

The Effectiveness of Technology-Based Interactive Learning Media to Improve Students' Cognitive Skill at Islamic Elementary School

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Abstract

This research aims to produce technology-based interactive learning media that is feasible and effective in improving students' cognitive learning process activities. This research uses the Research and Development (RnD) method with the ADDIE research model, namely analysis, design, development, implementation, and evaluation. The research test subjects were fourth-grade students of Darul Hikmah Islamic Elementary School. The data collection techniques used are observation, questionnaires, pre-test, post-test, and documentation. This interactive learning media is validated by material experts, media experts, and linguists if there are deficiencies or expert suggestions, it must be corrected according to the experts' suggestions. The comparative data analysis technique uses SPSS 19 to test the results of the effectiveness test or T-test. The results of interactive learning media development research get a percentage of material validity from material experts of 83%, from media experts getting a percentage of media validity of 80%, and a percentage of language validity of 80% from media experts, interactive learning media is declared feasible and can be tested on grade IV students of Darul Hikmah Islamic Elementary School. Based on the results of the t-test analysis on the pre-test, the average value is 71.40 and the post-test is 81.26. Because of the sig value. (2-tailed) or test 1 of 0.00 which means ≤ 0.05 , it can be concluded that H_0 is rejected, and H_a is accepted. The conclusion that can be drawn from this study's results shows a significant effect of interactive learning media on the cognitive abilities of fourth-grade students of Darul Hikmah Islamic Elementary School.

Keywords: Cognitive Skill, Interactive Learning Media, Technology

Abstrak

Tujuan dari penelitian ini adalah untuk menghasilkan media pembelajaran interaktif berbasis teknologi yang layak dan efektif untuk meningkatkan kognitif peserta didik dalam kegiatan proses pembelajaran. Penelitian ini menggunakan metode Research and Development (RnD) dengan model penelitian ADDIE, yaitu analisis, desain, pengembangan, implementasi, dan evaluasi. Subjek uji penelitian yaitu peserta didik kelas IV Madrasah Ibtidaiyah Darul hikmah. Teknik pengumpulan data yang digunakan yaitu obeservasi, kuesioner, pre-test, post-test, dan dokumentasi. Pada media pembelajaran interaktif ini divalidasi oleh para ahli materi, ahli media, ahli bahasa jika terdapat kekurangan atau saran ahli maka harus diperbaiki sesuai dengan saran para ahli tersebut. Teknik analisis data komparatif menggunakan SPSS 19 untuk menguji hasil uji keefektifan atau uji T. Hasil penelitian pengembangan media pembelajaran interaktif mendapatkan prosentase kevalidan materi dari ahli materi sebesar 83%, dari ahli media mendapatkan prosentase kevalidan media sebesar

80% dan prosentase kevalidan bahasa sebesar 80% dari ahli media, media pembelajaran interaktif dinyatakan layak dan dapat diujicobakan kepada peserta didik kelas IV Madrasah Ibtidaiyah Darul Hikmah. Berdasarkan hasil analisis uji-t pada pre-test diperoleh nilai rata-rata 71,40 dan post-test 81,26. Karena nilai sig. (2-tailed) atau uji 1 sebesar 0,00 yang berarti $\leq 0,05$, maka dapat disimpulkan bahwa H_0 ditolak H_a diterima. Kesimpulan yang dapat diambil dari hasil penelitian ini menunjukkan bahwa terdapat pengaruh yang signifikan dari media pembelajaran interaktif terhadap kemampuan kognitif peserta didik kelas IV Madrasah Ibtidaiyah Darul Hikmah.

Kata Kunci: Kemampuan Kognitif, Media Pembelajaran Interaktif, Teknologi

INTRODUCTION

From year to year, technology has experienced various developments in the field of education where everything has provided benefits to make all work easier, including the use of learning tools and media in the teaching and learning process in the classroom (Subandowo, 2022). in the field of education, technology is a supporting tool that helps teachers teach their students to achieve goals (Nurdyansyah & Aini, 2020). In times like this, we often see educators using technology in educational media to help students learn (Rusdi, et al., 2022; Said, 2023). Mastering and being proficient in using various media related to sophistication in the learning process is one of the talents that a teacher must have to improve students' cognitive abilities (Aqylah & Jarkawi, 2021; Nur, 2022) Through interesting, easy, interactive learning media innovations created, and easy to use, the world of education must improve school progress (Anyan et al., 2020). Learning media holds the main obligation to deliver material so that it can support learning (Indriyani, 2019). On the other hand, the development of interactive, visual, auditory, and audio-visual media must be closely aligned with the needs of students (Hermawan et al., 2020; Maritsa et al., 2021).

Based on observations made by researchers in class IV Darul Hikmah Islamic Elementary School, there are various problems in current teaching and learning procedures, most importantly in science and science subjects, many schools still use conventional methods or lectures so that learning becomes monotonous and boring. Material on plant parts at the basic level is still difficult to digest with abstract learning. Students are less involved in learning when explanations are given verbally or in book form because their fixed nature (still, black and white pictures, lots of text) will make it difficult for students to understand the subject matter being taught. Solutions help students understand lessons easily, science and science lessons especially require innovative approaches or interactive learning tools (Hidayanto, 2019; Jamaludin et al., 2022). To help students improve their cognitive abilities, there needs to be interactive media that can be operated flexibly inside and out. outside of school (Ardian & Abdah, 2019; Ragil Kurniawan, 2019; Regianti & Nurdyansyah, 2023).

