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The Effectiveness of E-Books in Learning: An Analysis of Trends in Elementary Schools

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Abstract: Teachers in elementary schools often encounter the challenge of unsatisfactory student learning outcomes. It is evidenced by the student learning outcomes that have not been maximized. The objective of this study is to provide a comprehensive description of the effectiveness of incorporating e-books into the learning process. This study used a quantitative approach with a time series design. The research subjects consisted of elementary school students and teachers. The student subjects involved came from the fifth-grade level. Data collection was done by testing and observation. Data analysis was performed by testing four trend models. They were Linear Trend Model, Quadratic Trend Model, Growth Curve Model, and S-Curve Trend Model. The research findings indicate that e-books are a viable tool for facilitating learning in elementary school settings. It is based on the positive trend shown in student learning outcomes after applying the e-book as a learning tool. It strengthens the recommendation regarding implementing e-books by teachers to maximize student learning outcomes.
'Keywords: E-books, trend analysis, elementary schools

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Introduction

The end of the pandemic has provided valuable experience in organizing education, especially in elementary schools. During the pandemic, online education is conducted remotely from home using the internet and other technologies such as mobile phones and computers (Herwin et al., 2021). Technology integration in learning is widely applied (Ambarwati et al., 2022). This learning is learning done on the internet network (online). Not only internet networks, but online learning also takes advantage of accessibility, connectivity, flexibility, and the ability to bring up various learning interactions (Sadikin & Hamidah, 2020). In addition, online learning can also be interpreted as the implementation of face-to-face learning in which the delivery method is in a digital format with the help of technology and the internet (Imania & Bariah, 2019). Therefore, implementing this learning is very dependent on the internet network. This learning concept is similar to e-learning, emphasizing the ability to be meticulous in receiving and processing information from the internet (Putria et al., 2020).

In line with the previous explanation, online learning requires media. Apart from internet media and technology, this learning also requires online learning media. Online learning media are everything used in the online learning process to convey messages from students to teachers through the help of the internet network. This media includes online learning, virtual learning, web-based learning, and all forms of learning that use computers (Imania & Bariah, 2019). The advantage of online learning media is that it clarifies the presentation of messages and information to enhance learning processes and outcomes. In addition, the media can attract students' attention to boost learning motivation and student participation in the learning process (Nurhayati, 2020). Online learning media that is commonly used is an application on a smartphone. The selection of media is also crucial to the success of the online learning process. The principles that must be considered in choosing media are (1) reference to learning objectives, (2) support for learning materials, (3) easy to use and accessible to teachers and students, (4) teacher skills in using media, (5) use of media according to the learning time, and (6) according to the

students' thinking stage so that students can understand it (Elianur, 2020). Media options that can be used are Whatsapp, Zoom, online educational games, interactive multimedia, e-books, Google Classroom, Google Meet, Edmodo, or applications that work with the Ministry of Education and Culture.

Low student motivation to study is a common issue in education. It is evident from the conduct of students who do not pay attention to the teacher's explanation and do not respond to the teacher's questions. Moreover, the teacher continues to dominate the learning activities. The teacher only uses lecture, question and answer, and assignment methods. New student activities are limited to listening to teacher explanations, answering questions, working on questions or assignments, and submitting them to Google Classroom. The teacher also conveys learning material that is still separated even though the curriculum used is thematic. The teacher made the teaching materials based on the student's book and other reference books and then changed the file format to pdf and distributed it to students via the WhatsApp group.

In addition, the preliminary study shows that students' interest in learning at the beginning of online learning is high in learning but decreases over time due to boredom. In addition, teachers experience obstacles from parents who are less cooperative in accompanying their children in online learning. He said that online learning is very important because of the role of parents, especially for lower-grade students. Parents are less cooperative because they lack patience in assisting their children. It resulted in some students learning independently.

Interest represents a feeling of liking, wanting and pleasure towards something without being forced and bringing satisfaction to oneself (Arrahim & Oktavia, 2019). Interest in learning is students' special attention to a subject to be actively involved in learning activities (Simbolon, 2013). Students who have an interest in learning will be encouraged to study diligently and will get good learning results (Arrahim & Oktavia, 2019). In addition, students with a strong interest in learning will pay attention and enthusiastically engage in active participation.

