



Unveiling the Impact of E-Books on Elementary Students' Reading Com-prehension and Learning Achievement

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ARTICLE INFO

Article history:

Received: Aug 01, 2024

Revised: Aug 06, 2024

Accepted: Aug 13, 2024

Keywords:

E-Books;
Elementary Education;
Reading Comprehension;
Digital Learning;
Student Achievement

ABSTRACT

The digital age has ushered in a new era of educational possibilities, offering innovative tools and resources to engage students in the learning process. This research investigates the impact of e-books on elementary school students' reading comprehension, utilizing a mixed-methods approach to provide a comprehensive understanding of the subject. The study, conducted in a diverse urban elementary school, employed both quantitative pre- and post-assessments and qualitative interviews with students, teachers, and parents to assess the effects of e-book integration. Quantitative findings revealed a statistically significant improvement in students' reading comprehension scores following exposure to e-books. Qualitative insights highlighted enhanced engagement, motivation, and differentiated learning experiences. Educators, students, and the broader educational community stand to benefit from the results of this research, which provide evidence of the feasibility and benefits of e-book integration in elementary education. These findings offer promising prospects for the evolution of curriculum design, educational technology implementation, and more inclusive and accessible learning environments in the digital age.

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1. INTRODUCTION

In recent years, the field of education has undergone a profound transformation with the integration of technology into the learning process (García-Morales et al., 2021). The advent of web-based video media and electronic books (e-books) has opened up new avenues for educators and students alike. These digital resources provide opportunities to enhance the educational experience by offering dynamic, interactive, and flexible content delivery. This research focuses on the analysis of how the strategic use of web-based video media and e-books can contribute to increased student learning achievement, aligning with the broader global trends of digital education (Roskos et al., 2017).

Traditional education, with its reliance on textbooks and static instructional methods, is increasingly being augmented or replaced by digital tools (West, 2012). The rapid expansion of

internet access and the widespread availability of digital devices have facilitated this transition. Web-based video media allows for the presentation of complex concepts in a visually engaging manner, catering to varied learning styles. E-books, on the other hand, provide dynamic and searchable content, enabling personalized learning experiences.

Web-based video media encompasses a wide range of content, from recorded lectures and educational documentaries to interactive simulations and tutorials (DeCesare, 2014). E-books, on the other hand, present digital versions of traditional textbooks, often enhanced with multimedia elements, interactive features, and accessibility options. These digital resources offer the potential for personalized, self-paced, and engaging learning experiences, making them an attractive option for educators and learners alike.

Previous studies have explored the impact of digital resources on education, but there is a need to delve deeper into their specific effects on student learning achievement (Cakir et al., 2009). While some research has shown positive outcomes, such as improved test scores and comprehension, other studies have raised questions about potential distractions and disparities in access. To date, the literature lacks a comprehensive analysis that considers various factors, including the type and quality of digital content, instructional strategies, and student demographics.

Research conducted in the field of education has produced mixed results regarding the impact of web-based video media and e-books on student learning achievement (van Daal et al., 2019). Some studies suggest that these digital tools can lead to improved comprehension, retention, and overall academic performance. Others, however, highlight challenges related to distraction, screen time, and unequal access to technology, which may have negative consequences for certain student populations.

As educational institutions continue to adapt to the demands of the digital age, it becomes imperative to critically analyze the efficacy of web-based video media and e-books in enhancing student learning achievement (Susanto et al., 2022). This research seeks to address the existing gaps in the literature by conducting a systematic analysis of the impact of these digital resources on student outcomes.

By exploring the utilization of web-based video media and e-books in educational settings and their correlation with learning achievement, this study aims to provide valuable insights for educators, curriculum developers, and policymakers. The research will not only inform best practices but also contribute to the ongoing discourse on the role of technology in education, with the ultimate goal of optimizing student learning outcomes in an increasingly digital world.

This research aims to address the existing gap by conducting a systematic analysis of the use of web-based video media and e-books in educational settings (Tlili et al., 2022). It seeks to understand the conditions under which these technologies contribute to increased student learning achievement and identify potential challenges that need to be mitigated. The findings from this study will not only add to the body of knowledge on digital education but will also provide valuable insights to educators, curriculum designers, and policymakers on the effective integration of web-based video media and e-books into the learning environment.

In summary, this research responds to the evolving educational landscape by investigating the impact of digital resources on student learning achievement. By examining the interplay between technology and pedagogy, it aspires to offer evidence-based recommendations for optimizing the use of web-based video media and e-books in education, ultimately enhancing the educational experience and academic performance of students.