Several previous studies discuss the same problem 1) Conducted by Sahal Mahfudz on "Interactive Media for Improving Learning Outcomes on Material on Functions of Plant Parts Class IV Al-Hidayah Islamic Elementary School Sono Kediri" with results proving student improvement before and after using interactive material about the function of plant parts (Mathematics, 2020). 2) Carried out by Mutya and Safrul on "The Effect of the STAD Learning Model Using Interactive Powerpoint on Students' Cognitive Abilities in Science Learning in Elementary Schools" with the results having a significant impact on the cognitive abilities of class IV students when studying Science AS. This can be seen from the average gain of the experimental group of 84.69, then the average gain of the control group of 74.06 (Riny & Safrul, 2022). 3) Yulistina conducted on "The Effectiveness of Using Powerpoint-Based Interactive Media in Limited Face-to-Face Learning in Elementary Schools with results: a) When PTM is limited to class V science and science learning" the use of PowerPoint-based interactive media is useful because it can increase student motivation and make it easier to understand the learning material (Nur, 2022). 4) carried out by Riccy et al on "Quiz-Based Interactive Learning Media Containing Indonesian Language Lessons in Elementary

Schools" with the results in the learning process being that students both at school and at home make optimal use of learning media so that it makes it easier to understand the material (Sitanggang et al., 2023).

What this research has in common with previous research is that it uses PowerPoint-based interactive learning media in science learning. The difference between this research and previous research is that this interactive PowerPoint media discusses sections with designs that cover all learning styles (audio, visual, and kinesthetic). The novelty in this research is that the learning media developed is linked to the learning styles of class IV students at Darul Hikmah Islamic Elementary School. Thus, this research also supports previous research, that the use of interactive learning media can improve students' cognitive abilities. Creating interactive PowerPoint media is easy for teachers to create flexibly by using Canva with various types of templates that have been presented which will then be re-processed by teachers according to the needs of the material to be used (Nurhalisa & Sukmawarti, 2022).

RESEARCH METHODS

This research uses R&D, namely the method. Research is used to create certain products and measure the effectiveness of these products (Safitri & Aziz, 2022). This research approach is descriptive analysis and applies the ADDIE-type stages, namely analysis, design, development, implementation, and evaluation. this type was chosen because the ADDIE stages present a structured approach to improving instruction. Figure 3. The stages of development design based on the ADDIE model (Hidayat & Nizar, 2021; Bujuri, et al., 2022) are as follows:

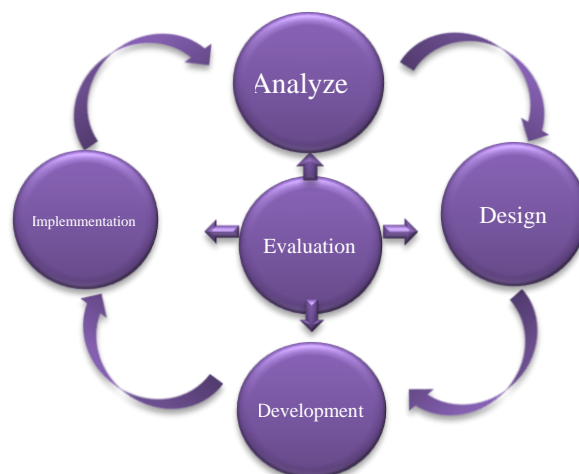


Figure 1. ADDIE Development Model

The first stage is analysis (needs analysis); At this stage, researchers carry out problem descriptions based on field investigators who examine basic skills, unmet needs, and behavior analysis. Design (design); At the design stage, researchers create all the materials needed to conduct research, including evaluation tools, learning media designs, pretest and posttest questions, and other things needed. The second stage is Development (development); At this stage, individual, small group and large group tests, and confirmation, are carried out. Researchers will modify products that have been tested by experts to produce quality final products, researchers will modify products that have been validated by experts based on feedback from experts. The resulting and revised media will also be tested on individuals, small groups, and field tests so that a suitable final product is obtained. The third stage is implementation (implementation); In This stage, the product

was tested on class IV students at Darul Hikmah Islamic Elementary School. Teachers and students received questionnaires to gather information about their reactions to the product. The fourth stage is Evaluation (evaluation); At this stage, data about the effectiveness of interactive learning media to improve students' cognitive (knowledge) and to improve interactive learning media based on feedback from students.

This research uses secondary data sources in the form of observations by observing the learning process in class IV classrooms at Darul Hikmah Islamic Elementary School to obtain information about research needs. The main data source used to create a questionnaire or questionnaire. Darul Hikmah Islamic Elementary School of Banjar Kemuning is the research location. The research population consisted of class IV students at Darul Hikmah Islamic Elementary School, totaling 23 students. This research applies data collection techniques used in this research, including: 1) Observation, researchers collect information from observing facts in the field. 2) Questionnaire, by collecting information from students' and educators' answers regarding research needs 3) Pre-test, for evaluation/tests carried out for students before starting learning 4) Post-test, evaluation activities/final tests carried out for students. 5) Documentation, to collect evidence of storing information in the form of images, videos, etc. related to research (Hidayat & Nizar, 2021; Jailani, 2023). The data analysis technique in this research is to organize data from validated questionnaire scoring results using descriptive quantitative analysis techniques. If there are deficiencies or suggestions from experts, the media must be revised very thoroughly with their suggestions, and comparative analysis techniques using SPSS 19 are used to test the results of the effectiveness test or T test on students (paired sample test).

1) Results of expert validation of interactive learning media products

The three experts are (1) material experts, who teach subject matter; (2) media experts, who understand how learning media are designed; and (3) linguists, who understand information about language in interactive learning media. The Likert scale is used in various questions that are part of the data validation process (Muliani et al., 2023; Permata & Nugrahani, 2023). The assessment categories are presented in the following table:

Table 1. Questionnaire Assessment Score

Score	Quality of Achievement	Criteria	Predicate
4	100%	Very Complete	No Correction
3	80%	Complete	No Correction
2	60%	Adequate	Need Correction
1	40%	Less	Need Correction

The value obtained can be calculated by:

$$Percentage = \frac{\sum Score \times component\ weights}{n \times The\ highest\ score} \times 100\%$$

2) Student questionnaire results

The media was tested on students after being revised. The research subjects were 20 class IV students (10 boys and 10 girls) at Darul Hikmah Islamic Elementary School. The following is a description of the questionnaire evaluation of the students' responses.