This situation has a direct impact on student learning outcomes. It is supported by the results of preliminary studies, which show that the achievement of student learning outcomes is still not in line with expectations. The average student learning outcomes generally have not reached the expected criteria. Various factors can trigger the problem of low learning outcomes. This factor can be present both from internal and external students.

Teachers who do not use interesting learning applications and teacher-dominated learning activities cause problems in online thematic learning. This problem causes students' interest in learning to decrease. According to the results of interviews with the classroom teacher, he said at first, the student's interest in learning increased but gradually decreased due to boredom. These problems can cause difficulties for students in understanding the material given to the teacher. If left unchecked, it will cause difficulties in understanding the next material.

This problem is caused by several factors, including the learning methods used by the teacher are less varied, not yet using an interesting learning model for students, learning media that have not been able to facilitate students' active participation, teaching materials made sober by the teacher due to lack of preparation time. Based on the causes of these problems, the most basic cause is learning media, which has not been able to facilitate students' active participation in learning. There is a need to change the use of applications as online learning media in conveying thematic learning material more interestingly.

Learning media serves as a platform via which educational messages and materials are directed toward students to facilitate the attainment of learning objectives. The media serves as a significant instrument in facilitating the learning process. According to Briggs, using learning media can be a valuable tool in stimulating students and facilitating learning (Hafid, 2011). There are several types of learning media, one of which is multimedia. Multimedia can present sound, animation, video, graphics, and film elements. This media can be delivered through computers and the Internet. Since students and teachers cannot meet in person, multimedia plays a crucial role in the online learning process. Therefore, online learning needs media (Habibah et al., 2020). One example of multimedia used in online learning is a learning application.

This study directs the focus on the application of Book Creator-based E-books. Book Creator is a website created in 2011 as a platform for creating electronic books that can be filled with text, images, audio, and video. Teachers can also use this website to develop creative abilities in developing learning

to increase student learning interest. The advantages of this website include teachers being able to create learning media in the form of interesting, fun and meaningful electronic books for students, this website can be used free of charge, books that have been made can be published publicly and privately, and this website also provides books written by other people that can be used as inspiration or used directly. In addition, this Book Creator website provides facilities for teachers to create and publish digital books. It is evidenced by the various features provided on the website, such as various page backgrounds, voice recorders, pens, various flat shapes, and integration with Canva, Giphy, Google Drive, and Bitmoji. The website has simple navigation, so teachers with basic computer skills can use it easily. It is also simple to use via Google Chrome without installing additional applications (Ralston et al., 2019). The objective of this study is to provide a comprehensive description of the effectiveness of incorporating e-books into the learning process.

Methods

This study used a quantitative approach with a time series design. This research was conducted to test the effectiveness of e-books in learning activities. This e-book is applied based on a predetermined time series design. This time setting follows the school agenda schedule (so as not to disturb the system programmed at school). In addition, effectiveness is measured by the tendency of student learning outcomes after participating in learning using the e-book.

The participants of this study consisted of elementary school students in the fifth grade. The students who participated in this study were selected as the primary subjects and served as respondents. They were immediately exposed to a learning treatment that involved the utilization of an e-book. Apart from students, another subject is the teacher. The teacher in this study has the role of facilitating student learning. The assistance facility in question is implementing the e-book in the learning program.

The main data collection in this study is the learning achievement test. This technique is carried out to measure and obtain information related to trends in student learning outcomes after participating in learning by applying the e-book. In addition, research data was also collected using observation techniques. It is done as a control over the learning process. The control ensures that the learning process is carried out in line with the design with the right treatment.

The data analysis technique used in this research is trend analysis. This analysis tests four trend models. These are the Linear Trend Model, Quadratic Trend Model, Growth Curve Model, and S-Curve Trend Model. To determine the ideal model, the measurement error estimation criterion is used. These criteria are the best model is the model that has the smallest measurement error. For the estimation of measurement error, this study uses the Mean Absolute Percentage Error (MAPE), Mean Absolute Deviation (MAD) and Mean Squared Deviation (MSD) approaches.

