SMILE Application-Excursion to Space to Improve the Critical Thinking Skills of Fourth Grade Elementary School Students

Nabila Arsy[1*], Muhammad Hanif[2], Ita Rustiati Ridwan[3], Susilawati[4]   iD

[1,2,3,4] Pendidikan Guru Sekolah Dasar Kampus Serang, Universitas Pendidikan Indonesia, Serang, Indonesia

A B S T R A K

*Rendahnya minat siswa dalam pembelajaran karena kurangnya media pembelajaran yang interaktif yang sejalan dengan perkembangan teknologi di abad ke-21. Tujuan dari penelitian ini adalah untuk membuat media pembelajaran berbasis aplikasi yang diberi nama SMILE (*Smart Interactive learning*) – Bertamasya ke Luar Angkasa yang dapat meningkatkan keterampilan berpikir kritis siswa kelas VI pada materi sistem tata surya. Penelitian ini menggunakan model pengembangan bahan ajar ADDIE yang terdiri dari 5 tahap yaitu:* Analysis, Design, Development, Implementation, *dan* Evaluation. *Teknik pengumpulan data dilakukan dengan wawancara, validasi ahli dan siswa, serta soal evaluasi (pretest dan posttest). Teknik analisis data meliputi data proses pengembangan media pembelajaran, data kelayakan media pembelajaran melalui validasi ahli dan validasi user, dan data efektivitas media pembelajaran dengan,* T-test *dan uji N-Gain. Hasil penelitian menunjukkan bahwa media pembelajaran aplikasi SMILE mendapatkan kategori "Sangat Layak" dari ahli materi, ahli media, dan dari siswa (*user*). Hasil penelitian juga menunjukkan adanya peningkatan keterampilan berpikir kritis siswa setelah belajar menggunakan aplikasi SMILE, yang terbukti oleh hasil uji T dan hasil uji N-Gain termasuk dalam kategori "tinggi". Kesimpulan dari penelitian ini adalah dihasilkan media pembelajaran berbasis aplikasi yang layak dan efektif untuk meningkatkan keterampilan berpikir kritis siswa.*

A B S T R A C T

The low interest of students in learning is due to the need for more interactive learning media in line with technological developments in the 21st century. This research aims to create an application-based learning media called SMILE (Smart Interactive Learning) - Excursions to Space, which can improve the critical thinking skills of grade VI students on solar system material. This research uses the ADDIE teaching material development model, which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. Data collection techniques were carried out by interview, expert and student validation, and evaluation questions (pretest and post-test). Data analysis techniques include data on the learning media development process, data on the feasibility of learning media through expert validation and user validation, and data on the effectiveness of teaching media with the T-test and N-Gain test. The results showed that the SMILE application learning media received the "Very Feasible" category from material experts, media experts, and students (users). The results also showed increased students' critical thinking skills after learning the SMILE application, which was proven by the T-test and N-Gain test results in the "high" category. This research concludes that an application-based learning media that is feasible and effective for improving students' critical thinking skills is produced.

1. INTRODUCTION

The progress of the 21st century has entered the field of education, which demands children of the nation who have broad knowledge, can think critically, can innovate, and have good experience using information technology as the core of learning activities in everyday society (Muliastrini, 2020; Niyarci, 2022). In education in the 21st century, changes in teaching materials, learning media, facilities, and learning models are required for students to face increasingly stringent global demands (Khusna et al., 2023; Mardhiyah et al., 2021). The skills that must be possessed in this era are called 4C, namely critical thinking,

*Corresponding author.
E-mail addresses: nabilaarsy@upi.edu (Nabila Arsy)

communication, collaboration, and creative thinking (Monika et al., 2022; Nurhayati et al., 2024). Education in the 21st century demands various skills that a person must master, so it is hoped that education can prepare students to master these various skills to become successful individuals (Jayadi et al., 2020; Rahayu et al., 2023). By developing 21st-century skills in learning, it is hoped that every individual will have the skills to live in the 21st century with the various opportunities and challenges faced in the era of technological and information progress (Annisa, 2022; Ramadhan & Heryadi, 2021).

