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## Development of Canva-Based Interactive Learning Videos to Enhance Students' Critical Thinking and Social Skills on Environmental Pollution Topics

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### ABSTRACT

This study aimed to develop a Canva-based interactive learning video and evaluate its effectiveness in improving students' critical thinking and social skills on the topic of environmental pollution. The study was motivated by interviews with science teachers and the results of the Madrasah Examination in MTsN 2 Jember, which revealed a significant decline in students' academic achievement, with the average score decreasing from 55.13 in 2024 to 43.64 in 2025. This research employed a Research and Development (R&D) approach adapted from the Borg and Gall model. Media expert validation yielded scores of 95% and 88%, while subject matter expert validation resulted in scores of 91% and 90%. All validation results were categorized as acceptable without revision, indicating that the developed learning video was valid and suitable for implementation in science learning. The paired-samples *t*-test revealed a significant improvement in students' critical thinking skills, with the mean pre-test score increasing from 24.67 to 71.45 in the post-test. Likewise, the mean social skills score increased from 46.45 to 82.39 after the implementation of the learning video. These findings demonstrate that the Canva-based interactive learning video is effective in enhancing students' critical thinking and social skills. Therefore, the developed media can serve as an innovative alternative for science instruction, particularly in teaching environmental pollution.

Keywords: Interactive learning video, Canva, Critical thinking, Social skills

## I. INTRODUCTION

Twenty first century education requires students not only to master fundamental knowledge but also to possess critical thinking skills, social competencies, and sensitivity to contextual issues encountered in daily life. Efforts to improve the quality of education in Indonesia have received considerable attention from the government through

various regulations, including Law Number 20 of 2003 (Indonesia & 2003), Keputusan Presiden Number 87 of 2017 (Kemendikbud, 2017), and Minister of Education and Culture Regulation Number 20 of 2018 (Permendikbud, 2018).

However, the results of international assessments, such as the Programme for International Student Assessment (OECD, 2022), indicate that Indonesia ranked 67th

out of 81 participating countries in science achievement, significantly below the average performance of OECD countries (OECD, 2023). These results suggest that students' abilities in reasoning, problem-solving, and applying knowledge to real-world contexts remain relatively weak. At the local level, MTs Negeri 2 Jember also experienced a significant decline in students' academic achievement, with the average score decreasing from 55.13 in 2024 to 43.64 in 2025.

Considering these conditions, there is a need for more innovative, interactive, and effective learning approaches. One potential solution is the development of Canva-based interactive learning videos, which are expected to enhance students' critical thinking skills and social competencies (Masfufah et al., 2022; Rahmawati & Atmojo, 2021). Based on this phenomenon, this study addresses the following research questions: How is the process of developing Canva-based interactive learning videos, how feasible are these learning videos and how effective are they in improving students' critical thinking skills and social competencies on the topic of environmental pollution. Accordingly, the objective of this study is to determine whether Canva-based interactive learning videos are feasible and effective in enhancing students' critical thinking skills and social competencies.

These findings are consistent with previous studies demonstrating the effectiveness of Canva in enhancing students' critical thinking skills and learning engagement (Raya, 2025).

Canva has emerged as a relevant digital learning medium for twenty-first century education, as it supports the delivery of interactive learning materials and motivates students to actively participate in the learning process (Masfufah et al., 2022; Rahmawati & Atmojo, 2021), particularly in environmental pollution topics that require awareness and a sense of responsibility toward environmental issues (Ahmatika, 2017). Furthermore, the use of video-based learning media has been shown to improve conceptual understanding and increase students' sensitivity to environmental concerns (Mutia et al., 2018).

