	32	8		4.07	1.09	81.5%	17.35	201.7	Agree	1
5	62 (20%)	52	39	125	32		2.95	1.34	59.2%	-0.55	88.6	Somewhat Agree	5
6	3 (1%)	1	24	142	140		1.66	0.72	33.2%	-	340.8	Strongly Disagree	11
7	2 (0.6%)	5	22	162	119		1.73	0.71	34.8%	32.81	349.9	Strongly Disagree	10
8	80 (25.8%)	62	50	70	47		3.20	1.45	64.6%	31.07	74.2	Somewhat Agree	4
9	66 (21.3%)	56	35	94	58		2.91	1.45	58.4%	2.24	94.8	Somewhat Agree	6
10	63 (20.3%)	63	27	93	64		2.89	1.45	57.9%	-0.98	35.3	Somewhat Agree	7
11	9 (2.9%)	8	21	131	141		1.75	0.91	35.0%	1.24	296.9	Strongly Disagree	9
										24.15			
Overall								0.52	8.42				

4.1.1 Analysis of Results

From Table 2, it is evident that the technological preparations required for employing e-learning in primary education in public schools in Omdurman are somewhat available, with a mean score of 2.75 and a standard deviation of 5.21.

- **Highest Rated Item:** Item 4 received the highest rank, with 71.11% of respondents (mean = 4.07) indicating that there are social media platforms for communication and information sharing among teachers.
- **Lowest Rated Item:** Conversely, Item 6 had the lowest percentage, with only 33.2% of respondents (mean = 1.66) affirming the existence of an electronic library at the school.
- **General Agreement:** Respondents agreed on the availability of computers (mean = 3.67) and email services (mean = 3.55). However, 72.1% reported a lack of consistent electricity supply.
- **Training and Support:** While there was some agreement on the provision of training courses and qualified technical personnel for electronic device maintenance (mean = 2.95, 2.91, and 2.89 respectively), several items faced significant opposition. For example, Item 3 regarding the existence of a dedicated school website saw 63.5% disagreement, and Item 11 on the availability of laptops encountered 85.7% disagreement.
- **Statistical Analysis:** The analysis revealed no statistically significant differences among the responses of the sample group. The required technological preparations for e-learning are available to a considerable degree.

These findings align with the results of previous studies, such as those by Al-Anzi (2022) and Al-Ajrami (2012), which also indicated challenges and opportunities in the integration of e-learning technologies in educational settings.

4.2 Presentation and Discussion of the Second Question's Results

To answer the second question, which asks: *What is the level of availability of competencies necessary for teachers to employ e-learning in primary education in Omdurman?* Frequency counts, percentages, and Chi-square and T-tests were utilized. The results are summarized in Table 3.

Table 3: Frequencies and Percentages of Required Competencies for Teachers

Item No.	Frequency & Percentage	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Weighted Frequency	Mean	Percentage	T-Test	Chi-square	Sample	Rank
1	82	88	72	50	18	3	3.53	70.60%	7.82	52.5	Agree	3	
2	51	60	63	97	39	2	2.95	59%	0.571	30.3	Somewhat Agree	10	
3	58	68	62	83	39	2	3.07	61.40%	0.991	16.4	Somewhat Agree	8	
4	83	83	48	66	29	3	3.46	69.20%	4.816	101.8	Agree	5	
5	83	91	51	59	26	3	3.47	69.40%	6.409	43.6	Agree	4	
6	64	72	56	78	40	3	3.13	62.60%	1.177	14.1	Somewhat Agree	6	
7	46	76	70	83	35	2	2.04	40.80%	0.682	27.1	Disagree	13	
8	39	52	75	105	39	4	4.82	96.40%	2.467	51.2	Strongly Agree	1	
9	155	89	31	22	13	4	4.13	82.60%	17.85	23.2	Agree	2	
10	55	71	60	96	28	3	3.09	61.80%	1.3	39.4	Somewhat Agree	7	
11	23	18	117	94	58	2	2.52	50.40%	7.606	121.3	Disagree	12	
12	36	29	112	91	42	2	2.76	55.20%	3.63	88.8	Somewhat Agree	11	
13	61	48	65	99	37	2	2.99	59.80%	0.129	35.4	Somewhat Agree	9	
Overall	315							66.4	949.57				

4.2.1 Analysis of Results

From Table 3, it is clear that the competencies necessary for teachers to employ e-learning were somewhat available according to the responses from the sample.