Science learning in elementary schools allows students to cultivate a natural sense of curiosity, develop the ability to ask questions, find answers to natural phenomena based on evidence, and develop scientific thinking (Julimah et al., 2020; Wedyawati & Lisa, 2019). The science learning process must emphasize providing direct experience for students to develop competencies to explore and understand the natural environment, ultimately allowing them to discover the concept of the subject matter they are studying (Andriana et al., 2020; Santika et al., 2022. Based on observations made by researchers in the sixth grade of SDN Karang Mulya 1, science learning activities in elementary schools are mostly carried out through lectures without using concrete learning media. The results of the interviews were related to science learning on solar system material, the lack of student enthusiasm when learning because students have difficulty imagining the planets, and students need a real picture of how the process occurs in the real environment. Based on the analysis of student books, the teacher stated that the science material on the solar system is still not broad enough, not deep enough, and not complete enough (Sentarik & Kusmariyatni, 2020; Winangun, M., 2020). Because the solar system is quite difficult to find in everyday life and is usually taught in the old way, it does not provide a gap for students to hone their critical thinking skills in understanding scientific concepts well. Critical thinking is a deliberate intellectual process concerned with determining what to believe or do. Accessing, analyzing, and synthesizing information are all critical thinking skills that can be learned, developed, and mastered (Hidayah et al., 2023; Rifky, 2020). Critical thinking skills are necessary for a person's life even after leaving school because, with critical thinking skills, a person can make good decisions (Ariza Rahmadana Hidayati et al., 2021; Putri et al., 2024). Critical thinking is a 21st-century skill that needs to be trained in students. Training critical thinking skills can help students have problem-solving skills (Rubini et al., 2019; Wulandari et al., 2023).

One of the important 21st-century skills in science learning is critical thinking. However, the facts obtained from the PISA (Program for International Student Assessment) assessment, namely a program to assess children's abilities in mathematics, science, and reading literacy, where the assessment carried out by PISA emphasizes 21st-century skills (Sari & Atmojo, 2021; Wahyuni et al., 2022). Natural Science lessons, better known as IPA, are one of the subjects that study nature and its contents. IPA learning has a very important role in the education process, and it is hoped that the learning process will be more interesting for students as they learn about nature around us (Daniah, 2020; Maulana, 2021). In science learning, the use of learning media is very necessary. This is because science material is abstract, so it can be adjusted to the cognitive capacity of students who are still operational-concrete (Nuryati & Darsinah, 2021; Tri Wulandari & Adam Mudinillah, 2022). Learning media is anything that can convey messages through various channels that can stimulate students' thoughts, feelings, and desires to encourage the creation of a learning process to add new information to students so that learning objectives can be achieved properly (Fahira Arsyaf et al., 2022; Hamid et al., 2020). Learning media is one of the factors that play an important role in the learning process. Teachers use media as an intermediary in delivering material so their students can understand it (Maisarah et al., 2023; Wahyuningtyas & Sulasmono, 2020). New, interesting, and sustainable media are needed to activate students in dynamic learning (Mcgill & Bax, 2022; Rahman & I Nyoman, 2020).

One alternative to support science learning activities is using more varied and interesting learning media, one of which is interactive multimedia (Herawati, 2022; Qistina et al., 2019). Interactive multimedia is another name for interactive learning media because it includes various graphics, text, audio, video, hyperlinks, and other interactive elements (Melanda et al., 2023; Tatsa Galuh Pradani, 2022). With interactive multimedia, students will be greatly helped in understanding abstract concepts or material because the material can be made concrete through interactive multimedia (Deliany et al., 2019; Feri & Zulherman, 2021). The use of interactive learning media can improve students' mastery of concepts and improve students' critical thinking skills. Interactive learning media has another advantage: it can be opened via a computer or smartphone, making it easier for students to use (Budiman et al., 2019; Wahyuni et al., 2022). Learning media is needed to foster critical thinking skills for students in studying science lessons on the Solar System material. Therefore, science learning media, especially about the solar system, can utilize interactive learning multimedia (Pratycia et al., 2023; Rahmawati & Atmojo, 2021). In improving students' critical thinking skills, especially in science learning on the solar system material, researchers use appropriate learning media to make it interesting and fun for students to understand and think critically relaxedly. In line with the need for learning media that can visualize the solar system and students' ability