Table 2. Guttman scale assessment scores

Score	Acquirement Quality
1	Like
0	Dislike

The results of the questionnaire can be calculated in the following way:

$$NP = \frac{n}{N} \times 100\% \text{ (Sugiono 2016 in Fakhri, 2021)}$$

The T test will be used to calculate the standards of the pre-test and post-test. The test results will show how effective and big the influence of interactive media is in improving students' cognitive abilities.

RESULTS AND DISCUSSION

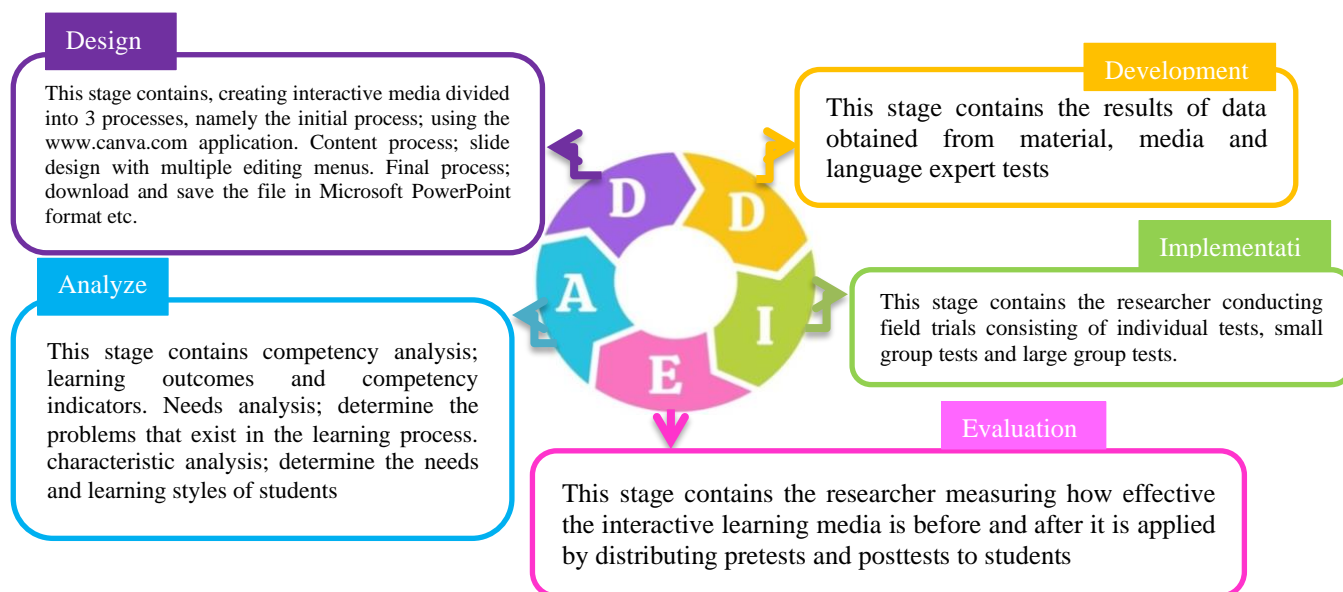


Figure 2. ADDIE Implementation Stage (Hidayat & Nizar, 2021; Safitri & Aziz, 2022)

Based on the picture above, the research process begins with the analysis stage which contains competency analysis, containing the following two elements, namely a) Learning outcomes; Identifying plant parts and describing their functions. b) competency indicators; 1. Name the parts of plants 2. Communicate the functions of plant parts 3. Observe the parts of plants which are divided into several types. As a reference for compiling material to suit the curriculum.

Second, the design stage is to create a fresh design animation that is pleasing to the eye so that it can attract students' attention so that they can fully participate in the learning process enthusiastically and not easily bored. Interactive learning media is defined as having attractive responsive characteristics that arouse user interest and communication between the user and the media (software) used (Julianti et al., 2023). According to Bintaro, the characteristics of Interactive Multimedia include:

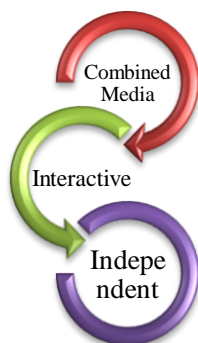


Figure 3. Characteristics of Interactive Multimedia (Hidayanto, 2019).

Based on the picture above, the characteristics of Interactive Multimedia: a) Combines two elements of audio and visual media, combines two components of audio and visual media to be considered interactive media. b) Interactive, can activate communication that runs in two or more directions and is not passive. c) Independent, making the content easy and complete so that users can operate freely without having to be guided by other people (Mulyanto & Mustadi, 2023). This interactive learning media was created by paying attention to the cognitive aspects of elementary-age children's development, which is one of the most important things to know and understand. Students increase their cognitive abilities gradually (Mutmainah, 2020). Verse 13 of Q.S Al-Hujurat describes various human traits. Schermerhorn conveyed that students' ability to collect or obtain information is reflected in their cognitive abilities (Fuad, 2019; Lestari & Sopiany, 2022). Indicators of cognitive abilities include:

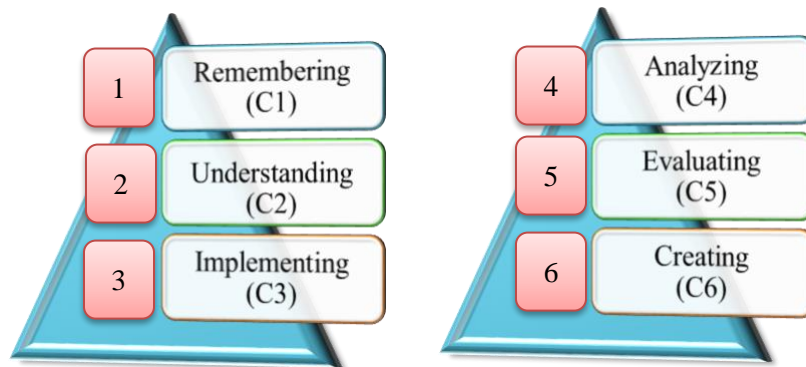


Figure 4. Cognitive Ability Indicators (Pradestya, 2019)



Figure 5. Initial Display of Interactive Powerpoint Media

Figure 5 is a picture of the initial display of the interactive PowerPoint media menu with a green-themed design according to the plant material. Each menu in interactive PowerPoint media has its information, designed in uncomplicated language so that explanations can be easily understood by basic-level students.