Results and Discussion

This study examines the effectiveness of e-books in learning activities in elementary schools. The effectiveness of the e-book application in facilitating student learning is evident in the observed learning outcomes. The lessons conducted possess significant subject content. At the planning stage, the teacher prepares learning by determining the competencies given to students. After that, the teacher sets a strategy to achieve these competencies. It is done by determining the right method and the right learning media as well. In addition, the teacher also designed an evaluation of learning outcomes to measure competency achievement by students after participating in learning activities with the teacher.

The study focuses on the application of e-books. To ensure that this treatment is carried out properly, observations are made during the learning process so that the quality of the implementation of the e-book can be maintained. This activity is carried out by teacher collaborators who are deliberately planned to be in charge of observing the course of the learning process. During the implementation of the learning process, the teacher carries out learning by referring to the plans that have been previously designed. It refers to the steps and learning procedures using the e-book as the main focus. The following illustrates examples of the e-book display.

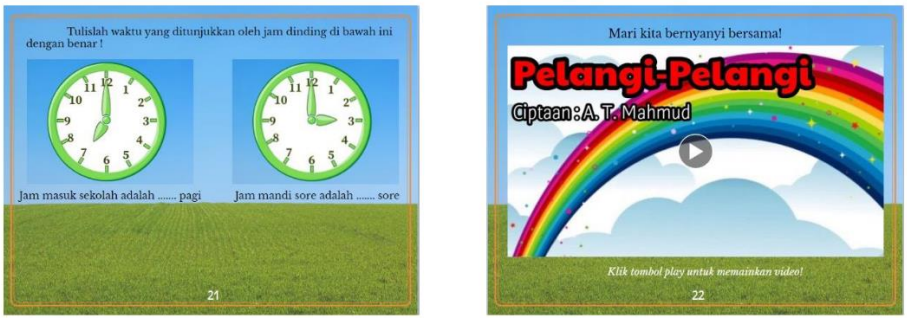

Figure 1. Example of the E-Book Display

Figure 1 presents an example of an e-book display used in learning. In the picture, there is a visual and audio presentation. Audio is included to strengthen students' understanding of the material, which students can play on their laptops and smartphones. After the learning process is implemented, the teacher measures student learning outcomes by giving student learning outcomes tests. These things are carried out periodically up to the specified meeting and week. Test results are used as learning outcomes that are processed based on trend analysis.

After obtaining the results of the student learning evaluation, the data is tabulated using a trend analysis approach. This information is in the form of the average student learning outcomes calculated at each meeting. As explained in the method section, this data is tested using four trend approaches: the Linear Trend Model, Quadratic Trend Model, Growth Curve Model, and S-Curve Trend Model. The results of the first analysis are presented based on the Linear Trend Model. Based on the analysis of this first model, information on trends in student learning outcomes is obtained, as presented in Figure 2 below.