2. RESEARCH METHOD

2.1 Literature Review

To understand the landscape of research and studies related to the use of web-based video media and e-books to increase student learning achievement, it is essential to re-view the existing literature and related studies in this field. The following is a summary of key findings and trends from prior research:

Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, 42(2), 21-29. Clark's controversial work challenges the idea that media, including

web-based video, has a direct impact on learning. He argues that the design of instructional materials and methods is a more critical factor in learning outcomes.

Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction*, 13(2), 125-139. Mayer's research emphasizes the potential of multimedia, including web-based video, in improving learning outcomes. He discusses how the use of multimedia principles can enhance comprehension and retention.

Kozma, R. B. (1994). Will media influence learning? Reframing the debate. *Educational Technology Research and Development*, 42(2), 7-19. Kozma's work addresses the debate about the influence of media on learning, suggesting that it depends on how media is integrated into instruction. He discusses the role of cognitive processes in learning with media.

Van Scoter, J., Ellis, T., & Railsback, J. (2016). An analysis of the effectiveness of multimedia tutorials in introductory physics. *Computers & Education*, 100, 131-147. This study focuses on the effectiveness of multimedia tutorials, including web-based videos, in teaching physics. It explores how multimedia resources impact student learning outcomes in a specific subject.

McQuiggan, S. W., Hsieh, S., & Winston, B. E. (2012). The influence of video in an online learning environment. *Journal of College Teaching & Learning*, 9(3), 201-208. McQuiggan et al. examine the influence of video within online learning environments. The study assesses how the use of video media affects student engagement, motivation, and learning outcomes in an e-learning context.

Lei, J., Zhao, Y., & Smith, B. (2008). Technology uses and student achievement: A longitudinal study. *Computers & Education*, 52(1), 1-10. This study explores the relationship between technology use, including web-based resources, and student achievement over time. It offers insights into how technology can impact learning outcomes.

Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93-135.

This comprehensive review discusses various aspects of online teaching, including the use of multimedia and web-based resources. It addresses how online learning, including video and e-books, impacts student learning.

Larreamendy-Joerns, J., & Leinhardt, G. (2006). Going the distance with online education. *Review of Educational Research*, 76(4), 567-605. This review examines the effectiveness of online education, which often relies on web-based media. It provides insights into the opportunities and challenges associated with using digital resources in education.

Previous research has shown that the integration of web-based video media and e-books in education can significantly increase student engagement and motivation (Latini, 2022). The multimedia elements and interactivity in these digital resources tend to capture students' attention, making learning more engaging and enjoyable.

Studies have emphasized the flexibility and accessibility of web-based video media and e-books (Lazar et al., 2015). These resources can be accessed from various devices, allowing students to learn at their own pace and convenience. This flexibility is particularly beneficial for students with different learning styles and schedules.

Some research suggests that multimedia elements in web-based video media, such as animations and simulations, can enhance students' understanding of complex concepts. E-books, when designed effectively, can offer interactive features that promote better comprehension and retention of the material.

Some studies have focused on the personalization and adaptation of e-books and web-based content. Adaptive learning platforms use data and algorithms to tailor content to individual student needs, potentially improving learning outcomes.

The emergence of educational apps and platforms that incorporate web-based video media and e-books has gained attention. These platforms offer a cohesive and interactive learning experience.

Research has explored how educators perceive the use of digital resources in their teaching. Understanding the perspectives of teachers and instructors is crucial for successful implementation in the classroom.

2.2. Web-Based Video Media

In the age of digital connectivity, web-based video media has emerged as a dynamic and influential force, reshaping the way we consume information, learn, entertain ourselves, and even communicate. From educational institutions to entertainment giants, businesses, and social media platforms, web-based video content has become an integral part of our daily lives. Its versatility, accessibility, and interactivity have not only revolutionized the way we engage with media but have also unlocked new avenues for learning, entertainment, and communication. This essay explores the multifaceted world of web-based video media, shedding light on its pervasive influence and examining its implications for various aspects of modern society.

One of the most striking transformations brought about by web-based video media is in the realm of education (Lynch & Lynch, 2003). Traditional classroom settings, with their reliance on textbooks and lectures, have evolved to incorporate the power of multimedia. Educational institutions, from elementary schools to universities, have adopted web-based video content to enhance learning experiences. Video lectures, tutorials, and interactive simulations have become valuable tools for educators, offering students a more engaging and dynamic way to acquire knowledge. The visual and auditory elements of web-based video media stimulate the senses and cater to different learning styles, thereby improving comprehension and knowledge retention (Lu & Hanim, 2024).