Third, the Development Stage, which contains before being field tested, the media will go through a validation stage. Validation was carried out by three experts, namely material experts,

design experts, and learning experts. Likert scale assessment guidelines ranging from 1 to 4 are used as an assessment instrument to test the validity of the products produced in this research. The questionnaire is in the form of a question-and-answer column. The completed questionnaire will be evaluated by the validator.

1. Material expert test

At this stage, Dewi Muniroh as the class teacher becomes the validation of the material expert in this development research. This data was obtained from the assessment of the first stage of material experts who obtained validation results with a score of 67% who received suggestions for improvement by the validator regarding the root material on interactive PowerPoint by explaining the differences in each of the 2 types of roots so that students do not only know that the differences are located in the pictures.



Figure 6. View of the material before revision



Figure 7. View of the material after revision

After several suggestions from experts, it was repaired. The second stage which has been improved gets a score of 83% so this qualification is included in the very complete category, so that

interactive learning media that are suitable for use do not need to be changed again. As for the indicators that have not been met, this is because the material is still not very complete the flow of learning objectives.

2. Media Expert Test

At this stage, Moch. B. Udin by Arifin as a PGMI UMSIDA lecturer who is an expert validator of this development research media. This data was obtained from the assessment of material expert instruments with the results of the first validation getting a score of 60%, getting suggestions for improvements to the media, and adding instructions for use with an attractive design by the theme taken until improvements were implemented.

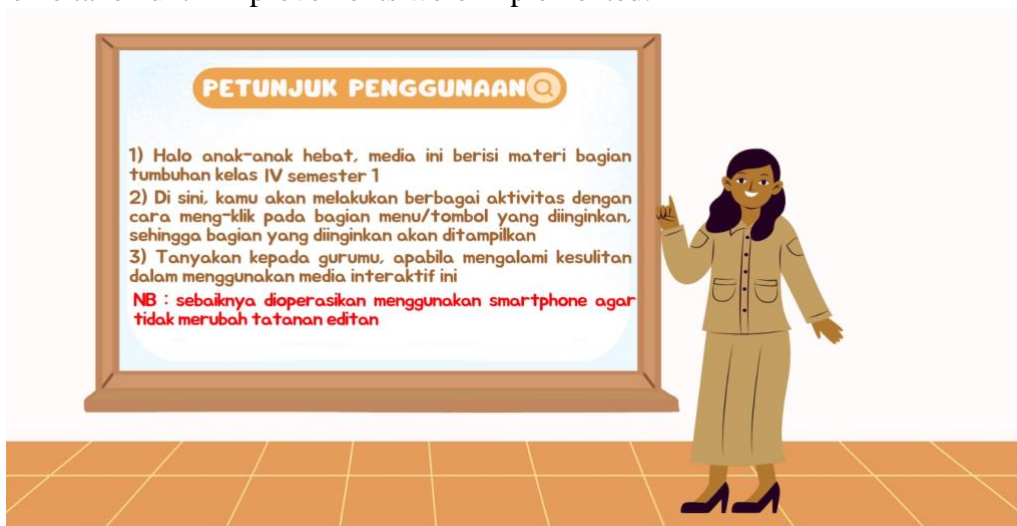


Figure 8. Results Before Revision from Media Expert Suggestions



Figure 9. Results After Revision from Media Expert Suggestions

Based on the image above, the results of the second validation stage which have been corrected get a score of 80% so that this qualification is included in the very complete category, so that interactive learning media that is suitable for use does not need to be changed. As for the indicators that have not been met, this is because the layout of the title/image/material is not proportional.

3. Linguist Test

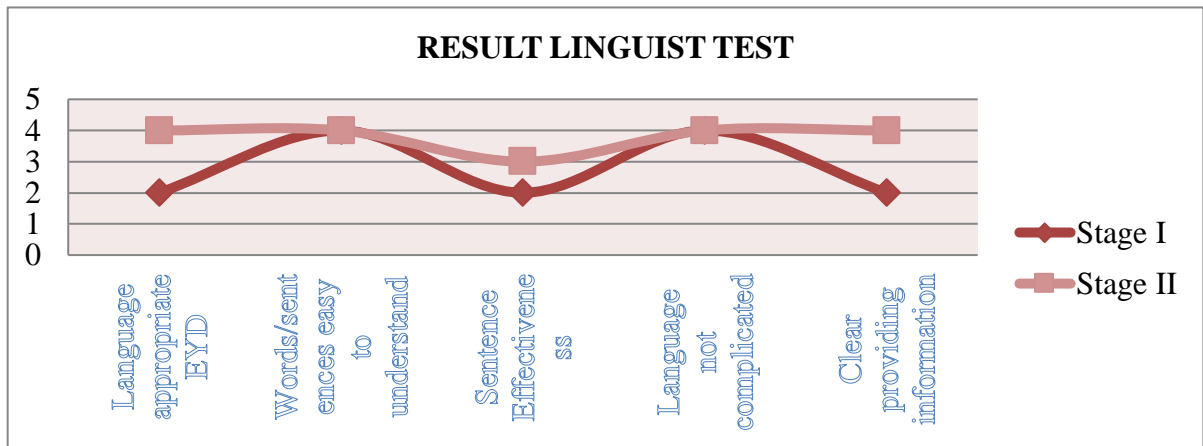


Figure 10. Linguistic Expert Assessment Results on Interactive Media

Based on the picture above, Dewi Muniroh as the class teacher is the validation of the language expert in this development research. This data was obtained from the assessment of language experts who obtained the first validity result of 75% until revisions were carried out. After several suggestions from experts, Figure 10 was revised, this is the result of the second stage of validation which has been corrected to get a percentage score of 80% so that this qualification is included in the extraordinary category so that interactive learning media that is suitable for use does not need to be changed. The indicators that have not been met are because the sentences in the learning media are not yet effective. The qualification value is the best so that it can be tested in the field.

