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The effectiveness of using Powtoon-based learning videos on the learning outcomes of grade XI science students at MAN Sidenreng Rappang

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Abstract

Penelitian ini menggunakan metode kuantitatif yang bertujuan untuk menguji apakah video pembelajaran berbasis Powtoon efektif terhadap hasil belajar ilmu pengetahuan alam siswa Kelas XI IPA MAN Sidenreng Rappang. Populasi sebanyak 124 siswa maka pengambilan sampel dalam skripsi ini adalah pengambilan seluruh sampel bila jumlah subjek kurang dari 100, dan pengambilan sampel 10-25% dari subjek, atau 20-25% dari mereka jika ada lebih dari 100 subjek. Karena hanya ada 26 orang dalam populasi-total kurang dari 100, peneliti memilih untuk mengambil sampel dari seluruh kelompok dengan menggunakan pendapat suharsimi arikunto dengan teknik pengambilan sampel yaitu simple random sampling. Variabel penelitian ini ada 2, yaitu variabel bebas berbasis Powtoon (X) dan variabel terikatnya yaitu hasil belajar ilmu pengetahuan alam (Y). Penelitian ini dilaksanakan di MAN Sidenreng Rappang tepatnya berada di Baranti Kec.Baranti, Kab.Sidenreng Rappang. Teknik pengumpulan data menggunakan tes dan dokumentasi. Data hasil tes yang telah terkumpul dianalisa menggunakan teknik statistik dengan menggunakan rumus mean. Berdasarkan hasil analisa data, diperoleh nilai X=87,17 > nilai Y=40,39 sehingga dapat disimpulkan bahwa penelitian ini menunjukkan adanya efektivitas penggunaan video pembelejaran berbasis Powtoon terhadap hasil belajar ilmu pengetahuan alam siswa kelas XI IPA MAN Sidenreng Rappang. Berdasarkan hasil penelitian yang diperoleh dapat disimpulkan bahwa efektivitas penggunaan video pembelajaran berbasis Powtoon terhadap hasil belajar ilmu pengetahuan alam siswa kelas XI IPA MAN Sidenreng Rappang, hal ini menunjukan bahwa hipotesis kerja yang menyatakan penggunaan video pembelajaran berbasis Powtoon efektif meningkatkan hasil belajar ilmu pengetahuan alam siswa kelas XI IPA MAN Sidenreng Rappang, diterima.

***Kata Kunci**: Efektivitas, Powtoon, Ilmu Pengetahuan Alam*

Abstract

This study uses a quantitative method that aims to test whether Powtoon-based learning videos are effective on the learning outcomes of natural science students of Class XI IPA MAN Sidenreng Rappang. The population is 124 students, so the sampling in this thesis is taking all samples if the number of subjects is less than 100, and taking 10-25% of the subjects, or 20-25% of them if there are more than 100 subjects. Because there are only 26 people in the population-total less than 100, the researcher chose to take samples from the entire group using Suharsimi Arikunto's opinion with a sampling technique, namely simple random sampling. There are 2 research variables, namely the independent variable based on Powtoon (X) and the dependent variable, namely the learning outcomes of natural science (Y). This research was conducted at MAN Sidenreng Rappang, precisely in Baranti, Baranti District, Sidenreng Rappang Regency.

Data collection techniques using tests and documentation. The collected test data were analyzed using statistical techniques using the mean formula. Based on the results of data analysis, the value of X = 87.17> Y = 40.39 was obtained so that it can be concluded that this study shows the effectiveness of the use of Powtoon-based learning videos on the learning outcomes of natural science students of class XI IPA MAN Sidenreng Rappang.

Based on the research results obtained, it can be concluded that the effectiveness of using Powtoon-based learning videos on the learning outcomes of natural science students of class XI IPA MAN Sidenreng Rappang, this shows that the working hypothesis stating that the use of Powtoon-based learning videos is effective in improving the learning outcomes of natural science students of class XI IPA MAN Sidenreng Rappang, is accepted.

***Keywords**: Effectiveness, Powtoon, Natural Science*

Introduction

Education is a fundamental process in human development that plays a crucial role in shaping intelligence, skills, and competencies aligned with individual identities and societal needs. It serves as a medium through which the potential of individuals is cultivated and directed towards achieving meaningful contributions in their communities. As an essential element in the advancement of society, education ensures the transmission of cultural values and knowledge from one generation to the next, while simultaneously fostering the development of each individual's unique potential.From a broader perspective, education can be interpreted in two primary dimensions: social and individual. Socially, education functions as a means of preserving and passing down culture, values, and traditions, thereby maintaining societal continuity. Individually, education enables personal growth, enhances critical thinking, and fosters creativity. These dual roles demonstrate that education is not limited to formal schooling but encompasses various structured and unstructured learning experiences aimed at personal and societal betterment.