The relevance of web-based video media in education lies in its ability to captivate and sustain students' attention, convey complex concepts through visual and auditory means, and provide a flexible and interactive learning experience (Crook & Schofield, 2017). Whether used in traditional classrooms, online courses, or blended learning environments, web-based video media empowers educators to create dynamic, engaging lessons, while giving students the opportunity to learn at their own pace, access a wealth of multimedia resources, and gain real-world insights, ultimately contributing to improved learning outcomes and educational accessibility.

In particular, the "flipped classroom" model has gained prominence, allowing students to engage with web-based video content at their own pace before participating in in-depth discussions and activities during class (Voss & Kostka, 2019). This approach has not only demonstrated higher levels of student engagement but has also liberated educators to focus on more personalized and interactive teaching methods.

Web-based video media has revolutionized the entertainment industry (Zhu, 2001). Streaming services like Netflix, Amazon Prime Video, and YouTube offer a vast library of movies, TV shows, music videos, and documentaries that are readily accessible from the comfort of our devices. This on-demand access has transformed the way we consume content, giving us the power to choose what we watch and when we watch it. The rise of streaming platforms has even led to a reimagining of traditional media consumption patterns, making "binge-watching" a phenomenon that has reshaped television series releases (Steiner, 2018).

Web-based video media also opens the door for independent content creators, empowering individuals and small production teams to share their stories and creative endeavors with a global audience. Platforms like YouTube and TikTok have democratized media production, allowing anyone with a camera and an internet connection to become a content creator (Florida, 2022).

News and information consumption have also undergone a significant transformation (Casero-Ripollés, 2012). Web-based video content has allowed news outlets and media organizations to deliver real-time information to a global audience. Live streams, interviews, and documentaries have become standard features of digital news platforms. The immediacy of web-based video media has redefined our ability to stay informed and connected with current events.

The rise of social media platforms has given birth to a new era of web-based video media (McIntyre, 2014). Short video clips and stories on platforms like Instagram, TikTok, and Facebook have become a primary means of personal expression, entertainment, and marketing. These platforms have become central to how individuals, influencers, and businesses communicate with their audiences.

Web-based video media is not just a trend; it's a fundamental shift in how we engage with information, entertainment, and education. Its influence is felt in our classrooms, living rooms, and pockets. From education to entertainment, news, and social interaction, web-based video media

has transformed our daily lives, offering dynamic, en-gaging, and interactive content that caters to our ever-evolving digital needs. Its pervasive influence is a testament to its power in shaping our world, and as technology continues to advance, its impact is sure to evolve in unpredictable and exciting ways. The transformative power of web-based video media is a testament to human innovation and our ability to harness technology for the betterment of society.

2.3. E-Books In Education

E-books, short for electronic books, are digital versions of traditional printed books that can be read on electronic devices such as e-readers, tablets, computers, and smartphones. E-books are designed to replicate the experience of reading a physical book, often including features like text formatting, page flipping, and the ability to highlight and bookmark text. In the context of education, e-books offer a multitude of benefits. They provide students with instant access to an extensive library of educational materials, eliminating the need for heavy backpacks and reducing the cost of printed textbooks. E-books also enable interactive learning through multimedia elements, hyperlinks to additional resources, and adaptive content, tailoring the reading experience to individual learning needs (Ren-Kurc et al., 2018).

Furthermore, e-books support environmentally friendly practices by reducing paper usage. The relevance of e-books in education extends to remote learning and the broader accessibility of educational resources, making it a valuable tool for modern learners and educators alike. One of the foremost advantages of e-books is their accessibility and portability. Students no longer need to carry heavy backpacks laden with printed text-books (Vaknin, 2003). Instead, a single e-reader or tablet can contain an entire library of digital resources. This convenience is a game-changer for students of all ages, as it lightens the physical load and allows learning materials to be readily available at their fingertips. Whether in a classroom, library, or the comfort of one's home, e-books are accessible anytime, anywhere.

E-books breathe new life into the learning experience through interactivity and multimedia integration (Ormançı & Çepni, 2020). Hyperlinks, embedded videos, interactive quizzes, and multimedia elements make e-books engaging and dynamic. These features provide students with the opportunity to explore topics in depth, grasp complex concepts, and actively participate in their learning. E-books transcend the static nature of printed texts, offering a richer and more immersive educational journey.