Fourth, the implementation stage, namely the field test stage which consists of individual, small group, and large group tests. Tests can be carried out after obtaining feasibility validation from design experts, media experts, and material experts. The following is an explanation regarding the stages of field testing that will be carried out by researchers.

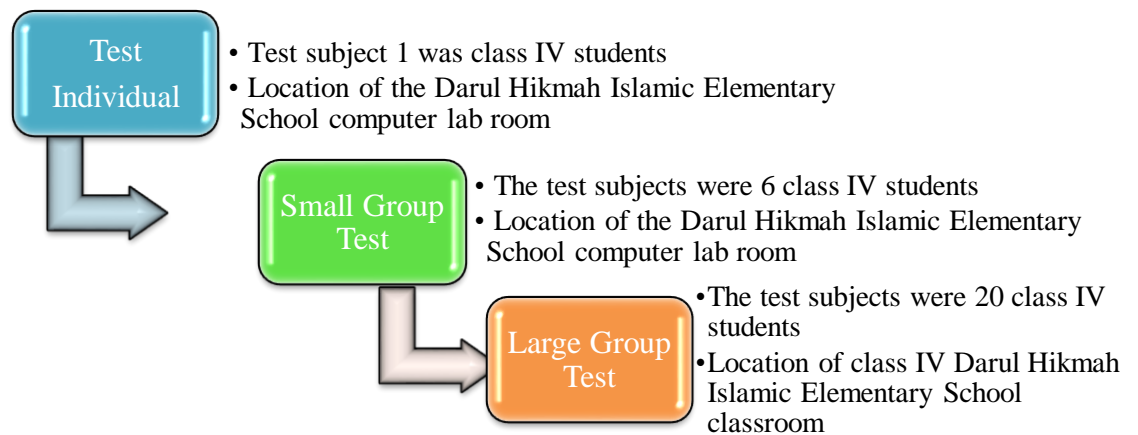


Figure 11. Stages of field testing

Based on the picture above, according to Arikunto, the trial was carried out on individual respondents of 1-3 people, small groups with respondents between 4 and 14 people, and large groups with respondents between 15 and 50 people. Students who act after respondents are given learning media are allowed to ask questions about it. After that, respondents filled out an assessment questionnaire for respondents to fill out a measurement questionnaire to find out what the results were before and after applying the learning media (Arikunto, 2010).

Lastly, the evaluation stage is the Difference Test (t-test) and class IV students at Darul Hikmah Islamic Elementary School carry out a pretest and posttest given by the researcher to measure how effective the interactive learning media is both before and after it is applied. At this stage, students can find out how their cognitive abilities have improved through the results of the pre-test and post-test.

Table 4. Paired Samples Statistic
 PAIRED SAMPLES STATISTICS

	Average	N	Std. Deviation	Std. Average Error
Pair 1	Pretest 71,40	20	6,824	1,526
	Posttest 81,25	20	6,324	1,414

Table 4 explains the statistics of the two samples, namely the pretest and posttest samples. The data before the test has an average value of 71.40 from 20 samples, with a standard deviation of 6.824 and an average standard error of 1.526. The data after the test has an average value of 81.25 from 20 samples, with a standard deviation of 6.324 and an average standard error of 1.414.

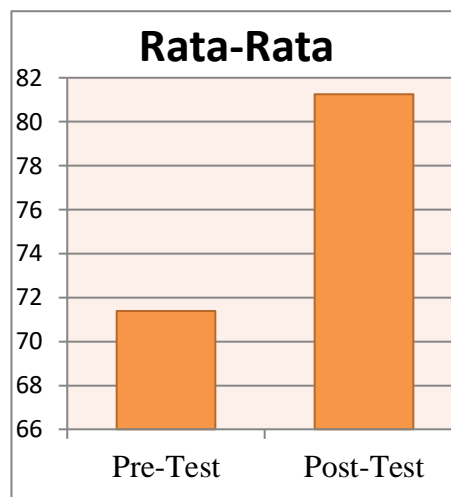


Figure 12. Improved Learning Outcomes

According to the explanation above, interactive media based on plant material has been used efficiently in the learning process. before using interactive media, the average pre-test score was 71.40 and after using interactive media, the average post-test score was 81.25. Thus, interactive learning shows significant improvement.

Table 5. Paired Samples Correlations
 PAIRED SAMPLES CORRELATIONS

	N	Correlation	Sig.
Pair 1 PRETEST & POSTTES	20	.735	.000

The correlation value is 0.735 and the significance is 0.000, it can be decided that there is a relevant relationship between the pretest and post-test test scores. This can be done because the relevant result is 0.000 less than 0.05. A correlation value close to 1 indicates a stronger relationship and a correlation value close to 0 indicates a weaker relationship. Based on the data above, we can decide that the correlation value is 0.735, which is close to 1, which means the relationship is strong.