The success of educational objectives heavily depends on the methods and approaches applied by educators in the learning process. A teacher's ability to create engaging, relevant, and student-centered learning environments is essential in overcoming learning fatigue or boredom and maintaining students' motivation to learn. Therefore, selecting appropriate teaching methods and media is a critical component of effective instruction.Learning media refers to the tools and materials used to convey instructional messages. Media becomes educational when it is used to deliver content and facilitate learning. Among various forms of learning media, video has emerged as a particularly powerful tool. As an audio-visual medium, it offers a dynamic combination of images, text, sound, and movement, enabling students to visualize abstract concepts and engage with content more interactively and meaningfully.

In recent years, the integration of technology into the classroom has opened new pathways for delivering content more effectively. One such innovative tool is Powtoon, a web-based animation application designed for creating animated videos and presentations. Powtoon allows educators to craft visually appealing and interactive content without requiring advanced technical skills. With a variety of ready-to-use templates, music, voiceovers, and animated elements, Powtoon can transform traditional learning materials into engaging digital experiences.

The application of Powtoon-based learning videos offers significant benefits in teaching, particularly in scientific subjects like Natural Science, which often involve complex and abstract concepts. Through animated visualization, students can better understand processes and systems that are otherwise difficult to grasp through text or verbal explanations alone. Furthermore, Powtoon videos can be accessed anytime and anywhere, offering flexibility in learning and promoting self-paced study.The relevance of Powtoon in education is supported by research findings that highlight its effectiveness in enhancing students' understanding and retention of content. Studies have shown that students who learn through animated videos demonstrate improved academic performance, greater engagement, and higher motivation compared to those taught using conventional methods. Additionally, Powtoon supports differentiated instruction by catering to various learning styles—visual, auditory, and kinesthetic.

In the context of MAN Sidenreng Rappang, observations and interviews have revealed that students often experience difficulties in concentrating during lessons, particularly when traditional lecture-based approaches are employed. The monotonous delivery and limited use of engaging media have contributed to reduced student participation and interest. Although teachers are becoming more familiar with digital tools, the implementation of such tools in the classroom remains inconsistent.This study seeks to introduce Powtoon-based learning videos as an alternative instructional medium in the Natural Science subject for Grade XI Science students at MAN Sidenreng Rappang. By integrating animated visuals, clear narration, and interactive content, Powtoon aims to enhance students' learning experiences, stimulate curiosity, and improve learning outcomes.

METHOD

This study employs a quantitative research approach, which is characterized by the collection and analysis of numerical data to examine hypotheses and draw conclusions. Quantitative research begins with the formulation of theoretical frameworks and hypotheses derived from previous studies, theories, and the researcher's observations.

The type of research used in this study is pre-experimental, specifically the One Group Pretest–Posttest Design. According to Sugiyono (2014), pre-experimental research involves only one group of participants who are subjected to both a pretest and a posttest without a control group. This design enables the researcher to determine the difference in outcomes before and after the implementation of a treatment—in this case, the use of Powtoon-based learning videos in Natural Science instruction.

This study involves two types of variables:

- Independent Variable (X): The use of Powtoon-based learning videos.
- Dependent Variable (Y): The students' learning outcomes in Natural Science.

Research Design:

To ensure that the research is conducted in a structured and goal-oriented manner, the One Group Pretest–Posttest design is implemented. The basic format of the design is as follows:

Pretest	Treatment	Posttest
O1	X	O2

Where:

- O1 = Pretest (administered before treatment)
- X = Treatment (Powtoon-based learning videos)
- O2 = Posttest (administered after treatment)

Students are given a pretest prior to the intervention to assess their initial understanding of the topic. Then, they receive instruction using Powtoon-based learning videos. Finally, a posttest is administered to evaluate the effectiveness of the instructional media.To ensure clarity and consistency, the variables in this study are defined operationally as follows:Powtoon-Based Learning Videos (X): Learning materials created using Powtoon, a web-based animation platform, which combine images, animations, text, sound, and voiceovers to form educational videos. These videos are used as the main instructional media during the learning sessions.Learning Outcomes (Y): The level of students' knowledge, skills, and understanding as measured by their performance on standardized test items in Natural Science. These outcomes are assessed through pretest and posttest scores.