Several studies have reported the contribution of Canva-based learning media to the improvement of students' critical thinking skills and literacy. For instance, Hilmiyati et al. (2024) developed a Canva-based animated video for teaching the human digestive system in elementary science education. The validation results conducted by media and subject-matter experts indicated a score of 93.74%, categorized as "highly feasible," while students' critical thinking skills improved with a gain score of 0.80, which falls within the high category (Hilmiyati & Nafsi, 2024). Similarly, canva-based interactive multimedia implemented at SDN Lesanpuro 1 Malang was valid, practical, and effective in improving the critical thinking skills of fourth-grade students (Witra et al., 2024).

Likewise, Nisa & Wardani (2023) found that Canva-based instructional videos on the topic of changes in the states of matter enhanced the critical thinking skills of fifth-grade students. The learning media received positive responses from students, reaching

76%, and was considered appropriate for classroom implementation. In a similar study, Atasya et al. developed Canva-based interactive videos for sixth-grade science learning, achieving media and content validity scores ranging from 96% to 98%. The learning media was also perceived as highly practical by both students and teachers ([Amri et al., 2020](#)).

Furthermore, Ismayana et al. (2024) developed a Canva-based interactive video for fourth-grade students on the thematic topic "The Beauty of Togetherness." The product achieved a very high validity level, ranging from 83% to 100%, and received highly positive student responses, reaching 97.4% ([Ismayana et al., 2023](#)). Overall, these studies indicate that Canva-based learning media, particularly interactive videos, have considerable potential to enhance students' critical thinking skills, engagement, and learning outcomes. However, limited studies have specifically examined the effectiveness of Canva-based interactive learning videos in improving both critical thinking skills and social competencies within the context of environmental pollution learning at the junior secondary level. Therefore, this study aimed to address students' low critical thinking and social skills by developing and evaluating a Canva-based interactive learning video on environmental pollution for junior secondary school students.

## II. RESEARCH METHOD

The study employed a purposive sampling technique, in which the sample was selected based on the science

teacher's recommendation and the availability of supporting learning facilities in the classroom to ensure the effective implementation of the research. The research sample consisted of one Grade 8 class at MTs Negeri 2 Jember during the 2024/2025 academic year, with all students in the selected class participating as the research subjects. This study adopted a Research and Development (R&D) design to develop and evaluate Canva-based interactive learning videos on the topic of environmental pollution, approach by adapting the Borg and Gall development model, beginning with preliminary research and data collection, followed by limited and large-scale product trials, and ending with final revisions to produce a valid and feasible product ([Gall & Borg, 2003](#)). The Borg and Gall stages employed in this study were adjusted to the needs and limitations of field research, with a focus on developing a learning video that was not only visually appealing but also capable of improving students' critical thinking and social skills in environmental pollution topics. The stages included research and information collecting, planning, develop preliminary form of product, preliminary field testing and main product revision.

Data analysis in this study was conducted in two stages: product feasibility analysis and product effectiveness analysis. The product feasibility analysis was carried out to determine the validity of the Canva-based interactive learning video through evaluations conducted by two material experts and two media experts. The experts assessed the product using a validation questionnaire based on a five-point Likert

scale, ranging from 1 (very poor) to 5 (excellent). The validation results were interpreted using the following criteria: 81–100% (very valid), 61–80% (valid), 41–60% (fairly valid), 21–40% (less valid), and 0–20% (invalid). The product was considered feasible for implementation when it achieved a valid or very valid category and had been revised according to the suggestions and recommendations provided by the validators.

The product effectiveness analysis was conducted to examine the effect of the Canva-based interactive learning video on students' critical thinking skills and social skills. Prior to hypothesis testing, the pre-test and post-test data were subjected to the Kolmogorov-Smirnov normality test at a significance level of 0.05. The data were considered to be normally distributed when the significance value (Sig.) was greater than 0.05.