to think critically in understanding concepts related to the solar system, appropriate media are needed to assist teachers in presenting learning materials related to the development of student experience in revealing ideas and information, such as material about the solar system.

Along with information and communication technology development, learning media is also increasingly developing because of the situation that requires technology in learning and the demands of teaching and learning activities that are increasingly developing to keep up with the times (Anggraeni et al., 2023; Wisman & Cukei, 2023). One of the technology-based learning methods is m-learning (mobile learning). The advantage of using mobile-based teaching media is that the price is relatively lower than Personal Computers (PCs) or laptops with a lower price. Smartphones have almost the same advantages as PCs, such as displaying multimedia elements in text, video, sound, animation, entertainment, etc (Husna, 2020; Wagiono et al., 2020). This study aligns with previous studies on developing online applications for science learning on human motor organ material. Based on the findings of this study, scientific learning applications can be considered valid. The findings of this study have implications for expanding teachers' perspectives, motivating students to learn more enthusiastically, and expanding the library of learning media in schools. Previous studies also aimed to determine the feasibility of ASTRODENT educational game learning media based on Android applications (Alfaris & Suryanti, 2018; Fitriani & Negara, 2021). The opportunities for using mobile technology devices in education are expanding with the increasing number of individuals who own and use Android (Putra et al., 2021; Riyan, 2021). Based on teacher interviews conducted at SDN Karang Mulya 01, most students already have smartphones, although some still use their parents' smartphones. Students of SDN Karang Mulya 01 can also operate smartphones very well. This potential encourages the creation of a learning application using a mobile phone, namely the SMILE application - Traveling to Outer Space. This application-based learning media contains descriptions or materials, practice questions, and games about the solar system material for sixth-grade science subjects, making it easier for students to find information about the solar system, namely the material as the center of the solar system. These planets make up the solar system and other celestial bodies. Based on the explanation above, this study aims to create a mobile application-based learning media that can be accessed anywhere and anytime, is used for interactive learning, and can also improve students' critical thinking skills. This application is SMILE (Smart Interactive Learning) - Traveling to Outer Space, which contains solar system material for sixth-grade elementary school.

2. METHOD

Researchers use the Research and Development (RnD) approach to develop the SMILE application - Space Trip, to Improve the Critical Thinking Skills of Sixth Grade Elementary School Students. The research and development method is used to produce certain products and test their product. (Okpatrioka, 2023; Pramesti, 2019) Research and Development (RnD) is research that produces a product and tests its effectiveness. The product in question can be hardware, such as books, modules, and learning aids in the classroom and laboratory. However, it can also be software, such as data processing programs, classroom learning, library programs, laboratory programs, learning models, guidance training, evaluation, management, etc.

Solar System Material requires careful planning and implementation when developing a learning media based on Smart Interactive Learning Mobile Application Based on Students' Critical Thinking Skills. The ADDIE development model is used in this study. The ADDIE (Analysis-Design-Development-Implementation-Evaluate) model is a classroom-centered development approach. The ADDIE technique was chosen as a model to produce learning media because it provides products and procedures that are systematically field-tested, assessed, and improved to ensure they meet the desired effectiveness, quality, and standard requirements. Thus, the model is ideal for designing or developing learning media for the SMILE Application - Space Trip to Improve Critical Thinking Skills of Sixth Grade Elementary School Students.

