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Analysis of the Need for Interactive Multimedia Development Using Canva in Pressure Material in Grade IX Junior High School

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A B S T R A C T

This needs analysis study aims to identify the urgency of developing Canva-assisted interactive multimedia on pressure material in Grade IX at SMP Negeri 4 Lalan, as an effort to improve the quality of science learning. The main problem found is the low mastery of pressure concepts by students (score of 30%) due to conventional learning methods that rely on lectures and static media, making it difficult for students to visualise abstract concepts. The results of the study show a very clear gap between current learning practices and the needs of students and teachers. Students showed a very high urgency for interactive media (95% media need; 100% interactive preference) that contained animations, simulations, and supported self-paced learning. Teachers also had critical awareness of learning constraints (score of 93%) and were in dire need of concept visualisation media (score of 100%). Supported by the readiness of school technology facilities and teachers' enthusiasm for Canva as an easily accessible design platform with the potential to produce interactive media (score of 100%), the development of Canva-based interactive multimedia is a much-needed strategic step to improve students' conceptual understanding and learning motivation in pressure-related material.

1. Introduction

Science education, particularly Natural Sciences (IPA), plays an important role in fostering critical thinking skills, conceptual understanding, and problem-solving skills among students (Primasari et al., 2020). Physics, as a branch of natural sciences, requires students to not only understand abstract concepts but also be able to relate them to everyday phenomena (Sholikah & Novika Pertiwi, 2021). However, Indonesia's science literacy achievement in PISA 2022 is still below the OECD average, so students' mastery of science concepts requires intervention and learning innovation (Ayu et al., 2025). The release of PISA results and related research emphasises the need for systemic improvements in learning practices and

the use of media that supports scientific concept understanding (Alfaruqi & Nurwahidah, 2025).

Similar problems are also seen in science learning at the junior high school level. Many schools still rely on lectures and textbooks as the main learning resources while interactive learning media have not been optimally utilized (Nisrina et al., 2025). The media used by teachers are generally static presentations such as PowerPoint or simple worksheets that do not attract students' attention. This condition has an impact on low student engagement during the learning process, decreased learning motivation, and limitations in understanding abstract concepts (Hasanah & Sudira, 2021).

One physics subject that requires a high level of conceptual understanding is pressure. The concept of pressure, which involves force, surface area, and other physical quantities, is abstract and therefore difficult for students to visualise. A study on the use of animated videos on liquid pressure, for example, showed an increase in learning outcomes after the use of visual media (Utami et al., 2021). Other studies also confirm that interactive media can improve students' understanding and learning outcomes in pressure material (Rohana et al., 2021). These findings emphasise the importance of more contextual and interactive learning media innovations so that complex physics concepts can be understood in depth.

Current developments in digital technology provide great opportunities to deliver more engaging science learning. Interactive multimedia is one effective alternative because it allows the integration of text, images, animations, audio, and video into a flexible learning package. Based on Mayer's cognitive theory of multimedia Rahayu et al. (2024), the combination of visual and auditory elements can strengthen information processing in long-term memory because humans process information through separate visual and auditory channels, and multimedia that presents images + narration allows for integration between these channels (Mayer, 2024). In addition, interactive multimedia provides a more personalised learning experience: adaptive learning systems can adjust the sequence, content, and pace according to individual needs (Contrino et al., 2024; Sayed et al., 2023). The adaptive self-paced approach has also been proven to enable students to learn at their own pace with increased active engagement (Christodoulou & Angeli, 2022).

In the context of learning media development, Canva is a promising web-based design platform because it allows teachers to create visual content and interactive graphic media without the need for complex software, making it more accessible to various groups (Ikram et al., 2025). Canva facilitates the creation of interactive multimedia content with a user-friendly interface, supporting the integration of templates, animations, videos, and collaboration between relevant parties in the distance learning process (Putra & Filianti, 2022). This platform also provides various educational templates that can be accessed via computers and mobile devices, making it easier for teachers to design materials that are visually appealing and flexible (Samosir et al., 2025). These advantages make Canva very suitable for developing interactive learning media for pressure-related materials, which require

the visualisation of phenomena such as liquid and air pressure, as well as their applications in everyday life.