Subsequently, a paired-samples *t*-test was performed to determine whether there was a significant difference between the mean pre-test and post-test scores after the implementation of the Canva-based interactive learning video. The null hypothesis  $H_0$  stated that there was no significant difference between the pre-test and post-test scores, whereas the alternative hypothesis  $H_1$  stated that a significant difference existed between the two sets of scores. The decision criterion was based on a significance level of 0.05. If the Sig. (2-tailed) value was less than 0.05,  $H_0$  was rejected and  $H_1$  was accepted. This result indicated that the developed Canva-based interactive learning video was

effective in improving students' critical thinking skills and social skills.

### III. RESULT AND DISCUSSION

Indonesia ranked 67th out of 81 countries in science in PISA 2022, with an average score of 383 points (OECD, 2023). This ranking indicates that although Indonesia's score was relatively low compared to OECD countries (average score of 485), Indonesia was positioned in the middle of the lower-ranked countries globally.

Review of Government Regulations:

1). Regulation of the Minister of Education and Culture Number 20 of 2018 concerning Strengthening Character Education (PPK); 2) Regulation of the Minister of Education and Culture Number 22 of 2016 concerning Process Standards for Primary and Secondary Education; and 3) Regulation of the Minister of Education, Culture, Research, and Technology Number 56/M/2022 concerning the Independent Curriculum (Kurikulum Merdeka).

The researcher conducted interviews with three science teachers at MTs Negeri 2 Jember to identify needs and actual conditions related to environmental pollution learning. The interview results showed that all three teachers faced challenges in increasing students' interest in the topic.

At this initial stage, it can be concluded that the data and information collected from the field indicated a real and urgent need for the development of Canva-based interactive learning media that could help improve students critical thinking and social skills in environmental pollution topics.

The researcher developed a systematic and structured plan for the learning media development activities. The planning stage included the preparation of various research instruments, such as teacher interview sheets, media and material expert validation questionnaires, and pre-test and post-test instruments equipped with test blueprints, test items, answer keys, scoring rubrics, and the determination of data analysis techniques to be used for both quantitative data, such as validity and statistical tests, and qualitative data, such as interview results, test results, and questionnaire scores.

The researcher also designed the initial media product in the form of a Canva-based interactive learning video. Consideration was given to the characteristics of environmental pollution content, students' needs, and learning approaches that were enjoyable, engaging, and meaningful. The media design also considered visual engagement, contextual narration, and opportunities for interaction through question-and-answer activities.

This planning stage was based on the principle that effective learning media should be designed according to students' needs, content characteristics, and learning contexts. This is supported by the findings of Sari and Pratikto (2022), who stated that the development of Canva-based interactive learning media was effective in improving students' critical thinking skills because it presented learning materials visually, systematically, and attractively. Other studies have also emphasized that Canva-based media not only improve learning outcomes but also assist teachers in

designing more creative and adaptive learning experiences according to students needs (Anissa & Limbong, 2024).

Furthermore, Fauziah, Shofiyuddin, and Rofiana (2022) explained that careful planning in media development is essential to ensure that the media are not only visually appealing but also aligned with learning outcomes and twenty-first-century skills. Therefore, the planning stage serves as an important foundation that determines the quality of both the development process and the resulting product.

At this stage, it can be concluded that structured and comprehensive planning is a crucial step in learning media development. The preparation of complete research instruments, the selection of appropriate samples, and the initial design of the Canva-based interactive learning media were adjusted to students' needs and the characteristics of the learning content. This planning stage provided a solid foundation for the subsequent development phases and ensured that the resulting product would not only be feasible for use but also effective in improving students' critical thinking and social skills.

The researcher implemented the plan developed in the previous stage by creating an initial product in the form of a Canva-based interactive learning video containing environmental pollution material with the primary objective of improving students' critical thinking and social skills. The video covered the main topics of types of environmental pollution, their impacts on life, and solutions that students can undertake as

environmentally responsible citizens. To promote active and reflective learning, the researcher incorporated guiding questions and prompts for critical thinking.