This study uses two types of data, namely qualitative data and quantitative data. Qualitative data is information on the process of making learning media. This qualitative data is taken through interviews; interviews are a way to obtain information through social interaction activities; this interview is conducted to observe the use of learning media products during the learning process. Quantitative data is the main data of the study regarding the assessment data of the feasibility of learning media and the effectiveness data of the SMILE application media - Traveling to Outer Space to Improve Critical Thinking Skills of Sixth Grade Elementary School Students. The questionnaire was used to obtain expert validation data to measure the feasibility level of the learning media developed. A critical thinking skills test was used to measure the effectiveness of using learning media. The research instruments used in this study were test and non-test

instruments. The non-test instrument used was a questionnaire, namely a validation questionnaire from material experts, media experts, and student validation (users). The test instrument used was a critical thinking skills test consisting of 10 questions covering the cognitive domains of analysis (C4), evaluation (C5), and decision-making (C6). The grid used for the pretest and post-test questions is shown in Table 1.

Table 1. Pretest And Post-Test Question

Basic competencies	Competency Achievement Indicators	Question Indicator	Cognitive Level	Critical Thinking Indicators
9.1 Describe the solar system and the positions of the components of the solar system	9.1.1 Looking for information about the planets that revolve around the sun.	Students can analyze why the earth is a planet that living things can inhabit	C4	Drawing conclusions
		Students can analyze why the planet Mars is not habitable	C4	Analyzing statements
		Students can analyze the characteristics of two planets	C4	Analyzing statements
		Students can make reasons why Venus has a very hot temperature	C6	Deciding on actions
	9.1.2 Determining the position of the planets in the solar system.	Students can analyze planets that do not have satellites	C4	Identifying assumptions
		Students can analyze the characteristics of planets	C4	Drawing conclusions
	9.1.3 Describes the movement of planets and other solar system members in the solar system.	Students can analyze parts of comets	C4	Analyzing statements
		Students can assess why planets are divided into two groups	C5	Making judgments
		Students can assess what can be seen if they are on Jupiter	C5	Making judgments
	9.1.4 Make a comparison of the sizes of the members of the solar system to the correct scale.	Students can assess why asteroids are not classified as planets.	C5	Making judgments

3. RESULT AND DISCUSSION

Result

The development of SMILE learning media - Space excursion using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) development approach. The entire implementation of this research is described in the following paragraphs. Analysis stage: at this stage, competency analysis, student characteristics analysis, and needs analysis are carried out. At the curriculum analysis stage, the researcher reviewed the relevant curriculum, namely the 2013 curriculum. Curriculum analysis was carried out to define core competencies (KI), basic competencies (KD), and indicators of theme 9 subthemes 1 in learning 1 grade six. Student characteristics analysis was conducted to determine the nature of students using learning media. The purpose of the student characteristics analysis is to identify the characteristics of students who will use mobile learning-based learning materials on the mobile phones that are made. Student analysis is used to determine the characteristics of sixth-grade students at SDN Karang Mulya 1 Tangerang. Interviews with students are used to conduct the analysis. Based on the results of the researcher's interview, the learning media used by the instructor in the learning process in class include

teacher books and student handbooks "Exploring Outer Space for Grade six SD/MI Ministry of Education and Culture of the Republic of Indonesia 2018" in teaching and learning activities. One of the reasons why students consider classroom learning uninteresting is because only books are used in the teaching and learning process. In addition, the reasons why students become bored studying in the classroom are as follows: students often feel sleepy because they hear very long explanations from the teacher, the lessons are difficult to understand, the teacher's explanations are not interesting for students, and the lesson material is not clear. Judging from why many students feel bored when studying in the classroom, researchers interviewed students about their preferred learning styles.

Based on the interview, many students prefer the discussion and Q&A learning style in groups, games, or observation activities outside the classroom. In addition, when audio-visual media such as videos are included in the teaching process, students in class VI A will be more actively involved because they use interesting animations and colors so that students' needs to understand the material can be met. When asked whether students have ever learned to use cell phones in class, they unanimously answered that they had never done so and were interested in learning to use cell phones. Out of 38 students in class VI A, almost all have cell phones: 30 students have personal cell phones, three students have cell phones belonging to their parents or siblings, and two do not have cell phones. This allows teaching and learning activities using cell phones to be carried out in the classroom. In this study, the results of the curriculum analysis and student characteristic analysis were used to determine the needs analysis. Seeing the condition of students who often feel bored when studying in class and the lack of teaching tools and materials used, almost all students already have personal cell phones. The researcher tried to provide a learning application that was expected to create a new atmosphere and enthusiasm for students to learn during teaching and learning activities.