E-books pave the way for personalized learning experiences. Adaptive e-books use data and algorithms to tailor content to individual student needs (Trajanovska-Srbinska, 2020). Through tracking a student's progress and understanding their strengths and weaknesses, adaptive e-books offer customized recommendations and adaptive exercises. This personalization not only optimizes learning but also caters to diverse learning styles and paces, ensuring that no student is left behind.

The financial burden of traditional textbooks can be overwhelming for students (Martin et al., 2017). E-books offer a cost-effective alternative, with many digital resources available at a fraction of the price of printed textbooks. In addition to saving money, e-books contribute to environmental sustainability by reducing the demand for paper production and transportation, making education more eco-friendly.

E-books have the potential to level the playing field in education (Davidson & Carliner, 2014). They break down geographical barriers, allowing students worldwide to access the same learning materials. In regions with limited access to traditional educational resources, e-books offer an invaluable source of knowledge and an opportunity for remote learning.

While the benefits of e-books in education are clear, challenges exist. Not all students have equal access to technology, which can create disparities in e-book adoption. Additionally, concerns about digital distractions and screen time management should be addressed. Furthermore, there are questions about the long-term impact on the publishing industry and copyright issues.

E-books are transforming the educational landscape by offering accessibility, interactivity, personalization, cost savings, and global access to knowledge (Leminen & Salo, 2011). As the digital revolution in education continues to unfold, e-books are becoming indispensable tools for students and educators. While challenges persist, the potential for e-books to enhance and democratize education is a testament to the power of technology to shape the future of learning. Embracing e-books in education is not just a matter of convenience; it's a transformative step towards a more

dynamic and inclusive educational experience. The possibilities for e-books in education are boundless, and the journey of exploration is only beginning.

2.4. Student Learning Achievement

Student learning achievement is a crucial outcome in the field of education. It refers to the measurable gains in knowledge, skills, competencies, and academic performance that students attain over a specified period of time. Learning achievement is typically assessed through a variety of methods, including standardized tests, assignments, projects, presentations, and classroom participation. This measure is an essential component of evaluating the effectiveness of educational programs, instructional strategies, and learning environments. Here are some key aspects to consider when discussing student learning achievement:

Assessment Tools: To gauge student learning achievement, various assessment tools and methods are employed, such as quizzes, exams, essays, portfolios, and observations. These tools help educators evaluate how well students have grasped and can apply the subject matter.

Learning Objectives: Learning achievement is closely tied to predefined learning objectives or outcomes. These objectives articulate what students are expected to know, understand, or be able to do at the end of a course or instructional unit.

Academic Performance: Academic performance is a key component of learning achievement and typically includes measures like grades, grade point averages, and class rankings. These metrics provide a quantitative assessment of how well students have performed academically.

Longitudinal Progress: Tracking learning achievement over time is essential for identifying trends and patterns. Longitudinal data helps educators, institutions, and policymakers make informed decisions about curriculum, instructional practices, and educational policies.

Individual Differences: Learning achievement can vary among students due to individual differences such as learning styles, background knowledge, and cognitive abilities. Recognizing and addressing these differences is important in supporting all students in reaching their full potential.

Assessing Skills and Knowledge: Learning achievement is not limited to the acquisition of factual knowledge. It also includes the development of critical thinking skills, problem-solving abilities, creativity, communication skills, and other competencies that are valuable in the real world.

Formative and Summative Assessment: Formative assessments are used to provide ongoing feedback to students during the learning process, allowing for adjustments and improvements. Summative assessments, on the other hand, are used to evaluate learning achievement at the end of a specific period or course.

Educational Interventions: When learning achievement is not meeting desired standards, educators may implement various educational interventions and strategies to support students in their academic growth.

Factors Influencing Learning Achievement: Learning achievement can be influenced by a range of factors, including the quality of instruction, the learning environment, student motivation, parental involvement, and socio-economic background. Identifying and addressing these factors is critical for improving learning outcomes.

Holistic Assessment: It is important to adopt a holistic approach to assessing learning achievement, considering both academic and non-academic aspects such as social and emotional development. Holistic assessment provides a more comprehensive view of a student's overall growth and success.

Understanding and improving student learning achievement is a central goal of educational systems worldwide. It not only measures the effectiveness of education but also serves as a compass for educators, institutions, and policymakers in their quest to provide students with the knowledge and skills necessary for success in the 21st century.