- **Highest Rated Item:** Item 8 received the highest agreement, with 96% of respondents (mean = 4.82) confirming their ability to design electronic courses.
- **Key Competencies:** A significant finding was that 82.6% of respondents agreed (mean = 4.13) that they were capable of using e-learning tools. Furthermore, 70.6% reported that they were proficient in using computers, and 69.4% were capable of utilizing search engines to gather information.

- **Limited Modern Teaching Methods:** In contrast, only 40.8% indicated proficiency in using modern teaching methods, with a low mean score of 2.04.
- **General Agreement:** Items 1, 4, 5, and 9 showed strong agreement, indicating a willingness to embrace e-learning, with percentages reaching up to 82.6%.
- **Moderate Agreement on Challenges:** Items 2, 3, 6, 10, and 13 reflected moderate agreement regarding challenges such as live lecture streaming, evaluating students, and individualized follow-ups.
- **Disagreement on Email and E-Learning Methods:** Items 12, 11, and 7 indicated disagreement, as most respondents felt they lacked proficiency in using email and electronic teaching methods, as well as questioning the effectiveness of e-learning.
- **Statistical Significance:** The analysis revealed no statistically significant differences among the responses of the sample group.

These findings are consistent with previous studies, such as those by Al-Anzi (2022), Ali and Al-Dhalai (2017), Ahmed and Al-Badih (2013), and Al-Ajrami (2012), which also highlighted the need for improved competencies among teachers for effective e-learning implementation.

4.3 Presentation and Discussion of the Second Question's Results

To answer the second question, which asks: *What is the level of availability of competencies necessary for teachers to employ e-learning in primary education in Omdurman?* frequency counts, percentages, and Chi-square and T-tests were utilized. The results are summarized in **Table 4**.

Table 4: Frequencies and Percentages of Required Competencies for Teachers

Item No.	Frequency & Percentage	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Weighted Frequency	Mean	Percentage	T-Test	Chi-square	Sample	Rank
1	82	88	72	50	18	3	3.53	70.60%	7.82	52.5	Agree	3	
2	51	60	63	97	39	2	2.95	59%	0.571	30.3	Somewhat Agree	10	
3	58	68	62	83	39	2	3.07	61.40%	0.991	16.4	Somewhat Agree	8	
4	83	83	48	66	29	3	3.46	69.20%	4.816	101.8	Agree	5	
5	83	91	51	59	26	3	3.47	69.40%	6.409	43.6	Agree	4	
6	64	72	56	78	40	3	3.13	62.60%	1.177	14.1	Somewhat Agree	6	
7	46	76	70	83	35	2	2.04	40.80%	0.682	27.1	Disagree	13	
8	39	52	75	105	39	4	4.82	96.40%	2.467	51.2	Strongly Agree	1	
9	155	89	31	22	13	4	4.13	82.60%	17.85	23.2	Agree	2	
10	55	71	60	96	28	3	3.09	61.80%	1.3	39.4	Somewhat Agree	7	
11	23	18	117	94	58	2	2.52	50.40%	7.606	121.3	Disagree	12	
12	36	29	112	91	42	2	2.76	55.20%	3.63	88.8	Somewhat Agree	11	
13	61	48	65	99	37	2	2.99	59.80%	0.129	35.4	Somewhat Agree	9	
Overall	315						66.4		949.5				

4.3.1 Analysis of Results

From **Table 3**, it is clear that the competencies necessary for teachers to employ e-learning were somewhat available according to the responses from the sample.

- **Highest Rated Item:** Item 8 received the highest agreement, with 96% of respondents (mean = 4.82) confirming their ability to design electronic courses.
- **Key Competencies:** A significant finding was that 82.6% of respondents agreed (mean = 4.13) that they were capable of using e-learning tools. Furthermore, 70.6% reported being proficient in using computers, and 69.4% were capable of utilizing search engines to gather information.
- **Limited Modern Teaching Methods:** In contrast, only 40.8% indicated proficiency in using modern teaching methods, with a low mean score of 2.04.
- **General Agreement:** Items 1, 4, 5, and 9 showed strong agreement, indicating a willingness to embrace e-learning, with percentages reaching up to 82.6%.
- **Moderate Agreement on Challenges:** Items 2, 3, 6, 10, and 13 reflected moderate agreement regarding challenges such as live lecture streaming, evaluating students, and individualized follow-ups.
- **Disagreement on Email and E-Learning Methods:** Items 12, 11, and 7 indicated disagreement, as most respondents felt they lacked proficiency in using email and electronic teaching methods, as well as questioning the effectiveness of e-learning.

- **Statistical Significance:** The analysis revealed no statistically significant differences among the responses of the sample group.