Table 6. Paired Samples Test

PAIRED SAMPLES TEST									
	Rata-rata	Std. Deviation	Std. Error Average	Lower	Upper	t	df	Sig. 2 tailed	
Pair 1	-9.850	4.804	1.074	-12.098	-7.602	-9.169	19	.000	
pretest-post-test									

Through the third output result in table 6. In the table above, the p-value or sig. (2-tailed) is 0.000, meaning less than (0.05), it is stated that H_0 is rejected and H_a is accepted. Influential significant in the average pre-test and post-test scores (moch. Bahak Udin by Arifin & Aunillah, 2021).

The advantages of using interactive learning media in science and science learning activities are a) making teaching media easier to convey and the material presented clearer (Eka Wulandari, 2022). Includes practicality of tools, attractive presentation design, can display text, images, films, sound effects, music, graphics, and animation to aid understanding and memory; it can also be easily edited, saved, and reused; this can be replicated quickly and cheaply (Swara, 2021). Participants do not need to use their quota to access it frequently. In addition, accessing this interactive Powerpoint does not require any other program, making it a very useful and effective tool (Trisanti & Nafiah, 2020).

Development of PowerPoint-based interactive learning media by utilizing the www.canva.com application which is very easy for teachers to access in order to create interactive media creations with various innovative models (Barus, 2024). Media can be downloaded in various desired formats such as saving jpg, png, pdf, video mp4 and Microsoft PowerPoint format files, then there is a share link menu called sharing on social media sites such as YouTube, WhatsApp, Instagram, and so on (Kelas & Sdn, 2023).

Interactive learning media is categorized as valid and effective because it meets the first criteria, the language aspect of the media is appropriate to the age development of grade 4 children, namely. One of the important things that must be considered when compiling the media is the language used, which must be Indonesian which is easily understood by students to prevent misunderstandings, good use of language can help students understand media content easily (Miftah & Nur Rokhman, 2022). The language used in learning media must be appropriate to the material, easy to digest, and easy to understand (Desrinelti et al., 2021). Second, the material aspect shows that the material presented is appropriate and follows the learning objectives. so interactive learning media regarding plant parts material has met the Learning Outcomes (CP) requirements and Competency Indicators set out in the Independent Curriculum. The learning media needed by students can be adjusted to curriculum needs, so learning materials must be prepared according to learning objectives or meet Learning Outcomes and Competency Indicators (Rahmayanti et al., 2022). The content of the material is adapted to the cognitive abilities of ten-year-old children (grade 4 SD/MI), students have better critical powers and can study problems thoroughly from various points of view. At level C3, cognitive abilities, students can not only know the types of plants but can also compare existing objects. At the age of 9 to 10 years, they begin to enter level C4, namely analyzing, where they can break down situations into more specific parts and understand the correlations between one part and another. Students can make conclusions by analyzing, contrasting, and linking theory with facts. Students can make conclusions about the positive and negative values contained in it (Nuryati & Darsinah, 2021).

Third, the media aspect, the media developed has an attractive presentation because it is by the learning objectives, is arranged systematically, and has complete information. Good media is media that meets students' needs and can also increase students' motivation to study well (Fira Afilia Firnanda*, Farida Nurlaila Zunaidah, 2024). Class 4 is included in the concrete operational stage where understanding logic with physical objects if given abstract learning media, will be difficult for students to understand (Hazmi, 2023). So, the PowerPoint-based interactive learning media used in this research does not only contain writing but contains audio and visuals because it is prepared by taking into account the concrete operational stages and students' learning styles.

The use of interactive media material on plant parts as a tool, as shown by the T-test data. The value of student learning outcomes above the KKM, learning is said to be effective because it can be seen from the post-test results which show an increase in student learning outcomes compared to the previous results, namely the pre-test. Thus, it can be decided that the use of interactive learning media regarding plant parts in science, is feasible and effective for satisfactory learning outcomes for class IV students. This research has advantages compared to other research, namely that PowerPoint-based interactive learning media can attract students' attention, is easy for educators to create using the Canva application, is easy for users to access, and is practical to use, apart from that, there has been a lot of research examining interactive learning media based on PowerPoint then the results of further research can use the latest technology-based interactive learning media in learning activities that cover more material.

CONCLUSION

The use of interactive learning media in science and science learning about plant parts can provide convenience to teachers as an effective teaching aid and students can more easily understand the material that has been presented on interactive media by paying attention to the cognitive abilities of class 4 students at the concrete operational stage where students It is easier to understand learning material with media containing concrete visuals and audio rather than just abstract explanations. This interactive media can provide a pleasant learning atmosphere because, with the help of media, it is interesting and not boring. However, this research has limitations, namely that the material in the learning media only focuses on one material, and is applied to one school level, so future researchers are expected to be able to develop more other materials and not just for one level by using the latest interactive media by following technological developments. Apart from that, it is hoped that future researchers can improve all the limitations in this research with a similar theme.

REFERENCE

- Anyan, A., Ege, B., & Faisal, H. (2020). Pengembangan Media Pembelajaran Interaktif Berbasis Microsoft Power Point. *JUTECH: Journal Education and Technology*, 1(1). <https://doi.org/10.31932/jutech.v1i1.690>
- Aqylah, N., & Jarkawi. (2021). Pentingnya Kompetensi Pedagogik Guru Pada Abad 21. *Proceeding Studium Generale 2021*, 54–58.
- Ardian, Y., & Abdah, Y. S. (2019). Media Pembelajaran Interaktif Mata Pelajaran IPA Kelas IV pada SD Negeri Karanganyar 02 Paiton Probolinggo. *Bimasakti*, 1–5. <https://www.neliti.com/id/publications/184869/media-pembelajaran-interaktif-mata-pelajaran-ipa-kelas-iv-pada-sd-negeri-karanga>
- Arikunto. (2010). *Metode Penelitian RnD*.
- Barus, R. (2024). *Pengembangan Media Pembelajaran Interaktif Berbasis Canva Pada Mata*