The urgency of utilising interactive multimedia, including design platforms such as Canva, is increasingly relevant to the demands of the Merdeka Curriculum and the 2013 Curriculum, which emphasise student-centred learning and the integration of information technology. This curriculum encourages the development of 21st-century skills such as critical thinking, creativity, communication, and collaboration (4C), so teachers need to provide media that encourages active engagement and contextual learning. Research shows that the use of learning technology in the Merdeka Curriculum can increase student participation and support the achievement of 4C competencies (Farid et al., 2024). In addition, the characteristics of digital native students demand interactive and visual learning media to increase motivation and conceptual understanding (Komariah et al., 2024). Interactive multimedia that combines text, images, animations, and audio can accommodate various student learning styles (visual, auditory, kinesthetic) and provide a more interesting and personalised learning experience.

Conditions in the field demonstrate the urgency of developing this learning media. Observations and interviews at SMP Negeri 4 Lalan revealed that students' enthusiasm for learning media is quite high, but the available media is still general, lacking in variety, and not interactive. Science teachers acknowledge that learning still relies heavily on static media such as textbooks and simple PowerPoint presentations, causing students to quickly become bored and have difficulty understanding abstract concepts. The school actually has adequate computer laboratory facilities and an internet network, but these have not been optimally utilised due to time constraints, teachers' limited skills in using design applications, and a lack of training in digital media development. In science teaching practice for the 2023/2024 academic year, particularly on topics such as the structure of the earth's layers, student learning outcomes are still below the minimum passing grade, reflecting the need for more visual and contextual media innovation.

Based on this background, a needs analysis needs to be conducted to identify the actual conditions in the field, including the availability of learning media, student characteristics, teacher readiness, and school facilities and infrastructure. This needs analysis will form the basis for the development of Canva-assisted interactive multimedia on the subject of pressure to suit the school context, student characteristics, and learning objectives, so that it is expected to improve students' conceptual understanding and learning outcomes.

2. Methodology

This study uses a qualitative descriptive approach supported by quantitative data (mixed descriptive). The purpose of this study is to describe the actual conditions of the need for the development of Canva-assisted interactive multimedia on pressure material in Grade IX junior high school, including the availability of learning media, student characteristics, teacher readiness, and school facilities and

infrastructure. Descriptive research was chosen because it is suitable for capturing phenomena in depth without intervening or developing products (Mackiewicz & Creswell, 2018).

Research Location and Subjects

The research was conducted at SMP Negeri 4 Lalan in the even semester of the 2024/2025 academic year. The research subjects included (1) Grade IX students, as the main respondents to reveal their science learning experiences, difficulties in understanding pressure material, and needs for interactive learning media; (2) Grade IX science teachers, as key informants who provided information about learning practices, media utilisation, and obstacles to technology use; (3) The school principal or curriculum representative, as additional informants regarding technology utilisation policies and school facility support.

Data Collection Techniques

Data was collected through several techniques described in Table 1 below.

Table 1. Data Collection Techniques

No	Technique	Source
1	Questionnaire	Teachers and Students
2	Interview	Teachers
3	Observation	School Facilities and Infrastructure

Research Instrument

Table 2 below presents the instrument used to analyze students' needs, which was designed to gather comprehensive data regarding their learning preferences, challenges, and expectations toward the developed learning media.

Table 2. Student Needs Analysis Instrument

No	Aspect	Statement
A	Current Learning Conditions	1. I am interested in the science lessons that take place in class.
		2. My teacher uses a variety of learning media.
		3. My teacher often utilises technology or multimedia in science learning.
B	Difficulty Understanding Pressure Material	4. I understand the concepts of force, surface area, and pressure well.
		5. I can relate the concept of pressure to events in everyday life.
		6. I have difficulty visualising processes or phenomena related to pressure. *(reverse the score if you want a negative direction)*
C	Learning Media Needs	7. I am interested in learning using interactive multimedia-based learning media.
		8. I enjoy learning materials that include animations, images, and videos.
		9. I need media that allows me to learn at my own pace.
D	Technology Readiness and Access	10. I have a device (mobile phone, laptop, or tablet) that can be used for technology-based learning.

		11. I have sufficient internet access to participate in online learning.
		12. I am accustomed to using online learning applications.
E	Preferences for Interactive Learning	13. I am interested in learning materials with visually appealing designs.
		14. I would like to learn about pressure concepts through simulations or animations.
		15. I am more motivated to learn if the learning is presented in the form of interactive multimedia.