These findings are consistent with previous studies, such as those by Al-Anzi (2022), Ali and Al-Dhalai (2017), Ahmed and Al-Badiah (2013), and Al-Ajrami (2012), which also highlighted the need for improved competencies among teachers for effective e-learning implementation.

4.4. Presentation and Discussion of the Fourth Question's Results: Proposed Framework

To answer the fourth question of the research, which states: "**What is the proposed framework for employing e-learning in teaching at the primary education level in Omdurman?**", the researchers developed a framework based on the findings of the study. The current research results indicated a deficiency in the cognitive, skill-based, and emotional aspects of teachers, highlighting their need for further training and qualification in e-learning.

After reviewing the literature related to the employment of e-learning, along with the researchers' experience in the academic and technical fields, the following detailed framework was derived in response to the fourth question: "**What is the proposed framework for employing e-learning in teaching at the primary education level in Omdurman?**"

Rationale and Justifications for Building the Proposed Framework

Several justifications motivated the researchers to build this framework, including:

- **Teachers' Needs:** The necessity for teachers to understand how to effectively utilize e-learning in primary education.
- **Global Trends:** The worldwide shift towards adopting e-learning as a modern educational system, especially in times of crisis.

Objectives of the Proposed Framework:

The proposed framework aims to achieve the following goals:

- **Establish Standards:** Formulate standards for employing e-learning in teaching at the primary education level in Omdurman.
- **Provide Local Standards:** Offer local standards to the relevant authorities in the Ministry of Education to measure the quality of e-learning implementation in primary education.

Sources for Preparing the Proposed Framework:

The preparation of the proposed framework was based on the following sources:

- **Educational Literature:** Relevant educational literature concerning standards for employing e-learning in primary education.
- **Previous Research Findings:** Results from prior studies related to e-learning.
- **The Researcher's Perspective:** The researchers' own insights and experiences.

Requirements for the Proposed Framework:

To implement the proposed framework, several requirements must be met:

1. Material Resources:

- **Financial Resources:** Funding for training teachers on e-learning implementation standards, including attending relevant workshops or training courses.
- **Infrastructure:** Financial resources to establish the necessary infrastructure (classrooms, computers, screens, etc.) for awareness courses on local and global standards.

2. Non-Material Resources:

- **Qualified Personnel:** Teachers, trainers, and technicians specialized in the technical field as members of a dedicated e-learning management unit.
- **Measurement Tools:** Design integrated measurement and evaluation tools to assess the quality of e-learning courses.

Content of the Proposed Framework:

The content consists of a plan based on a systems analysis approach (inputs, processes, outputs) in the form of four steps: (1) Awareness and Preparation, (2) Planning, (3) Implementation, and (4) Evaluation.

1. Awareness and Preparation Phase:

- Promote international standards for employing e-learning through seminars, posters, newsletters, training courses, conferences, and the school's website.
- Prepare the basic infrastructure for employing e-learning in primary education, starting with convincing academic and administrative leaders of the importance of adhering to standards in e-learning.

- Budget Allocation: Schools should allocate an appropriate financial amount, as financial support is crucial for employing e-learning. The budget should cover expenses such as purchasing licenses for specific programs that facilitate e-learning.
 - Train some teachers on skills that contribute to employing e-learning in primary education.
 - Consult specialized experts in designing and evaluating the e-learning implementation experience.
- 2. Planning Phase:**
- From e-learning committees in schools, composed of technicians to assist teachers in designing their curricula and monitoring students electronically, derived from the higher e-learning committee at the Academic Development and Quality Assurance Center within the Ministry of Education.
 - Conduct an analytical study of the standards for employing e-learning in regional and global systems and regulations.
- 3. Implementation Phase:**
- Develop an action plan that includes detailed information, budgets, and timelines for starting and completing tasks while identifying responsible parties.
 - Design a unified template according to the agreed-upon standards for teachers to follow when designing their curricula.
 - Prepare a guiding manual and regulatory list that outlines all agreed-upon standards.
- 4. Evaluation Phase:**
- Appoint a follow-up and evaluation team from the Academic Development Center at the Ministry of Education to periodically monitor the implementation of the electronic curriculum designs according to global standards.
 - Provide the Academic Development Center with feedback on suggestions and ideas for improving the methods and strategies for designing and implementing e-learning in teaching at the primary education level.

Components of the Proposed Framework:

The researchers constructed the framework's standards as follows:

1. Standards Related to Course Description and Outcomes

These are the criteria that should be considered during the analysis and planning stages of designing and building the e-course, such as:

- Clarity of the e-course objectives.
- Meeting learners' needs.
- Identifying prerequisites for the course.
- Identifying current requirements for the course.
- Clearly defining the expected outcomes of the e-course.