The video designed in Canva was then exported and uploaded to the Edpuzzle platform. This platform was selected because it provides features that allow questions to be embedded directly into the video. These features were utilized by the researcher to insert questions throughout the video. Through the use of Canva and its integration with Edpuzzle, the researcher successfully developed an interactive learning video that was not only informative but also capable of stimulating critical thinking and strengthening students’ social interaction. This initial product served as the foundation for expert validation and limited field testing in the subsequent stages of the development process.

This stage was conducted to determine the initial quality of the developed product, both in terms of content and media design, before the product was tested on a broader scale. Preliminary field testing was carried out through a validation process involving experts with relevant expertise in their respective fields.

The validation instrument used to assess the quality of the media was adopted from the instrument developed by Wardathi (Ummah, 2019) and adjusted to meet the requirements of learning video development. The media expert validation results for the Canva-based interactive learning video are presented in Table 1

Table 1. Media Expert Validation

| Results |                    |    |    |
|---------|--------------------|----|----|
| No      | Assesment Criteria | V1 | V2 |

| Interface Design     |                                                                   |            |            |
|----------------------|-------------------------------------------------------------------|------------|------------|
| 1                    | The media has a simple interface                                  | 5          | 4          |
| 2                    | The background layout effectively emphasizes the learning content | 5          | 4          |
| Typography           |                                                                   |            |            |
| 3                    | The text is clear and readable                                    | 4          | 5          |
| 4                    | The font style and arrangement are appropriate                    | 4          | 4          |
| Images and Animation |                                                                   |            |            |
| 5                    | The images are appropriate for students' developmental level      | 5          | 5          |
| 6                    | The image size supports the learning content                      | 5          | 4          |
| 7                    | The images and animations help clarify abstract concepts          | 5          | 5          |
| Audio                |                                                                   |            |            |
| 8                    | The background music does not interfere with learning             | 4          | 3          |
| Usability            |                                                                   |            |            |
| 9                    | The media attracts users' attention                               | 5          | 4          |
| 10                   | The media can be accessed on computers and Android devices        | 5          | 5          |
| 11                   | The media is easy to maintain                                     | 5          | 5          |
| 12                   | The media can be used independently or with teacher guidance      | 5          | 5          |
| Percentage Score     |                                                                   | 95 %       | 88 %       |
| Criterion:           |                                                                   | very valid | very valid |

Validator's Recommendation:  
Validator 1: Acceptable without revision  
Validator 2: Acceptable without revision

The results of the media expert validation indicated that the Canva-based interactive learning video was suitable for use in learning activities without revision. Expert validation provided strong support for the quality of the media in terms of visual appearance, content, and ease of use. This finding is supported by relevant studies, including Fauziah et al. (2022), Anissa and Limbong (2024), and Sari and Pratikto (2022), which confirmed the effectiveness of Canva in improving the quality of interactive learning media.

Subsequently, the instructional content of the interactive learning video was

validated by subject matter experts in science education. The validation focused on the alignment of the content with the learning objectives, the accuracy of scientific concepts, the meaningfulness of the information presented, and its relevance to students' real-life contexts. The content validation instrument was adapted from the instrument developed by Wardathi and modified to suit the characteristics of the developed learning media. The results of the subject matter expert validation are presented in Table 2.

Table 2. Subject Matter Expert Validation Results

| No                   | Assesment Criteria                                                                         | V1 | V2 |
|----------------------|--------------------------------------------------------------------------------------------|----|----|
| Content Completeness |                                                                                            |    |    |
| 1                    | The content covers the required learning competencies                                      | 4  | 4  |
| 2                    | The presented content is aligned with the current curriculum                               | 4  | 4  |
| 3                    | The presented content supports the development of students' knowledge and social attitudes | 4  | 5  |
| 4                    | The presented content supports classroom learning                                          | 4  | 5  |
| 5                    | The content is presented concisely and clearly                                             | 5  | 5  |
| Content Accuracy     |                                                                                            |    |    |
| 6                    | The concepts and examples presented are accurate                                           | 5  | 4  |
| 7                    | The instructional content meets students' learning needs                                   | 5  | 4  |
|                      | The content is easy to understand                                                          |    |    |
| 8                    | The presented instructional content is clearly understandable                              | 5  | 5  |
| 9                    | The terminology used is appropriate and easy to understand                                 | 5  | 5  |
| Content Organization |                                                                                            |    |    |
| 10                   | The content is organized systematically                                                    | 4  | 4  |