The instrument used for the teacher needs analysis can be seen in Table 3.

Table 3. Teacher Needs Analysis Instrument

No.	Aspect	Statement
A	Current Learning Conditions	1. I feel that the science learning media I currently use are varied.
		2. I still often rely on lectures and textbooks in science learning. *(reverse scoring if necessary)*
		3. I rarely utilise interactive multimedia in science education. *(reverse scoring if necessary)*
B	Challenges in Teaching Pressure-Related Material	4. Pressure material is difficult for students to understand if it is only explained verbally.
		5. Students often have difficulty visualising the concepts of force, surface area, and pressure.
		6. Student learning outcomes on pressure material are still below the minimum competency standard (KKM).
C	Learning Media Requirements	7. I require learning media that can clearly visualise the concept of pressure.
		8. I require learning media that can increase student motivation and active engagement.
		9. I am interested in using interactive multimedia-based learning media.
D	Technology Readiness and Support	10. My school has adequate supporting facilities (computers, internet network) for the development of digital media.
		11. I have basic skills in using design applications or creating digital media.
		12. I require training to enhance my ability to create technology-based learning media.
E	Views on Canva	13. I am familiar with the basic functions of Canva as a design platform.
		14. I am interested in using Canva to create science learning media.
		15. I believe Canva can help produce engaging and interactive learning media.

The teacher interview guide, which was designed to explore teachers' needs and opinions in more detail, is presented in Table 4.

Table 4. Teacher Interview Guide

Aspect	Interview Questions
Current Learning Conditions	1. How do you usually deliver science material, especially pressure material, in class? 2. What learning media have been used in teaching science? 3. How do students respond to the learning media currently used? 4. Is the available media sufficient to support the understanding of pressure concepts?

Challenges and Obstacles	5. What difficulties do students often experience in learning pressure concepts? 6. Do you encounter obstacles in providing interesting and interactive learning media? If so, what are the obstacles? 7. What is the level of student participation and motivation when learning pressure concepts with the methods/media currently used?
Learning Media Needs	8. In your opinion, what kind of media is most effective in helping students understand pressure material? 9. To what extent do you consider the use of interactive multimedia important in science learning? 10. Have you ever used animation, video, or simulation-based media? What was your experience using them?
Technology and Facility Readiness	11. What is the condition of technological facilities at the school (computer laboratories, internet access, multimedia devices)? 12. Do these facilities support the development or use of digital-based media? 13. What are your skills in using design applications or creating digital media?
Views on Canva	14. Have you heard of or used Canva before? 15. In your opinion, what are the advantages and disadvantages of Canva as a platform for developing learning media? 16. If given training, would you be willing to use Canva to develop interactive learning media? Why?
Expectations	17. What are your expectations for the development of interactive learning media using Canva for pressure-related materials? 18. What support do you need to optimally utilise digital learning media?

Data Analysis Techniques

The researcher analysed the data from the student needs questionnaire using the following percentage formula:

$$p = \frac{\Sigma x}{\Sigma x1} \; x \; 100\%$$

Notes:
P = Percentage
X = Total number of responses from all respondents
X1 = Total ideal score
100% = Constant

This formula is used to determine the level of student need for the development of interactive learning media assisted by Canva. The percentage obtained is then categorised to assess the level of need based on certain qualifications. This assessment makes it easier for researchers to interpret questionnaire data into clear conclusions regarding the urgency of media development. The percentage criteria used in this study refer to modifications of the interpretation scale as shown in the following table 5.

Table 5. Student Response Percentage Scale

Percentage	Criteria
81-100	Very Positive
61-80	Positive
41-60	Neutral
21-40	Less positive
0-20	Not Positive

Based on these criteria, it can be concluded that if the calculation results show 75–100%, then the students' need for interactive multimedia development using Canva is in the category of highly needed. A percentage of 51–74% indicates that students need this media. A percentage of 25–50% indicates that students have a low need for this media. A percentage of 0–24% indicates that students do not need this media development. The results of this analysis form the basis for assessing the extent to which the development of interactive multimedia assisted by Canva is needed as a medium for science learning, particularly for pressure-related material.