1. *D. Time and Place of Research*

The study was conducted at MAN Sidenreng Rappang, located at Jl. Poros Pinrang No.1A, Baranti District, Sidenreng Rappang Regency, South Sulawesi Province. The research was carried out over a period of three months, from January to March 2025.

Population:

The population in this study consists of all Grade XI students at MAN Sidenreng Rappang, totaling 124 students, distributed across five classes (XI A to XI E).

Sample:

The sampling technique used is Simple Random Sampling, a type of probability sampling in which each member of the population has an equal chance of being selected. Based on Suharsimi Arikunto's (2010) guideline, if the population is less than 100, the entire population can be used as a sample. Since class XI A consists of 26 students, and this number is below 100, the entire class is taken as the sample.

Class	Male	Female	Total
XI A	15	11	26

2. *F. Data Collection Techniques*

The data collection methods used in this study are as follows:

1. Documentation:
   Used to obtain information related to the student composition, class schedule, and school policies relevant to the research process.
2. Test:
   The test is used to measure students' cognitive learning outcomes. The test comprises 30 multiple-choice questions. Each correct answer is awarded 1 point, while incorrect answers receive 0. The final score is calculated using the formula:

   Score=(Total Correct Answers30)×100\text{Score} = \left(\frac{\text{Total Correct Answers}}{30} \right) \times 100Score=(30Total Correct Answers)×100

   This test is administered as both pretest and posttest to assess improvement after the treatment.Questionnaire:
   A structured questionnaire is administered to gather additional data about student experiences, perceptions, and the effectiveness of the learning process. The questionnaire includes two main indicators:Mastery Learning: Refers to students' ability to complete tasks and understand materials based on the Powtoon content.Time Efficiency: Evaluates whether the use of Powtoon helps deliver materials within an appropriate time frame and supports comprehension.Each question in the questionnaire requires a "Yes" or "No" response and is used to support the test data by offering qualitative insights into student learning behavior.

The quantitative data obtained from the pretest and posttest are analyzed using descriptive statistical analysis techniques. The analysis aims to determine the mean scores and measure the difference between pretest and posttest performance.

1. Score Conversion Formula:

Score=(Obtained ScoreMaximum Score)×100\text{Score} = \left(\frac{\text{Obtained Score}}{\text{Maximum Score}} \right) \times 100Score=(Maximum ScoreObtained Score)×100

2. Mean (Average) Calculation:

Mx=ΣFxN,My=ΣFyNM_x = \frac{\Sigma F_x}{N}, \quad M_y = \frac{\Sigma F_y}{N}Mx=NΣFx,My=NΣFy

Where:

- MxM_xMx: Mean score of posttest
- MyM_yMy: Mean score of pretest
- ΣFx\Sigma F_xΣFx: Total of posttest scores
- ΣFy\Sigma F_yΣFy: Total of pretest scores
- NNN: Number of students (sample size)

The effectiveness of the treatment is determined by comparing the average posttest score with the average pretest score. If the posttest average is significantly higher than the pretest average, the use of Powtoon-based learning videos is considered effective.

This methodical approach ensures that the research is systematic, valid, and reliable in determining whether Powtoon-based instructional videos can positively influence student learning outcomes in Natural Science.

RESULT AND DISCUSSION

This research was conducted at MAN Sidenreng Rappang, located on Jl. Poros Pinrang No. 1A, Duampanua, Baranti District, Sidenreng Rappang Regency, South Sulawesi Province. The study took place from January 8 to March 8, 2025, based on the research permit issued by the Investment and One-Stop Integrated Services Office. The subject matter in this study focused on the Natural Science topic “Human Coordination System” taught using Powtoon-based learning videos.The research data was collected from Class XI A, comprising 26 students. The instruments used to gather data were pretest and posttest in the form of multiple-choice questions (30 items). The pretest was conducted before the implementation of Powtoon videos to determine students' prior knowledge, while the posttest was administered after the treatment to assess the learning outcomes.

Below is a summary of students’ scores:Pretest Scores: The highest pretest score was 60, while the lowest was 23.33, with most students scoring between 30–50. The mean (average) score was 40.39, indicating that students’ initial understanding of the material was relatively low before the treatment.Posttest Scores:The highest posttest score was 96.67, and the lowest was 80, with most students scoring above 85. The mean score was 87.17, showing a significant increase after the use of Powtoon videos during instruction.

These findings indicate a substantial improvement in students’ academic performance, demonstrating that Powtoon-based learning videos had a positive impact on learning outcomes.