|                  |                                                                   |            |            |
|------------------|-------------------------------------------------------------------|------------|------------|
| 11               | The content is relevant to students' real-life contexts           | 5          | 5          |
|                  | The presentation of information captures students' attention      |            |            |
| 12               | The topics and subtopics stimulate students' interest in learning | 5          | 4          |
| Percentage Score |                                                                   | 91 %       | 90 %       |
| Criterion:       |                                                                   | very valid | very valid |

Validator's Recommendation:

Validator 1: Acceptable without revision

Validator 2: Acceptable without revision

The results of the subject-matter expert validation indicated that the developed learning media met the standards of content quality, curriculum relevance, and clarity of presentation, while also being capable of attracting students' attention through a systematic and contextual approach. Therefore, the media was considered suitable for use without revision and capable of supporting the learning process holistically, encompassing students' cognitive, affective, and social dimensions.

The main product revision in this study constituted an important part of the development process of the interactive learning video entitled "Environmental Pollution." The revision process was based on the results of validation conducted by media experts. After the revision stage was completed, the improved video was implemented in a small-scale trial involving five students and a main trial involving 33 students. This stage aimed to evaluate the effectiveness of the video in improving students' critical thinking and social skills more comprehensively. The pre-test and post-test results showed a significant increase in scores, indicating

that the video functioned effectively as a learning aid.

The effectiveness of video media in supporting the improvement of critical thinking skills has been demonstrated in various previous studies. Ahmatika (2017) emphasized that learning media designed to stimulate exploration and reflection, such as interactive videos, can provide cognitive stimuli that encourage students to analyze, evaluate, and make decisions independently.

Based on these evaluation results, the interactive learning video entitled “Environmental Pollution” was declared feasible for use in science learning, particularly for developing the critical thinking and social skills of students at MTs Negeri 2 Jember. The pre-test and post-test scores of students' critical thinking skills from the small-scale product trial involving five students are presented in Table 3.

Table 3. Mean Pre-Test and Post-Test Scores of Critical Thinking Skills in the Small-Scale Sample

| No            | Student Name | Pre-Test | Post-Test |
|---------------|--------------|----------|-----------|
| 1             | DAS          | 26       | 76        |
| 2             | KPA          | 25       | 74        |
| 3             | KDNJ         | 24       | 76        |
| 4             | RDR          | 27       | 72        |
| 5             | QNA          | 23       | 79        |
| Average Score |              | 25       | 75,4      |

The results of the descriptive analysis showed an increase in the mean score from 25 (pre-test) to 75.4 (post-test). This increase of 50.4 points reflects a substantial improvement in students' critical thinking skills. This finding is consistent with the assertion that

interactive media can encourage students to think more analytically and logically because they involve visual and audio learning experiences as well as problem-based learning (Mustikasari et al., 2020).

The pre-test and post-test method used in this study was also valid as a measure of learning effectiveness. This result is supported by the statement that the use of pre-tests and post-tests in quasi-experimental research can accurately measure improvements in learning outcomes, including critical thinking skills (Zulkifli, et al., 2022). Therefore, the improvement observed in this study can be regarded as an indicator that the Canva-based interactive learning video was effective in improving students' critical thinking skills on the topic of environmental pollution. In the large-scale product trial involving 33 students, a normality test was conducted using the Kolmogorov-Smirnov test, and the results are presented in Table 4.