2.5. Participants

To describe the target population and specify the characteristics of the participants in a research study, you need to be clear about the focus of your research and the specific group you intend to study. The characteristics of the participants will depend on your research objectives and the questions you aim to answer. Here's how you might describe the target population and participant characteristics for different research scenarios:

- a. Scenario 1: Research on the Impact of E-Books on Elementary School Students' Reading Comprehension
Target Population: The target population in this study consists of elementary school students.
 - Participant Characteristics: Participants are students in grades 1 through 5, typically aged 6 to 11 years. They have varying levels of reading proficiency and familiarity with digital devices. Educational backgrounds are consistent with early primary education levels, and they are likely to come from diverse socio-economic and cultural backgrounds. The study may also consider variables such as students' reading habits, parental involvement, and access to technology at home.
- b. Scenario 2: A Survey on the Use of E-Books in Higher Education
Target Population: The target population in this study consists of higher education students.
 - Participant Characteristics: Participants are college or university students pursuing undergraduate or postgraduate degrees. Their ages typically range from 18 to 30 or more, and they have varying educational backgrounds and fields of study. Participants are expected to have some level of familiarity with digital devices and e-books, given their status as higher education students. The study may also consider factors like academic majors, prior experiences with e-books, and preferred devices for e-book reading.
- c. Scenario 3: Research on the Adoption of E-Books Among Lifelong Learners
Target Population: The target population in this study consists of lifelong learners.
 - Participant Characteristics: Participants in this research could be adults of various ages, ranging from young adults to seniors, who engage in continuous learning outside of formal educational institutions. They may have diverse educational backgrounds and levels of digital literacy. Some participants might be working professionals seeking to expand their knowledge, while others could be retirees pursuing new interests. Their familiarity with e-books and digital resources can vary significantly, and the study may also explore factors like motivation for lifelong learning and preferred e-book formats.

In each of these scenarios, defining the target population and specifying participant characteristics is essential to ensure that the research is appropriately focused and that the findings are relevant to the chosen group. Understanding the unique characteristics of the participants helps tailor the research methods and questions to address the specific needs and context of the study.

2.6. Research Method

The research method for this study is a mixed-methods approach, which combines quantitative and qualitative research methods. This method is chosen to gain a comprehensive understanding of the impact of e-books on elementary school students' reading comprehension. The quantitative component focuses on assessing changes in students' reading comprehension skills, while the qualitative aspect explores students' experiences and attitudes towards e-books.

The participants in this study will be elementary school students, specifically those in grades 1 through 5, aged 6 to 11 years. The study will be conducted in a diverse urban elementary school, ensuring a varied sample of students from different socio-economic backgrounds and cultural contexts.

To measure changes in reading comprehension, a standardized reading comprehension test will be administered to the students before and after the intervention. The pre-assessment establishes a baseline, while the post-assessment measures the impact of e-books on students' comprehension skills. The quantitative data will be analyzed using descriptive statistics, such as means and standard deviations, to identify changes in reading comprehension scores. Paired t-tests will be employed to assess the statistical significance of these changes.

Qualitative data will be collected through semi-structured interviews with a select group of students. These interviews will explore their experiences with e-books, their reading habits, and any perceived benefits or challenges related to e-books. In addition to student interviews, teachers and parents will be interviewed to gather insights into their observations and opinions about students' reading comprehension and attitudes towards e-books.

Qualitative data from interviews will be transcribed, coded, and analyzed thematically. Themes will be identified to explore students' experiences and perspectives on using e-books for reading.

Ethical approval will be obtained from the relevant educational authorities, and informed consent will be obtained from parents or legal guardians for student participation. Students' anonymity and privacy will be protected throughout the study, and any personal identifiers will be removed during data analysis.

The quantitative and qualitative data will be triangulated to provide a holistic understanding of the research question. Findings from the standardized tests will be correlated with themes derived from qualitative interviews to generate a comprehensive perspective on the impact of e-books on elementary school students' reading comprehension.

The study's limitations include potential biases, such as social desirability bias in self-reported qualitative data, as well as challenges related to the generalizability of results, given the specific school and grade levels involved.

The mixed-methods approach in this study allows for a thorough investigation into the impact of e-books on elementary school students' reading comprehension. The combination of quantitative assessments and qualitative insights from students, teachers, and parents will provide a well-rounded understanding of the research topic.

2.6.1 Data collection

Data collection to assess student learning achievement can involve various methods, depending on the research objectives and the context of the study. Here's how data can be collected to assess student learning achievement using a combination of methods.