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- Bujuri, D. A., Ananda, N., Saputra, A. D., & Handayani, T. (2022, October). Pengembangan Bahan Ajar Tematik Berbasis Model Pembelajaran Contextual Teaching and Learning Di Madrasah Ibtidaiyah Swasta. *SITTAH: Journal of Primary Education*. <https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/sittah/article/view/495>
- Desrinelti, D., Neviyarni, N., & Murni, I. (2021). Perkembangan siswa sekolah dasar: tinjauan dari aspek bahasa. *JRTI (Jurnal Riset Tindakan Indonesia)*, 6(1), 105. <https://doi.org/10.29210/3003910000>
- Eka Wulandari. (2022). Pemanfaatan Powerpoint Interaktif Sebagai Media Pembelajaran Dalam Hybrid Learning. *JUPEIS: Jurnal Pendidikan dan Ilmu Sosial*, (1) 2(2), 1–7.
- Fira Afilia Firnanda*, Farida Nurlaila Zunaidah, K. E. P. (2024). Analisis Kebutuhan LKPD pada Materi Gaya Magnet untuk Siswa Kelas IV SDN Gayam 3. 514–520.
- Fuad, S. (2019). Alur Berpikir Analisis Siswa Dalam Pemecahan Masalah Matematika Ditinjau Dari Level Kognitif Siswa. 15–45.
- Hazmi, D. (2023). Perkembangan Kognitif Anak Menurut Teori Piaget. *Mimbar Kampus: Jurnal Pendidikan dan Agama Islam*, 22(2), 412–419. <https://doi.org/10.47467/mk.v22i2.3018>
- Hermawan, B., Endang, L., & Apriana, M. (2020). Peran Media PPT untuk Peningkatan Minat Belajar dalam Pembelajaran Kosakata Bahasa Mandarin (The Role of PowerPoint media towards the students ' interest and competence in Chinese Vocabulary Learning). *Jurnal Penelitian Pendidikan*, 20, 183–191. <https://ejournal.upi.edu/index.php/JER/article/view/26887>
- Hidayanto, N. (2019). Pengembangan Media Interaktif..., Nur Hidayanto, FKIP, UMP, 2017. 2012, 6–20.
- Hidayat, F., & Nizar, M. (2021). Model Addie (Analysis, Design, Development, Implementation and Evaluation) Dalam Pembelajaran Pendidikan Agama Islam. *Jurnal Inovasi Pendidikan Agama Islam (JIPAI)*, 1(1), 28–38. <https://doi.org/10.15575/jipai.v1i1.11042>
- Indriyani, L. (2019). Pemanfaatan Media Pembelajaran Dalam Proses Belajar Untuk Meningkatkan Kemampuan Berpikir Kognitif Siswa. *Prosiding Seminar Nasional Pendidikan, FKIP, Universitas Sultan Ageng Tirtayasa*, 2(1), 17–26.
- Jailani, M. S. (2023). Teknik Pengumpulan Data Dan Instrumen Penelitian Ilmiah Pendidikan Pada Pendekatan Kualitatif dan Kuantitatif. 1, 1–9.
- Jamaludin, J., Alanur S, S. N. A. S., Amus, S., & Hasdin, H. (2022). Penerapan Nilai Profil Pelajar Pancasila Melalui Kegiatan Kampus Mengajar Di Sekolah Dasar. *Jurnal Cakrawala Pendas*, 8(3), 698–709. <https://doi.org/10.31949/jcp.v8i3.2553>
- Julianti, E. S., Rustini, T., & Furnamasari, Y. F. (2023). Analisis Soal Tes IPS Pada Buku Siswa Kelas VI Dalam. 03(01), 1–10.
- Kelas, S., & Sdn, I. V. (2023). 1, 2 1,2. 08, 3223–3229.
- Lestari, A. A., & Sopiany, H. N. (2022). *Jurnal Didactical Mathematics* Deskripsi Kemampuan Kognitif Siswa dalam Menyelesaikan. 4(April), 84–93.
- Maritsa, A., Hanifah Salsabila, U., Wafiq, M., Rahma Anindya, P., & Azhar Ma'shum, M. (2021).