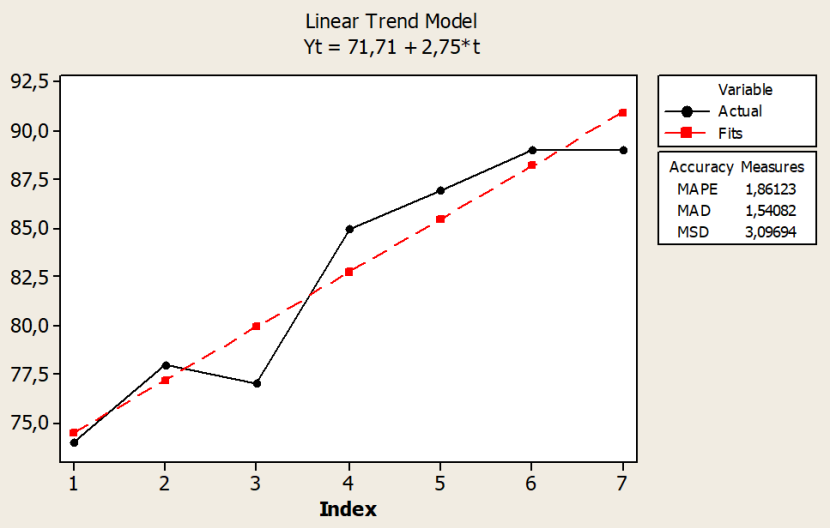

Figure 2. Analysis Results with the Linear Trend Model

Figure 2 shows the findings of this study on student learning outcomes based on the Linear Trend Model. In the picture, you can see two lines, red and black. The red line shows the expected fit or ideal model. In comparison, the black line is empirical data in the field. If seen from the estimation of measurement error, it can be explained that in this model, the MAPE error obtained is 1.86; MAD of 1.54; MSD of 3.09. The second analysis is continued using the next model, the Quadratic Trend Model. The following are the results of the two findings presented in Figure 3.

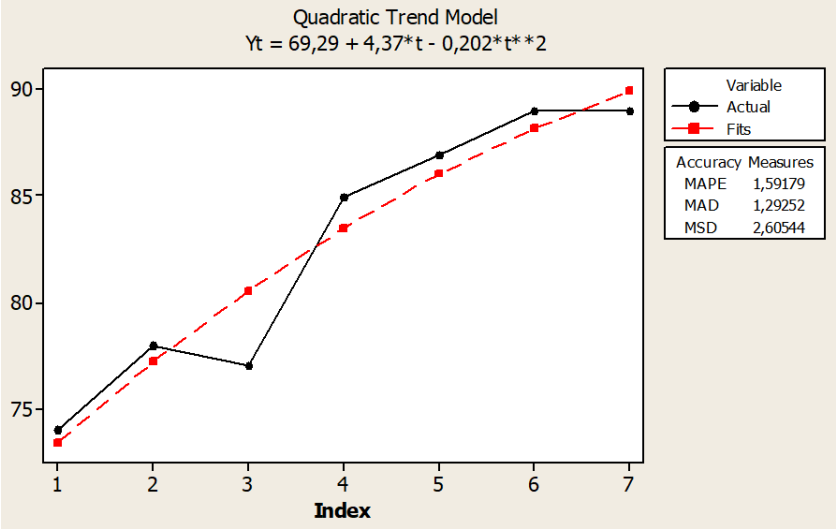

Figure 3. Analysis Results with the Quadratic Trend Model

Figure 3 demonstrates the findings of this study regarding student learning outcomes based on the Quadratic Trend Model. Based on this second analysis, the estimated measurement error is obtained. It can be explained in this model the MAPE is 1.59, MAD of 1.29, and MSD of 2.60. Graphically, the best model is closest to the empirical data (black line) with the ideal model (red line). Compared to the previous model, this model looks better regarding graphics and measurement errors. The third model analysis is the Growth Curve Model. In the following, the results of this model are presented.