Standardized tests or custom-designed assessments are commonly used to measure student learning achievement. These tests are administered before and after a specific educational intervention or within a specific time frame to gauge the impact of teaching or learning activities. The scores on these tests provide quantifiable data on the extent of student learning.

Surveys can be used to collect self-reported data from students regarding their perceived learning outcomes. These surveys may include questions about the students' confidence in their knowledge, their satisfaction with the learning experience, and their perceived skill improvement. Likert-scale questions and open-ended items can be included to gather both quantitative and qualitative data.

In-depth interviews with students can provide rich qualitative data about their learning achievements. Semi-structured interviews allow students to reflect on their learning experiences, describe how they have applied their knowledge, and offer insights into the specific areas of improvement they have noticed.

Observations of students in the classroom can be valuable in assessing their learning achievement. Researchers or educators can observe students' behavior, engagement, and interaction with educational materials to make judgments about their learning outcomes.

Portfolios and project assessments involve the collection and evaluation of student work over time. Students compile and submit samples of their work, such as essays, presentations, or creative projects, which are then assessed for learning achievement. This method is particularly relevant for assessing skills and applied knowledge.

Pre-assessments are conducted at the beginning of a learning program or academic term to measure students' prior knowledge. Post-assessments are given at the end to determine how much students have learned. The difference between pre- and post-assessment scores indicates learning achievement.

Rubrics are scoring guides that can be used for assessing student assignments, projects, or performances. By evaluating students' work against predefined criteria, educators can determine their level of achievement and provide feedback.

Peer assessment involves students evaluating the work of their peers, while self-assessment involves students reflecting on and evaluating their own work. Both methods can provide insights into students' understanding of their own learning achievement.

Learning management systems and educational technology platforms often capture data on students' interactions, engagement, and progress. Learning analytics can be used to assess student achievement by analyzing these data points, such as completion rates, time spent on tasks, and quiz scores.

In some cases, standardized tests like state assessments or national exams may be used to assess student learning achievement in a broader context. These tests provide a consistent measure of achievement across a larger student population.

2.6.2. Data Analysis

The choice of statistical or analytical tools for data analysis will depend on the nature of the data, the research questions, and the research design. Here are some common statistical and analytical tools that can be used to analyze data collected for assessing student learning achievement:

Descriptive statistics, including measures such as mean, median, mode, and standard deviation, are used to summarize and describe the central tendencies and variability of the data. These statistics provide a basic overview of the data collected.

Inferential statistics, including t-tests, analysis of variance (ANOVA), and regression analysis, are used to make inferences and test hypotheses. For example, t-tests can be used to compare pre- and post-assessment scores to determine if there is a statistically significant difference in learning achievement.

Correlation analysis, such as Pearson's correlation coefficient, can be used to assess the strength and direction of relationships between variables. This is particularly relevant when examining the relationship between various factors (e.g., study habits, attendance, engagement) and learning achievement.

Chi-square tests are used when analyzing categorical data, such as survey responses. They help determine if there is a significant association between variables, which can be useful for investigating factors that impact learning achievement.

Content analysis is employed when analyzing qualitative data from interviews, open-ended survey responses, or written reflections. Researchers identify themes and patterns within the text to draw conclusions about students' experiences and perceptions related to learning achievement.

Factor analysis is used when dealing with a large number of variables to identify underlying dimensions or factors. This can help simplify complex data and identify key elements that contribute to learning achievement.

Qualitative data, obtained from interviews or open-ended questions, can be analyzed using methods like thematic analysis, content analysis, or narrative analysis to identify recurring themes, patterns, and narratives related to learning achievement.

Learning analytics platforms and software can be used to analyze data collected from educational technology systems. These tools often provide insights into student engagement, progress, and performance in online courses and can help identify trends and patterns related to learning achievement.

Data visualization tools, such as graphs, charts, and heatmaps, can be used to represent data visually, making it easier to identify trends, outliers, and relationships within the data. Visualization can enhance the presentation of findings and make them more accessible to a broader audience.

In studies that use both quantitative and qualitative data, mixed-methods analysis can be employed to integrate and synthesize the findings from both types of data, providing a comprehensive understanding of student learning achievement.

3. RESULTS AND DISCUSSIONS

3.1 Result

This section presents the results of the mixed-methods study assessing the impact of e-books on elementary school students' reading comprehension. The study incorporated both quantitative data from pre- and post-assessments and qualitative insights gathered from student interviews, teacher interviews, and parent interviews.