3. Results and Discussion

This research was conducted at SMP Negeri 4 Lalan in the even semester of the 2024/2025 academic year, involving 20 ninth-grade students, one science teacher, and one deputy headmaster in charge of the curriculum as supporting informants. Data were obtained through questionnaires, interviews, observations, and documentation, which were analysed descriptively and qualitatively with the support of quantitative data. The following are the results of the questionnaire distributed to students and teachers. As shown in Figure 1, the diagram represents the overall framework of the student needs analysis.

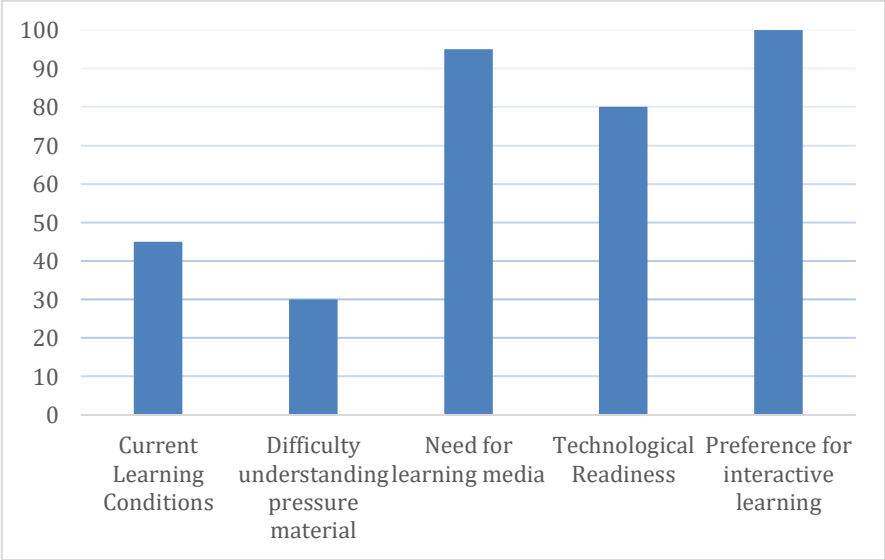

Figure 1. Diagram of Student Needs Analysis

The results of the student needs analysis show a contrasting picture between the current science learning conditions and the expectations and readiness of students to receive more innovative learning. In terms of learning conditions, the percentage score was only 45 per cent, which is in the neutral category. This figure indicates that students consider the science learning process to be not yet fully engaging and innovative. Although some students showed interest in science material, the media used by teachers tended to be limited to conventional forms such as textbooks or PowerPoint presentations. The use of technology and multimedia has not become a

routine practice, so the learning experience obtained by students is not rich in visual and interactive aspects. This condition shows that the learning approach applied by teachers has not been able to fully meet the needs of the digital generation who are accustomed to visual stimuli and dynamic interactions.

Students' difficulties in understanding pressure material further emphasise these limitations. The aspect of understanding the concept of pressure only obtained a score of 30 per cent, which is considered less than positive. This low score indicates that most students experience obstacles in understanding the relationship between force, surface area, and pressure, as well as difficulties in visualising processes or phenomena related to this concept. Abstract pressure material is difficult to understand through verbal explanations alone, requiring more concrete and contextual learning media support. This obstacle is a strong signal that science learning, especially pressure material, demands media innovation capable of providing visualisations, animations, or simulations that make it easier for students to connect theory with everyday phenomena.

On the other hand, the level of students' need for learning media shows very encouraging results. The aspect of media needs scored 95 per cent, which is in the very positive category, confirming that students have a very high desire to learn through interactive multimedia-based media. Students hope to learn with the support of animations, images, and videos that not only present information in text form but also provide self-paced learning features so that they can adjust their learning speed to their individual abilities. These results indicate that students are not only ready to accept technology-based learning but also actively demand the presence of richer and more flexible media.

The readiness of technology to support learning also sends a positive signal. A positive rating of 80 per cent indicates that most students have personal digital devices, adequate internet access, and are quite familiar with using online learning applications. With the infrastructure already in place, the main obstacle to learning is no longer the means, but rather the availability of learning media that suits the characteristics of the students and the material being taught. Furthermore, students' preference for interactive learning shows tremendous enthusiasm. This aspect received a 100 per cent rating, indicating a very positive response from all students. All respondents expressed a high level of interest in media with attractive visual designs, a desire to learn through simulations or animations, and greater motivation when learning is presented in the form of interactive multimedia. These findings confirm that students are not only technologically ready, but also have the intrinsic motivation to actively engage in learning processes based on interaction and visualisation.