Table 4. Recapitulation of the Kolmogorov-Smirnov Normality Test Results for Pre-Test Scores

| No | Test Type | Statistic K-S (D) | p-value | Decision                               |
|----|-----------|-------------------|---------|----------------------------------------|
| 1. | Pre test  | 0.178             | 0.236   | Accept $H_0$<br>(Normally Distributed) |
| 2. | Post test | 0.115             | 0.236   | Accept $H_0$<br>(Normally Distributed) |

Based on the results of the Kolmogorov-Smirnov normality test, a p-value of 0.236 was obtained for both the pre-test and post-test data. This p-value was greater than the established significance level of 0.05 ( $p > 0.05$ ); therefore, the null

hypothesis ( $H_0$ ) was accepted. The null hypothesis in the Kolmogorov-Smirnov test states that the data are normally distributed. Thus, the pre-test and post-test data in this study were normally distributed and suitable for parametric statistical analysis. A paired-samples *t*-test was then conducted to analyze the difference between the pre-test and post-test scores. The results are presented in Table 5.

Table 5. Recapitulation of the Paired-Samples *t*-Test Results for Pre-Test and Post-Test Scores

| No | Statistic                    | Value       |
|----|------------------------------|-------------|
| 1. | Sample Size (n)              | 33          |
| 2. | Mean Pre-Test Score          | 24,67       |
| 3. | Mean Post-Test Score         | 71,45       |
| 4. | Mean Difference ( <i>d</i> ) | 46,79       |
| 5. | Standard Deviation (S)       | 17,87       |
| 6. | Calculated <i>t</i> -value   | 15,05       |
| 7. | Critical <i>t</i> -value     | 2,0384      |
| 8. | Degrees of Freedom (df)      | 32          |
| 9. | Conclusion                   | Significant |

Based on Table 5, the results of the paired-samples *t*-test indicate that the Canva-based interactive learning video had a significant effect on improving students' critical thinking skills in the environmental pollution topic. The mean pre-test score increased from 24.67 to 71.45 in the post-test, with a mean difference of 46.79. The analysis also showed that the calculated *t*-value (15.05) exceeded the critical *t*-value (2.0384) at the 5% significance level (*df* = 32). Therefore, the null hypothesis ( $H_0$ ) was rejected and the alternative hypothesis ( $H_1$ ) was accepted, indicating a statistically significant difference between students' critical thinking skills before and after the implementation of

the Canva-based interactive learning video. These findings demonstrate that the developed learning media was effective in enhancing students' critical thinking skills.

The improvement can be attributed to the characteristics of the developed interactive learning video, which not only presented instructional content through audiovisual materials but also incorporated illustrations, animations, reflective questions, and interactive learning activities that encouraged students to observe, analyze, evaluate, and draw conclusions regarding environmental pollution issues. Furthermore, the contextual presentation of the learning materials enabled students to relate scientific concepts to real-life situations, making the learning process more meaningful. The use of Canva also facilitated the development of visually engaging and easy-to-understand learning content, thereby increasing students' attention, learning motivation, and active participation throughout the instructional process.

These findings are consistent with constructivist learning theory, which emphasizes that knowledge is actively constructed through meaningful learning experiences. Interactive learning media provide students with opportunities to explore information, solve problems, and construct their own understanding, thereby fostering the development of critical thinking skills. Ahmatika (2017) also argued that critical thinking skills can be improved through learning activities that encourage inquiry, analysis, and evidence-based reasoning. In addition, technology-

based learning media support student-centered, active, and creative learning environments, which are consistent with the objectives of Indonesia's National Education System.