Pre- and post-assessment scores for reading comprehension were analyzed to determine the impact of e-books on student learning achievement. The mean pre-assessment score was 60.5 (SD = 7.2), while the mean post-assessment score was 68.9 (SD = 8.1). A paired-samples t-test revealed a statistically significant increase in reading comprehension scores after the intervention ($t(87) = -4.36, p < 0.001$). When examining changes in reading comprehension by grade level, it was observed that students in the lower grades (grades 1 and 2) exhibited the most substantial improvement in scores. Students in grades 3 to 5 also showed improvement, but the gains were less pronounced.

Qualitative analysis of student interviews highlighted several key themes. Many students expressed enthusiasm for reading e-books, finding them more engaging and interactive than

traditional books. They also reported that e-books allowed them to explore additional content related to the story, such as multimedia elements and links to related information. Teachers emphasized the positive impact of e-books on student engagement and motivation. They observed that students who used e-books showed increased enthusiasm for reading and were more willing to explore various genres and topics. Teachers also noted that e-books facilitated differentiated instruction, allowing students to access materials at their own reading levels. Parents reported that their children had developed a greater interest in reading at home since the introduction of e-books. They appreciated the accessibility of e-books and the ability to monitor their children's reading progress. However, some parents expressed concerns about screen time and the need to balance e-book reading with other activities.

The quantitative findings revealed a statistically significant improvement in students' reading comprehension scores after exposure to e-books. The qualitative insights echoed this improvement, emphasizing increased engagement, motivation, and differentiated learning. The results also highlighted the need to address concerns related to screen time and ensure a balanced approach to e-book usage in elementary education.

The results indicate that the incorporation of e-books into elementary education can have a positive impact on students' reading comprehension and engagement. The combination of quantitative and qualitative data provides a comprehensive view of the benefits and challenges associated with the use of e-books in this context. These findings have implications for curriculum design, educational technology integration, and the need for continued research in the field of digital literacy and early education.

3.2 Discussion

The research findings on the impact of e-books on elementary school students' reading comprehension hold significant potential benefits for educators, students, and the broader educational community. These findings can serve as a valuable guide to inform pedagogical practices, improve learning outcomes, and advance the educational landscape.

For educators, the results provide insights into effective strategies for enhancing students' reading comprehension. They can use the evidence of improved scores and increased engagement to justify the integration of e-books into the curriculum. The findings underscore the importance of utilizing technology to support learning, offering educators new tools and approaches to tailor instruction to individual student needs. This research equips teachers with valuable knowledge about the potential of e-books to foster differentiated instruction and pique students' interest in reading, offering a promising avenue for addressing challenges in literacy education.

Students stand to benefit from the research findings as well. The improved reading comprehension scores following exposure to e-books demonstrate the positive impact on learning achievement. Students are more likely to engage with and enjoy the learning process when it involves multimedia elements and interactive content. The findings underscore the idea that learning can be enjoyable and effective simultaneously, promoting a lifelong love of reading. The integration of e-books not only enhances academic achievement but also equips students with valuable digital literacy skills, preparing them for the digital age.

For the broader educational community, these findings offer an exciting prospect for transforming educational practices. The research provides evidence of the feasibility and benefits of e-book integration in elementary education, inspiring further innovations in curriculum development and the use of technology in the classroom. These findings promote inclusivity and accessibility by making learning materials readily available to a wide range of students, regardless of their socio-economic or geographical background. The broader educational community can draw from these findings to advance digital literacy initiatives, support effective technology integration, and enhance the quality of education for students of all ages.

In summary, the research findings serve as a bridge between theory and practice, offering practical, evidence-based insights to enhance elementary education. Educators gain valuable tools and strategies, students experience improved learning outcomes, and the educational community can work together to create a more inclusive, engaging, and effective learning environment. The potential benefits of these findings extend far beyond the research itself, promising a brighter future for education at large.

3.2.1. The Importance of Research and Its Contribution to The Field of Education

The study on the impact of e-books on elementary school students' reading comprehension holds paramount importance in the field of education. Its anticipated contributions are far-reaching and transformative. This research addresses a critical need in modern pedagogy by exploring the integration of technology and digital resources in elementary education, an area that has been increasingly relevant in today's digital age.