- Pengaruh Teknologi Dalam Dunia Pendidikan. *Al-Mutharahah: Jurnal Penelitian dan Kajian Sosial Keagamaan*, 18(2), 91–100. <https://doi.org/10.46781/al-mutharahah.v18i2.303>
- Mathematics, A. (2020). Pengembangan Media Interaktif Untuk Peningkatan Hasil Belajar Pada Materi Fungsi Bagian Tumbuhan Kelas IV MI Al-Hidayah Sono Kediri. 1–23.
- Miftah, M., & Nur Rokhman. (2022). Kriteria pemilihan dan prinsip pemanfaatan media pembelajaran berbasis TIK sesuai kebutuhan peserta didik. *Educenter: Jurnal Ilmiah Pendidikan*, 1(9), 641–649. <https://doi.org/10.55904/educenter.v1i9.92>
- moch. bahak udin by arifin, M. P. ., & Aunillah, M. S. (2021). buku ajar statistik pendidikan.
- Muliani, D. E., Kasmira, N., & Yusmanila, Y. (2023). Validasi dan Praktikalitas Bahan Ajar Berbasis Google Sites. *Edukatif: Jurnal Ilmu Pendidikan*, 5(2), 1250–1257. <https://doi.org/10.31004/edukatif.v5i2.4467>
- Mulyanto, S., & Mustadi, A. (2023). Media Pembelajaran Powerpoint Interaktif Pada Mata Pelajaran IPS Kelas V Sekolah Dasar. *Jurnal Penelitian dan Pengembangan Pendidikan*, 7(1), 110–116. <https://doi.org/10.23887/jppp.v7i1.54552>
- Mutmainah. (2020). Guru Profesional dalam Perspektif Tafsir Hadist. *AL-THIQAH: Jurnal Ilmu Keislaman*, 3(01), 1–16. <http://ejurnal.stiuda.ac.id/index.php/althiqah/article/view/24>
- Nur, Y. (2022). Efektivitas Penggunaan Media Interaktif Berbasis Powerpoint pada Pembelajaran Tatap Muka Terbatas di Sekolah Dasar. *Jurnal Basicedu*, 6(4), 6190–6196. <https://jbasic.org/index.php/basicedu>
- Nurdyansyah, N., & Aini, Q. (2020). Peran Teknologi Pendidikan Pada Mata Pelajaran Matematika Kelas Iii Di Mi Ma'arif Pademonegoro Sukodono. *At-Thullab: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, 1(1), 124. <https://doi.org/10.30736/atl.v1i1.81>
- Nurhalisa, S. S., & Sukmawarti. (2022). Pengembangan Media Interaktif Berbantuan Canva Pada Pembelajaran IPA Dengan Pendekatan Saintifik. *Journal Ability: Journal of Education and Social Analysis*, 3(1), 38. <https://pusdikra-publishing.com/index.php/jesa/article/view/386%0Ahttps://pusdikra-publishing.com/index.php/jesa/article/download/386/329>
- Nuryati, N., & Darsinah, D. (2021). Implementasi Teori Perkembangan Kognitif Jean Piaget dalam Pembelajaran Matematika di Sekolah Dasar. *Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar*, 3(2), 153–162. <https://doi.org/10.36232/jurnalpendidikandasar.v3i2.1186>
- Permata, R. D., & Nugrahani, R. (2023). Validasi Ahli pada Pengembangan Media Puzzle Book untuk Anak Usia 4-5 Tahun. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 6(7), 5286–5289. <https://doi.org/10.54371/jiip.v6i7.2201>
- Pradestya, R. (2019). Langkah-Langkah Pemecahan Masalah Dan Kemampuan Kognitif. *Jurnal UMMI*, 2(2), 43–49.
- Ragil Kurniawan, M. (2019). Analisis Karakter Media Pembelajaran Berdasarkan Gaya Belajar Peserta Didik. *JINoP (Jurnal Inovasi Pembelajaran)*, 3(1), 491. <https://doi.org/10.22219/jinop.v3i1.4319>
- Rahmayanti, R., Astuti, D. D., & Rustini, T. (2022). Analisis Pengaruh Aspek Perkembangan Anak Usia Sekolah Dasar Terhadap Efektifitas Pelaksanaan Pengelolaan Kelas. *Jurnal Pendidikan Tambusai*, 6, 10682–10688. <https://www.jptam.org/index.php/jptam/article/view/4122%0Ahttps://www.jptam.org/index.php/jptam/article/download/4122/3456>
- Regianti, A. M., & Nurdyansyah. (2023). Pengembangan Media Interaktif Fabel Untuk

- Meningkatkan Minat Baca Dan Keterampilan Menulis Peserta Didik. *Autentik: Jurnal Pengembangan Pendidikan Dasar*, 7(2), 70–81.
- Riny, M., & Safrul, S. (2022). Pengaruh Model Pembelajaran STAD Menggunakan Powerpoint Interaktif terhadap Kemampuan Kognitif Siswa pada Pembelajaran IPA di Sekolah Dasar. *Jurnal Basicedu*, 6(5), 8666–8674. <https://doi.org/10.31004/basicedu.v6i5.3885>
- Rusdi, A., Fitriani, A., Hamzah, A., Handayani, T., & Bujuri, D. A. (2022). Development of Diorama Media on Cultural Diversity Materials in My Country Islamic Elementary School. *Al-Mudarris: Journal of Education*, 5(2), 157–172.
- Safitri, M., & Aziz, M. R. (2022). ADDIE, sebuah model untuk pengembangan multimedia learning. *Jurnal Pendidikan Dasar*, 3(2), 50–58. <http://jurnal.umpwr.ac.id/index.php/jpd/article/view/2237>
- Said, S. (2023). Peran Teknologi Sebagai Media Pembelajaran di Era Abad 21. *Jurnal PenKoMi : Kajian Pendidikan & Ekonomi.*, 6(2), 194–202.
- Sitanggang, R. R., Tegeh, I. M., & Simamora, A. H. (2023). Media Pembelajaran Interakti Berbasis Kuis Bermuatan Pelajaran Bahasa Indonesia di Sekolah Dasar. *Jurnal Imiah Pendidikan dan Pembelajaran*, 7(1), 68–74. <https://doi.org/10.23887/jipp.v7i1.58144>
- Subandowo, M. (2022). Teknologi Pendidikan di Era Society 5.0. *Sagacious Jurnal Ilmiah Pendidikan dan Sosial*, 9(1), 24–35.
- Sugiono 2016 dalam Fakhri. (2021). *Metode Penelitian Purposive Sampling*. 2021, 32–41.
- Swara, G. Y. (2021). Pemanfaatan Visualisasi 3D Pada Multimedia Interaktif Dalam Pengenalan Penyakit Demam Berdarah. *Jurnal Teknoif Teknik Informatika Institut Teknologi Padang*, 8(1), 19–24. <https://doi.org/10.21063/jtif.2020.v8.1.19-24>
- Tri Wulandari, & Adam Mudinillah. (2022). Efektivitas Penggunaan Aplikasi CANVA sebagai Media Pembelajaran IPA MI/SD. *Jurnal Riset Madrasah Ibtidaiyah (JURMIA)*, 2(1), 102–118. <https://doi.org/10.32665/jurmia.v2i1.245>
- Trisanti, S., & Nafiah, N. (2020). Penggunaan Media Powerpoint Interaktif Untuk Meningkatkan Hasil Belajar Siswa Kelas 2 Sdn Losari Jombang. In *National Conference for Ummah (NCU)*, 1(1), 623–630. <https://conferences.unusa.ac.id/index.php/NCU2020/article/view/689>