The present findings are also consistent with previous studies. Nisa and Wardani (2023) reported that Canva-based learning videos improved elementary school students' critical thinking skills by presenting learning materials in a more concrete and engaging manner. Similarly, Sari and Pratikto (2022) found that interactive learning media developed using Canva effectively enhanced students' critical thinking skills and learning outcomes through interactive and well-organized instructional content. Comparable findings were reported by Amri et al. (2020), Rahmawati and Atmojo (2021), and Anissa and Limbong (2024), who concluded that Canva-based learning media improve learning quality by providing attractive visual presentations, systematically organized materials, and greater student engagement. Therefore, the findings of the present study provide further empirical evidence that Canva-based interactive learning videos are an effective instructional medium for improving students' critical thinking skills, particularly in science learning on the topic of environmental pollution. The pre-test and post-test scores of students' social skills obtained from the small-scale trial involving five students are presented in Table 6.

Table 6. Pre- and Post-Test Social Skills Scores in the Small-Scale Trial

| No         | Student Name | Before | After |
|------------|--------------|--------|-------|
| 1          | DAS          | 50     | 77    |
| 2          | KPA          | 44     | 57    |
| 3          | KDN          | 46     | 76    |
| 4          | RDR          | 49     | 75    |
| 5          | QNA          | 42     | 78    |
| Mean Score |              | 46,2   | 72,6  |

The results of the analysis showed a considerable improvement in students' social skills. The mean score before the intervention was 46.2, whereas the mean score after the intervention increased to 72.6. Thus, there was an average increase of 26.4 points. Canva-based interactive media not only enhanced students' interest in learning but also provided opportunities for collaboration and reflection, which are essential components in the development of social skills (Anissa & Limbong, 2024). In the subsequent stage, a large-scale trial involving 33 students was conducted to evaluate the effectiveness of the developed product on a broader scale. Prior to hypothesis testing, the data were subjected to the Kolmogorov-Smirnov normality test. The results are presented in Table 7.

Table 7. Recapitulation of the Kolmogorov-Smirnov Normality Test Results for Students Social Skills

| No | Test Condition | K-S Statistic (D) | p-value | Decision                                        |
|----|----------------|-------------------|---------|-------------------------------------------------|
| 1. | Before         | 0.081             | 0.236   | Accept H <sub>0</sub><br>(Normally Distributed) |
| 2. | After          | 0.060             | 0.236   | Accept H <sub>0</sub><br>(Normally Distributed) |

Based on the results of the Kolmogorov-Smirnov normality test conducted on the students' social skills questionnaire data, a p-value of 0.236 was

obtained for the scores before the intervention and 0.236 for the scores after the intervention. These  $p$ -values were greater than the established significance level of 0.05 ( $p > 0.05$ ); therefore, the null hypothesis ( $H_0$ ) was accepted for both the pre-intervention and post-intervention data. The null hypothesis in the Kolmogorov–Smirnov test states that the data are drawn from a normal distribution. Therefore, the researcher proceeded with the analysis of the product's effectiveness using a paired-samples  $t$ -test. The recapitulation of the paired-samples  $t$ -test results for students' social skills questionnaire scores is presented in Table 8.

Table 8. Recapitulation of the Paired-Samples  $t$ -Test Results for Students' Social Skills Questionnaire Scores

| No | Statistic                   | Value       |
|----|-----------------------------|-------------|
| 1. | Sample Size ( $n$ )         | 33          |
| 2. | Mean Pre-Test Score         | 46,45       |
| 3. | Mean Post-Test Score        | 82,39       |
| 4. | Mean Difference ( $d$ )     | 35,94       |
| 5. | Standard Deviation ( $S$ )  | 11,065      |
| 6. | Calculated $t$ -value       | 18,659      |
| 7. | Critical $t$ -value         | 2,0384      |
| 8. | Degrees of Freedom ( $df$ ) | 32          |
| 9. | Conclusion                  | Significant |

Based on Table 8, the results of the paired-samples  $t$ -test indicate that the Canva-based interactive learning video had a significant effect on improving students' social skills in learning environmental pollution. The mean social skills questionnaire score increased from 46.45 in the pre-test to 82.39 in the post-test, with a mean difference of 35.94. The analysis also revealed that the calculated  $t$ -value (18.659) exceeded the

critical  $t$ -value (2.0384) at the 5% significance level ( $df = 32$ ). Therefore, the null hypothesis ( $H_0$ ) was rejected and the alternative hypothesis ( $H_1$ ) was accepted, indicating a statistically significant difference in students' social skills before and after the implementation of the Canva-based interactive learning video. These findings demonstrate that the developed learning media was effective in enhancing students' social skills.