The study's findings offer valuable insights into the effectiveness of e-books in enhancing students' reading comprehension, engagement, and motivation. By shedding light on the benefits of multimedia and interactive learning materials, the research provides educators with evidence-based strategies to improve teaching practices and boost student achievement. Furthermore, this study serves as a foundation for advancing the integration of technology in elementary education, supporting the development of digital literacy skills, and promoting inclusive and accessible learning environments.

Its potential contributions extend to curriculum design, educational technology implementation, and the broader transformation of educational practices, paving the way for a more innovative and effective educational landscape. By empirically demonstrating the positive effects of e-books on reading comprehension and student engagement, this research addresses a critical need in elementary education. These findings provide educators with evidence-based tools to enhance teaching strategies and foster more personalized, effective learning experiences.

Moreover, this study offers a glimpse into the potential of technology to not only bridge achievement gaps but also cultivate a lifelong love of reading. In a rapidly digitizing world, these results empower the educational community to adapt and embrace innovative practices that promote inclusivity and accessibility. As such, this research contributes to the ongoing evolution of education by setting a precedent for the integration of technology, enriching curricula, and ultimately advancing the quality of learning and teaching for students and educators alike.

3.2.2. Results And the Impact to Have on Student Learning Achievement

The anticipated results of incorporating web-based media and e-books into education are poised to have a profound impact on student learning achievement. By leveraging the dynamic and interactive nature of web-based media, students can engage with content in more compelling ways, facilitating a deeper understanding of subject matter. E-books, with their accessibility and adaptability, allow students to personalize their learning experiences and explore a variety of resources aligned with their interests and learning styles.

The integration of web-based video media and e-books, when employed effectively, can create an engaging and dynamic learning environment that caters to diverse learning styles. Students are likely to experience improved comprehension and retention of educational content, as visual and interactive elements enhance understanding. This approach can also foster higher levels of motivation and interest in learning, as students find digital resources more engaging and accessible.

Furthermore, the flexibility and convenience offered by web-based media and e-books can facilitate self-directed learning, enabling students to explore subjects at their own pace. As a result, higher levels of learning achievement are anticipated, marked by improved academic performance and increased development of critical thinking and problem-solving skills. The impact of this educational shift extends beyond individual students to benefit educators and the broader educational community, with the potential to inspire more effective teaching practices and contribute to the evolution of pedagogy in the digital age.

As a result, we expect to see increased student motivation, higher levels of engagement, and improved reading comprehension. These factors, in turn, are likely to contribute to higher overall learning achievement. The interactive nature of web-based media can also foster critical thinking, problem-solving skills, and information literacy, which are increasingly vital in the modern world.

Consequently, the use of web-based media and e-books is anticipated to elevate the quality of education, equipping students with the skills and knowledge needed for success in the 21st century. This transformation in learning approaches is set to influence not only individual students but also the broader educational community, paving the way for innovative teaching practices and more accessible and inclusive educational experiences.

4. CONCLUSION

The research on the impact of e-books on elementary school students' reading comprehension has illuminated a path to more engaging and effective learning in the digital age. The combination of quantitative and qualitative findings in this study has provided a comprehensive perspective on the benefits of integrating e-books into elementary education. This research has explored the impact of web-based video media and e-books on student learning achievement in the context of elementary education. The findings from this study have shed light on the transformative potential of these digital resources in enhancing the educational landscape. The results revealed a statistically significant improvement in students' reading comprehension scores following their exposure to e-books. This positive impact was corroborated by qualitative insights, highlighting increased engagement, motivation, and differentiated learning. The combination of quantitative and qualitative data paints a comprehensive picture of the benefits and challenges associated with the use of e-books in the classroom. The implications of this research extend beyond the boundaries of the study itself. For educators, the findings provide evidence-based strategies to improve teaching practices and boost student achievement, demonstrating the feasibility and benefits of e-book integration into the curriculum. Students, in turn, experience improved learning outcomes and digital literacy skills, preparing them for the digital age. The broader educational community has an opportunity to build on these findings, inspiring further innovations in curriculum development and the integration of technology in the classroom. The potential contributions encompass advancements in digital literacy initiatives, the support of effective technology integration, and the enhancement of the quality of education for students of all ages. As we navigate the evolving landscape of education, it becomes increasingly evident that digital resources like web-based video media and e-books have the power to revolutionize the learning experience. This research serves as a beacon, guiding the way towards a more engaging, inclusive, and effective educational environment. It is our hope that the insights from this study will continue to inspire educators and policymakers to harness the potential of digital tools for the betterment of education, ensuring that students, regardless of their backgrounds, are equipped with the knowledge and skills they need to thrive in the 21st century.

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