Design Stage: The design process starts by selecting the material provided through application-based learning media and creating learning media. The material taken is the solar system material contained in theme 9, "Exploring outer space," sub-theme 1, "Amazing regularity," learning 1 for sixth-grade students, which will contain material about the solar system where students will learn about the sun as the center of the solar system, the planets that orbit the sun. (Mars, Venus, Earth, Mercury, Jupiter, Saturn, Uranus, and Neptune), and other celestial bodies (Satellites, Asteroids, and Comets). Next is a flowchart, which provides a basic overview of the learning media from start to finish. After creating the application flowchart, the next step is to create a learning media product; the learning media is created using the PowerPoint 2016 application and I Spring Suits 9. The learning media created is the SMILE (Smart Interactive Learning) - Traveling to Outer Space—application flowchart. The results of the development of learning media products can be seen in Figure 1.
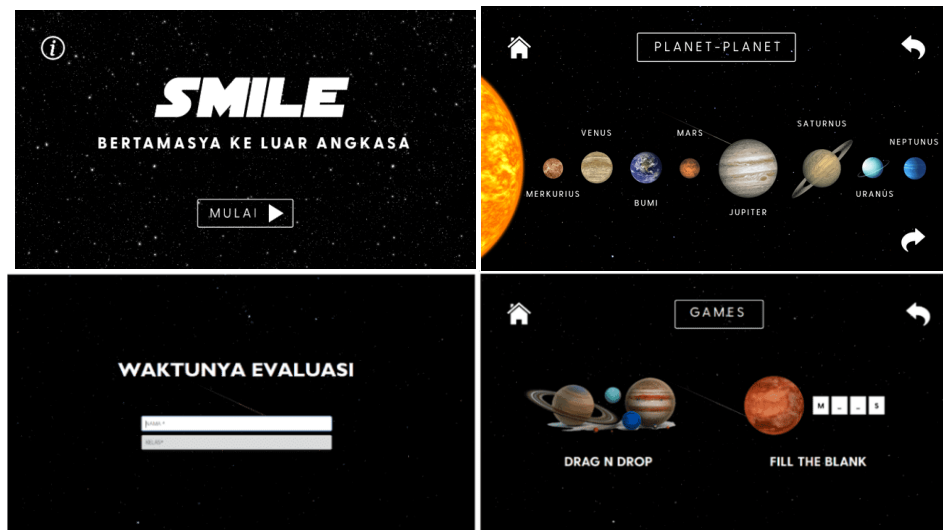

Figure 1. SMILE (Smart Interactive Learning) Development Results

Development Stage. At the development stage, validation tests were carried out by material experts, media experts, and student validation (users), and then product revisions were carried out. At this stage, media validation was carried out by one of the material experts and media experts. Learning media was also validated by students (users) to 10 sixth-grade elementary school students. Suggestions and ideas from media and material experts will be utilized to improve the media. The results of the material experts, media experts, and student validation can be seen in Table 2. The results of revisions from expert comments

can be seen in Figure 3.