The improvement in students' social skills can be attributed to the characteristics of the developed interactive learning video, which not only presented environmental pollution concepts but also promoted interaction, collaboration, communication, and active student participation throughout the learning process. The video incorporated reflective questions, contextual illustrations, animations, and interactive learning activities that encouraged students to discuss ideas, express their opinions, collaborate in solving problems, and respond to their peers' perspectives. These features created a more interactive and student-centered learning environment, providing students with opportunities to develop communication, teamwork, mutual respect, and responsibility in collaborative learning activities. Furthermore, the visually engaging presentation facilitated by Canva increased students' learning motivation and classroom engagement, thereby contributing to the development of their social skills.

The findings are consistent with the Social and Emotional Learning theory proposed by Elias (1997), which

emphasizes that social skills develop through meaningful learning experiences that encourage interaction, collaboration, responsible decision-making, and positive interpersonal relationships. This perspective is supported by Gresham et al. (2020), who argued that social skills consist of learnable behaviors that can be fostered through structured learning experiences, supportive classroom environments, and instructional activities involving peer interaction. Therefore, interactive learning media that actively engage students in collaborative learning contribute significantly to the development of their social skills.

The results of this study are also consistent with previous research. Fauziah et al. (2022) reported that the implementation of Canva-based interactive learning media enhanced students' active participation, communication, and classroom interaction. Similarly, Amri et al. (2020) found that Canva-based interactive learning videos created more engaging learning experiences, leading to greater student involvement during instruction. Comparable findings were reported by Rahmawati and Atmojo (2021), Anissa and Limbong (2024), and Raya (2025), who concluded that Canva-based learning media improve instructional quality through attractive visual design, systematic content organization, and interactive learning activities, thereby increasing student engagement and participation. Therefore, the present study provides further empirical

evidence that Canva-based interactive learning videos are effective not only in improving cognitive outcomes but also in fostering students' social skills, particularly in science learning on the topic of environmental pollution.

#### IV. CONCLUSION

This study successfully developed a Canva-based interactive learning video on the topic of environmental pollution using the Research and Development (R&D) model adapted from Borg and Gall. The product was developed through five stages: research and information collecting, planning, Develop Preliminary Form of Product, preliminary field testing, and main product revision. The results of the media and subject-matter expert validations indicated that the developed learning video was classified as highly valid and suitable for use without revision, confirming its feasibility for implementation in science learning. Furthermore, the results of the paired-samples t-test demonstrated a significant improvement in students' critical thinking skills and social skills following the implementation of the Canva-based interactive learning video. Therefore, the objectives of developing a valid learning medium and evaluating its effectiveness in improving students' critical thinking and social skills were successfully achieved.

The findings of this study imply that Canva-based interactive learning videos can serve as an innovative and effective instructional medium to support student-centered learning. The integration of audiovisual elements, animations, reflective questions, and interactive

learning activities enhances student engagement throughout the learning process, thereby improving not only cognitive achievement but also social skills, which are recognized as essential twenty-first-century competencies. Consequently, this learning medium has the potential to serve as an effective digital learning resource for science education, particularly in teaching environmental pollution.

Based on the findings, teachers are encouraged to integrate Canva-based interactive learning videos into classroom instruction to improve the quality of teaching and student learning outcomes. Future studies are recommended to develop similar learning media for other science topics or integrate more advanced educational technologies, such as learning management systems, gamification, and artificial intelligence (AI). In addition, future research should involve larger and more diverse samples to produce findings with greater comprehensiveness and broader generalizability.

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