2. Standards Related to Content Organization and Coherence

These criteria should be considered when starting to design the e-course, including:

- Alignment of scientific content with course outcomes.
- Currency of the scientific content.
- Dividing content into smaller parts.
- Presenting content in a logical sequence.
- Gradually increasing difficulty in delivering educational content.
- Considering individual differences among learners.
- Adhering to instructional design standards.
- The ability to convert educational media into text.

3. Standards Related to Content Delivery Methods

These criteria ensure that educational content reaches the learner effectively:

- Presenting educational content in multiple formats.
- Providing support and assistance to learners while using the e-course.
- Offering a guide on how to use the e-course.

4. Standards Related to Engaging Learners in Learning

These criteria measure the degree of learner engagement and interaction with the provided e-content, such as:

- Ease of navigation through different content sections for learners.
- Diversifying examples and activities appropriate for the age group.
- Ensuring the e-content aligns with the age group.
- Providing timely reinforcement to learners.

5. Standards Related to Course Evaluation and Outcomes

These criteria measure the extent to which learning objectives are achieved, such as:

- Including a pre-test to assess learners' initial levels.
- Providing formative assessments to measure learners' progress.
- Including a post-test to evaluate whether course objectives were met.
- Offering immediate feedback on learners' responses.
- Ensuring test questions are aligned with course objectives.

6. Standards Related to Content Structuring Educational Activities

Activities should be varied, including participation in forums between teachers and learners to inquire about course topics, such as:

- Discussion groups via the network.
- Utilizing search engines and websites to accomplish learning tasks.
- Conducting practical experiments.
- Using virtual labs.
- Producing video files to explain lessons.
- Creating teaching-related images and presentations.
- Attending conferences virtually.
- Varied activities between individual and group work.

Teaching Tools:

The tools should be diverse, including: the internet, computers, data projectors, audio recordings, video files, and educational websites.

Teaching Methods in the Proposed Framework:

The proposed framework includes various teaching methods and strategies according to the educational context requirements, such as:

- Electronic discussions.
- Electronic games.
- Electronic brainstorming.
- Collaborative electronic learning.
- Electronic projects.
- Knowledge journeys via the web.
- Electronic mind maps.
- Electronic lectures.
- Participatory electronic learning.

Evaluation Methods for the Proposed Framework:

Formative Evaluation:

To determine the progress and understanding of teachers regarding training objectives, and to identify weaknesses and correct deficiencies, formative evaluation occurs during each training session through activities and exercises based on teachers' responses. Transitioning from one topic to another only occurs after ensuring that teachers reach the specified level, accompanied by timely feedback.

Summative Evaluation:

This involves measurement tools aimed at assessing the skills of trainees after interacting with the program, consisting of: a knowledge test to measure the cognitive aspect related to electronic writing, and an observation checklist to assess the skill aspects of planning, designing, and evaluating electronically.

Finalization of the Proposed Framework:

The proposed framework was presented to a group of experts in the field of e-learning to gather their opinions on its validity and adequacy. Based on their feedback and observations, the framework was refined into its final form.

5 Conclusions

- The positive attitudes of teachers towards e-learning and their ability to design e-courses contribute to the successful implementation of the proposed framework, enhancing its effectiveness in the educational process.
- The application of the proposed e-learning framework facilitates new ways to deliver information to learners more quickly and with less effort. This enables better management of the educational process, monitoring and assessing learners' performance, and providing a suitable learning environment, thereby

increasing learners' motivation towards learning and enhancing their self-directed learning skills and problem-solving abilities.

- The proposed e-learning framework transforms the role of the teacher from a source of information to a facilitator and guide in the educational process. Consequently, the role of the student shifts from a passive recipient to an active participant in the educational experience.

5.1 Recommendations

Based on the findings of the current study, the researchers offer several recommendations:

- **Utilize Social Media:** It is essential to integrate social media networks into the educational process within primary education institutions.
- **Training Workshops:** Organize training courses for teachers, including those who are not educational specialists, on how to use e-learning strategies to enhance their teaching skills in line with technological advancements.
- **Student Training:** Conduct training sessions for students on electronic educational platforms and tools, teaching them how to effectively utilize these resources in their self-directed learning processes.

Research Proposals:

In light of the study's findings, the researchers propose future research directions as follows:

- **E-Learning in Secondary Education:** Investigate the application of e-learning for teaching at the secondary education level.
- **Performance Measurement Standards:** Establish standards for measuring the job performance of teachers related to e-learning.

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