Data Summary Table

Test Type	Highest Score	Lowest Score	Average Score
Pretest	60.00	23.33	40.39
Posttest	96.67	80.00	87.17

The difference between the average posttest and pretest scores is 46.78 points, which confirms that the learning video treatment had a notable effect.

3. B. Discussion

Based on the research results, it can be concluded that the use of Powtoon-based learning videos significantly improved the learning outcomes of Class XI Science students at MAN Sidenreng Rappang. The following sections analyze the key findings in detail:

The primary goal of this study was to enhance students' understanding of the Human Coordination System in Natural Science through the integration of Powtoon. The comparative results between pretest and posttest scores provide strong evidence of the effectiveness of this media. Prior to the implementation, students' performance showed limited understanding of the material. The increase in posttest scores suggests that students were able to comprehend the subject matter more effectively when it was presented in a visual and animated format.

These findings are in line with Mayer's Cognitive Theory of Multimedia Learning (2001), which states that students learn more deeply from a combination of words and pictures than from words alone. Powtoon videos utilize text, animations, transitions, sound effects, and narration, which together facilitate dual-channel information processing and reduce cognitive load.

In addition to test scores, observational data and student feedback indicated increased motivation and engagement during the learning process. Students expressed greater interest in the lessons when Powtoon videos were used compared to traditional lecture methods. The visual appeal, animations, and storytelling aspects of the videos made learning more enjoyable and less monotonous.

This supports the findings of Hanipah & Saputra (2022), who argue that animation-based media helps to reduce boredom and sustain student attention. Motivation is a crucial factor in learning, as it determines the effort and persistence of learners in acquiring knowledge. By presenting the material in a fun and interactive way, Powtoon encouraged students to stay focused and actively participate.

The use of Powtoon also showed advantages in terms of time efficiency and clarity. Teachers were able to deliver key concepts more effectively within a limited timeframe. Powtoon videos helped explain complex systems such as the nervous system and sensory organs through animated sequences that are difficult to achieve through static images or verbal explanation.

This was reflected in the questionnaire responses, where students reported that learning through Powtoon helped them understand the content faster and more clearly. The combination of visual and audio elements in a concise video format optimized the instructional time and helped clarify abstract scientific processes.

Powtoon caters to various learning preferences, especially visual and auditory learners. Students who typically struggle with textbook-based or lecture-heavy instruction benefited from the multimedia format. This aligns with the concept of differentiated instruction, which emphasizes tailoring teaching methods to accommodate diverse learner needs.

According to the questionnaire data, a majority of students found Powtoon videos easier to follow than traditional materials. This confirms the assertion of Melinda (2017), who stated that visual media can enhance students' memory retention and concept comprehension, especially when animated visuals are used to represent real-world phenomena.

Based on the results, it can be concluded that the working hypothesis (H1), which states that "the use of Powtoon-based learning videos is effective in improving the

learning outcomes of Grade XI Science students at MAN Sidenreng Rappang", is accepted. Meanwhile, the null hypothesis (H0), which states that "the use of Powtoon-based learning videos is not effective", is rejected.

The mean posttest score (87.17) was significantly higher than the mean pretest score (40.39), and this result was consistent across all students. Therefore, it can be concluded that the intervention using Powtoon significantly affected student learning outcomes in a positive direction.

Discussion

The improvement in students' academic performance after using Powtoon videos demonstrates the potential of multimedia-based learning tools in enhancing science education. The data suggest that Powtoon not only improves learning outcomes but also fosters a more engaging, inclusive, and time-efficient learning experience.The results of this study support the use of Powtoon as an innovative alternative to conventional instructional media. The ability to visualize abstract concepts, increase motivation, and accommodate different learning styles makes Powtoon an effective and accessible tool for modern educators.

CONCLUSION

Based on the results of the research and data analysis, it can be concluded that the use of **Powtoon-based learning videos** is **effective** in improving the learning outcomes of Grade XI Science students at MAN Sidenreng Rappang. This is evidenced by a significant increase in students' scores between the pretest and posttest. The average pretest score was **40.39**, while the average posttest score increased to **87.17**, indicating a substantial improvement after the application of Powtoon in the learning process.

The animated video format provided through Powtoon helped make abstract concepts in Natural Science more concrete and easier to understand. It also enhanced students' motivation and engagement, made learning more enjoyable, and allowed for a more efficient use of instructional time. The combination of visual and auditory elements in the videos facilitated better comprehension and retention of material.

Therefore, the research hypothesis (H1), stating that Powtoon-based learning videos are effective in improving learning outcomes, is **accepted**, while the null hypothesis (H0) is **rejected**.

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