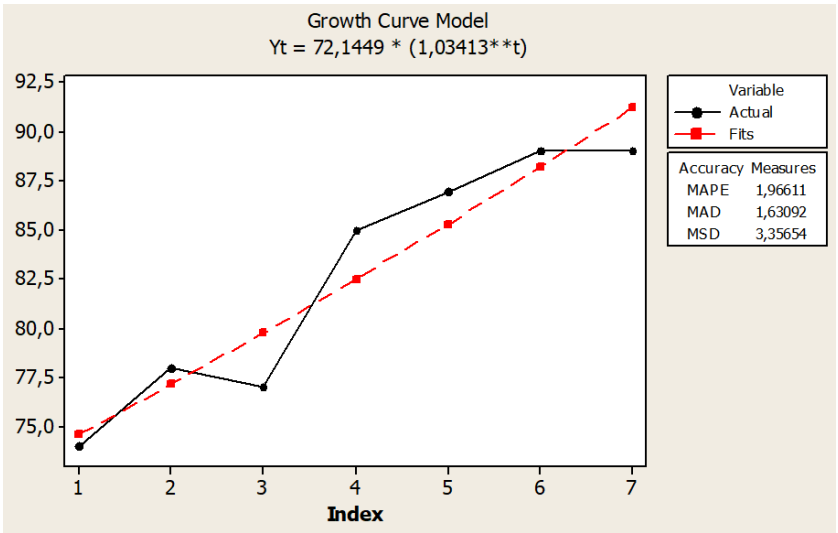

Figure 4. Analysis Results with the Growth Curve Model

Figure 4 presents the findings of this study regarding student learning outcomes based on the Growth Curve Model. Based on this second analysis, the estimated measurement error is obtained. It can be explained that in this model, the MAPE is 1.96; MAD of 1.63; MSD of 3.35. Graphically, the best model is closest to the empirical data (black line) with the ideal model (red line). Compared to the previous model, it seems this model is no better regarding graphics and measurement errors. The third model analysis is the S-Curve Trend Model. In the following, the results of this model are presented.

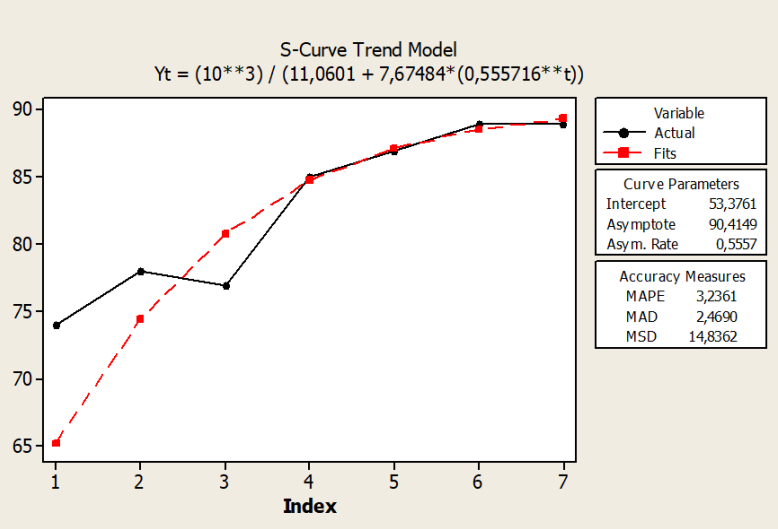

Figure 5. Analysis Results with the S-Curve Trend Model

Figure 5 shows the findings of this study regarding student learning outcomes based on the S-Curve Trend Model. If seen from the estimation of measurement error, it can be explained that in this model, the MAPE is 3.23; MAD of 2.46; MSD of 14.83. After testing the four models being compared, the next step is to determine the best model to be used as a trend model for improving student learning outcomes based on e-books. The following is a comparison recapitulation of the four models tested.

Table 1. Recapitulation of Test Results

No	Model	Measurement Error Estimation		
		MAPE	MAD	MSD
1	Linear Trend	1.86	1.54	3.09
2	Quadratic Trend	1.59	1.29	2.60
3	Growth Curve	1.96	1.63	3.35
4	S-Curve	3.23	2.46	14.83

Table 1 shows the comparison results between the four trend models tested. Look at the four models tested, and the estimated measurement errors used. It can be explained that the Quadratic Trend Model is the best model used to estimate the trend of student learning outcomes using the e-book. It can be seen in Table 1 that the Quadratic Trend Model has the smallest measurement error estimation coefficient compared to the other three trend models. Therefore, it can be explained that the best trend equation model in this study is $Y_t = 62.29 + 4.37_t - 0.202\ _t^2$.

The findings of this study indicate that e-books have a positive effect on learning activities in elementary schools. The use of e-books in learning activities in elementary schools has a beneficial impact on students' cognitive learning outcomes, as supported by several prior relevant research findings (Retno Palupi et al., 2022; Susilawati & Rusdinal, 2022). E-Book media has been proven to improve the quality of interaction in learning activities (Hanikah et al., 2022). It is very beneficial for both teachers and students.