Table 2. Expert Validation Results

No.	Validation	Rated aspect	Score(%)	Category	Revision
1.	Content Expert	Relevance of material, Presentation of material, Evaluation, Language, and Effects for learning strategies	98,33%	Very Worthy	Improvements to learning objectives and other celestial body sub-topics
2.	Media Expert	Ease of use and Navigation, Visual display, Audio, Language, and Benefits of media	99%	Very Worthy	Improvements to the menu page and solar system material page
3.	Students (users)	Learning materials and media	96%	Very Worthy	Very easy to understand

Figure 3. Results Before And After Revision on Other Celestial Body Sub-Materials

Implementation Stage. The implementation stage is carried out by distributing the final product, the SMILE application - Bertamasya ke Luar Ruang- to 30 sixth-grade students of SDN Karang Mulya 01 Tangerang. Students are asked to install the media on their cell phones before use. The researcher provides learning media via Bluetooth by sending an .apk file to each student One day before the implementation activity. In this study, the subjects were 38 sixth-grade students of SDN Karang Mulya 1. The material taught was theme 9, subtheme 1, learning 1 regarding the solar system. The learning media used in this learning were cell phones, the SMILE application, and critical thinking skills evaluation questions. Learning activities began with opening activities, namely greetings, praying, taking attendance, and ice-breaking. Before the main activity, students were given pretest questions. In the main activity, students learned independently using cell phones and the SMILE application installed on their cell phones. After the main activity, a question and answer session was held with students to discuss their feelings after learning to use the SMILE application. Students were given post-test questions before the teaching and learning activity was closed. The activity ended with a joint prayer and closing greeting.

Evalution Stage (Evaluation). Students are given critical thinking test questions after learning with the SMILE application learning media. Furthermore, the test results are calculated and evaluated to determine whether students' critical thinking skills have improved. Based on the pretest and post-test, the average pretest was 46.05, and the average post-test was 87.11; these results indicate that there has been a very significant increase. N-Gain is conducted to assess the variation in changes in student learning outcomes after using the SMILE learning media. The N-Gain value from the pretest and post-test is 0.77, so it is effective.

In the trial stage using the SMILE application, hypothesis testing was carried out to prove the research hypothesis, namely: H (0): There is no significant increase in critical thinking skills using the developed SMILE application, H (1): There is a significant increase in critical thinking skills using the developed SMILE application. To test the hypothesis, parametric statistics were used using the T-test using SPSS 22 for Windows software. Based on the data analysis, a significance value of 0.000 was obtained, indicating that H (0) was accepted and H (1) was accepted because 0.000 <0.05. This shows that using the created SMILE learning application significantly improves critical thinking skills. As a result, the developed SMILE learning application can help students strengthen their critical thinking skills while supporting their understanding of solar system information.

Discussion

Further research results are reviewed in the discussion. The discussion of the research includes an assessment of the feasibility and effectiveness of learning media. Assessment of the Feasibility of Learning Media. The feasibility of the product is assessed during the development stage, and material experts, media

experts, and students carry out validation. Based on data collected from the validation process of the SMILE application - Space Travel by material experts, media experts, and students - all three are considered very feasible, and the SMILE application can be used as a supporting learning media. This feasibility can be observed in various aspects evaluated by professionals using existing criteria.

The first assessment was by the material expert, the sixth-grade homeroom teacher of SDN Karang Mulya 1. The assessment was based on material relevance, material presentation, evaluation/practice questions, language, and effects on learning strategies. The average score of 3.93 with a percentage of 98.33% is included in the very feasible category of all factors assessed. The next assessment was by the media expert, namely the computer teacher of SDN Karang Mulya 1. The assessment was based on ease of use, navigation, visual appearance, audio, language, media integration, and benefits. With an average score of 3.69 and a percentage of 99%, this value is included in the very feasible category for use as a learning medium. In line with the previous study, the results obtained 93.75% from the material expert and the material expert. Based on the criteria that have been set, it can be explained that the creation of a multimedia mobile learning energy source for the fourth grade of elementary school meets the relevant requirements and can be accepted for use in learning (Rheina, 2022; Saifudin et al., 2020) The final assessment, namely student validation, was carried out by ten sixth grade students of SDN Karang Mulya 1. Overall, the learning media assessed by students obtained a score of 764 with a percentage of 96%, which included the category of very suitable for use as learning media. Similar results were also obtained by previous research conducted on 21 students of SDN Sidomulyo, with a percentage of 98.73%. After being converted, the percentage was suitable for use as learning media (Mcgill & Bax, 2022; Melanda et al., 2023).

Effectiveness of Learning Media. The student's critical thinking skills test was conducted to determine their critical thinking skills improvement after using the SMILE application. The test was conducted twice, giving a pretest and post-test to 38 students in class VI A SDN Karang Mulya 1 Tangerang. The purpose of the pretest was to determine students' initial abilities or knowledge. The post-test was used to determine whether students' knowledge had increased or not after learning to use the SMILE program. Based on the pretest results, the average score of students was 42.37, with at least one student achieving the KKM and 37 students failing to achieve the KKM. Students' inadequate critical thinking skills in the pretest were because they had never studied this material or had studied it but did not understand or forgot it. The post-test results showed that most students experienced an increase in their scores after using the SMILE application. This can be seen from the increase in students' average score to 88.16. In addition to the increase in scores, the post-test also showed an increase in the number of students who had achieved the KKM. Namely, 34 students were declared to have passed, and four still need to achieve the KKM. Students gained better knowledge about the solar system after using the SMILE application, which resulted in increased grades and the number of students who obtained the KKM.

The pretest and post-test questions on critical thinking skills cover various cognitive domains, including analyzing (C4), evaluating (C5), and making decisions (C6). This study looked at the achievement and improvement of students' critical thinking skills before and after using the SMILE program to determine whether there was an increase in their critical thinking skills. Questions included in the cognitive domain of analyzing (C4) are 1, 2, 3, 5, 6, and 7. Questions included in the cognitive domain of evaluating (C5) are 8, 9, and 10. While question number 4 is included in the cognitive domain of creating (C6). Based on the pretest and post-test data, there was an increase in the number of students who answered the questions correctly. The largest increase was in question number 9, where eight students answered correctly on the pretest while all answered correctly on the post-test. Twenty-two students experienced an increase in answering questions correctly on question number 7. Critical thinking indicators include the ability to (1) provide simple explanations (elementary clarification), (2) build basic skills (basic support), (3) determine strategies and tactics, (4) make further explanations (advance clarification), and (5) draw conclusions (inference). Based on the pretest and post-test results, students experienced a high increase. Students have achieved critical thinking indicators after learning to use the SMILE application and conducting evaluations using critical thinking questions with cognitive domains C4, C5, and C6.

Audio-visual media can attract and direct students' attention to concentrate on the related lesson material. In addition, students also enjoy learning and easily understand and remember the information contained (Rifky, 2020; Saputro et al., 2021). Students will not find learning boring if the right learning tools are used because they will be more interested in the lessons taught, more motivated to learn, and better able to retain what they have learned. Based on the average increase in students' critical thinking skills, N-Gain scores, and T-test results, using the SMILE application - Space Trip, helps students learn and improve their critical thinking skills from before. This study has advantages: Combining application technology with a space-themed learning approach can increase students' interest in learning. Involvement in interesting content, such as space, can stimulate students' interest in learning. The implication is that applications such as SMILE expand the learning model in schools by utilizing technology effectively. This can encourage the

use of technology in the context of outcome-oriented learning and present more interesting and relevant learning for the digital generation. However, this study still has limitations. Implementing applications on a large scale in schools may involve organizational challenges, teacher training, and adequate administrative support to ensure the success and sustainability of the program.

4. CONCLUSION

The interactive learning media based on the application "SMILE - Space Trip to Improve Critical Thinking Skills of Sixth Grade Students of SDN Karang Mulya 1" is very feasible as a supporting learning media. Evaluation of product feasibility by material experts, media experts, and students consistently gave positive assessments of material relevance, presentation, question evaluation, language, and effects on learning strategies. In addition, measuring effectiveness through critical thinking skills tests showed a significant increase in students' average scores and the number of students who achieved KKM after using the SMILE application. This application not only meets the feasibility standards but also successfully improves the critical thinking skills of sixth-grade students. The implication is that the SMILE application can be considered a potential innovation in improving learning at the elementary school level, and the results of this study can be the basis for the development of further technology-based learning methods.

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