The application of the e-book does not only contribute positively to the cognitive learning outcomes of elementary school students. Teachers can achieve good effective learning outcomes by implementing e-book in the learning process in elementary schools (Nurjanah et al., 2022). E-books have also been proven to increase students' interest in learning in elementary schools (Khikmawati et al., 2021). Of course, this is a very positive thing. High interest in learning will bring encouragement from within students to learn. It is the main component to generate students' internal motivation to learn.

E-books or electronic books are one of the learning aids or learning resources which is currently the choice that is commonly used in aspects of the main learning media that utilize digital integration (Kirana, 2020; Mentari et al., 2018; Puspita et al. al., 2021; Rusdiana & Wulandari, 2022; Suprapto et al., 2019; Wu & Chen, 2018). E-books are a component that has a positive contribution as a source of learning. E-books are currently widely used in education, such as blogs and educational websites

developed by the government. They are very helpful for students in accessing easy learning resources. Find information through digital learning resources.

The e-book is one of the efforts made by teachers to integrate technology into learning activities. It is also very important and is supported by previous relevant studies, which found that the integration of technology in learning activities makes a positive contribution to the quality of learning (Hariyanta et al., 2022; Herwin et al., 2022; Herwin & Dahalan, 2022; Ningrum et al., 2022; Ramadhan & Herwin, 2022). It can guide teachers in developing learning based on strengthening students' thinking skills at a high level (Hastuti et al., 2021).

E-books make it easier for teachers to streamline and streamline learning activities in terms of time. Teachers may find it difficult to present many reading book learning resources in hard-copy form, which are quite heavy to carry around. Therefore, e-books are utilized in digital form so that they are very practical to carry in many reading sources because they are in the form of files (Andaresta & Rachmadiarti, 2021; Chang et al., 2021; Handayati, 2020; Hisbiyati & Khusnah, 2017). In addition, electronic teaching materials have become a trend today (Triwahyuningtyas et al., 2022). It is another proof that e-books can facilitate teachers and students in the learning process.

E-books are viewed in their physical form, which consists of digital files, and their physical size is practical because it enables them to be stored in efficient file storage media such as hard drives, e-mails, and flash drives. In addition, e-books have the advantage that they will not become obsolete like printed books in general. The digital form will last forever as long as the file is maintained in an unchanged format. E-books serve as interactive educational materials that facilitate learning in both traditional classroom settings and online environments, owing to their ability to incorporate multimedia illustrations (Mahardika et al., 2022; Sabtaningrum et al., 2020). E-books have a significant impact on the incorporation of technology in educational delivery. It is very beneficial for teachers with E-book technology with all its facilities and conveniences. Teachers tend to present sources of subject matter and increase references to learning resources. Teachers do not need to leave one room to another, which can drain time and energy because e-books can be accessed from a link and only need to sit and present with internet access (Sackstein et al., 2015; Staiger, 2012).

This finding strengthens the contribution of technology to learning (Achmad & Utami, 2023; Aprilia et al., 2023). E-books are one of the foundations for professional development and core competencies for teachers in their careers. Finally, this study confirms that the E-Book is an innovation in learning activities that positively contributes to the quality of student learning processes and outcomes. Hence, these findings serve as the foundation for subsequent advancements and utilization of e-books in educational endeavors within primary educational institutions. The present study provides empirical evidence supporting a positive correlation between using e-books in educational activities and enhanced student learning outcomes.

Conclusion

This study concludes that the application of e-books in learning activities provides effective results for elementary school students learning outcomes. It was found through testing in this study that a positive trend was obtained for student learning outcomes after implementing the e-book in learning activities. In addition, if you look at the four models tested and the estimated measurement errors used, it can be explained that the Quadratic Trend Model is the best model used to estimate the trend of student learning outcomes using the e-book. The findings of this study recommend implementing e-book in learning in elementary schools because this will increase the effectiveness of learning. Because e-book is very beneficial for the quality of learning, it is recommended to be applied on an ongoing basis both for face-to-face and distance learning. Furthermore, future researchers should further deepen the effectiveness of applying the e-book in learning activities in various method approaches.

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