Overall, the results of this study reveal a clear gap between conventional learning conditions and students' high readiness and need for multimedia-based learning. The low scores on learning conditions and understanding of pressure-related material prove that the current approach is not yet able to accommodate the learning styles of the digital generation. Conversely, the high demand for media, technological readiness, and preference for interactive learning provide a strong

basis for the development of more creative and innovative learning media. These findings are in line with Mayer's multimedia cognitive theory, which emphasises the importance of integrating visual and auditory elements to strengthen the understanding of abstract concepts. In this context, the use of design platforms such as Canva is highly relevant as it allows teachers to create engaging animated content, images, and videos without requiring complex technical skills. With adequate technological facilities and high student enthusiasm, the development of interactive multimedia using Canva is expected to address the challenges of science learning, particularly in pressure-related material, and provide a more engaging, contextual learning experience that is tailored to the digital native characteristics of students. The diagram illustrating the summarized results of the teacher needs analysis is presented in Figure 2.

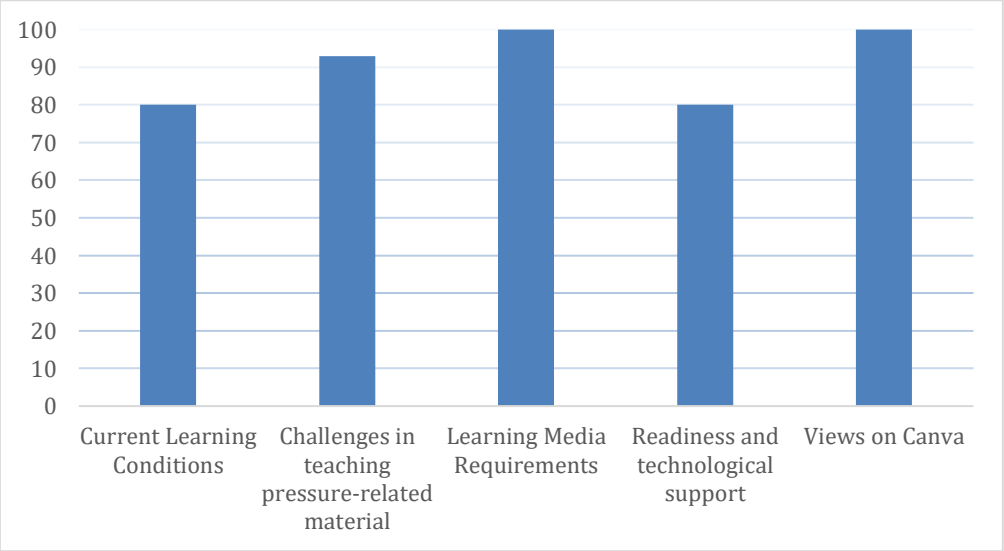

Figure 2. Diagram of Teacher Needs Analysis Results

The results of the teacher needs analysis show that the science learning process in the classroom still requires a lot of improvement, even though most teachers are aware of the importance of innovation. The score for the current learning conditions aspect reached 80 per cent, but this high score actually shows that teachers recognise that their teaching is not yet interesting enough and does not fully help students achieve optimal learning outcomes. The questionnaire statements highlighting teachers' habit of relying on lecture methods, textbooks, and minimal use of interactive multimedia mean that this high percentage can be interpreted as a critical awareness that current learning practices still need to be updated. In other words, teachers are aware of the limitations in the variety of methods and media, and this opens up great opportunities for change.

This awareness is further emphasised by the high score on the aspect of learning obstacles in pressure material, which reached 93 per cent. Teachers assessed that the concepts of force, surface area, and pressure were difficult for students to understand if only explained verbally. They also observed that students often had difficulty visualising phenomena related to pressure, so that learning outcomes were

often below the minimum passing criteria. This very high percentage indicates that the pedagogical challenges in pressure material are urgent and require learning media solutions that can provide visual and interactive experiences so that students can build a better conceptual understanding.

Awareness of this challenge is in line with the findings on the need for learning media, which received a perfect score of 100 per cent. All teachers stated the need for learning media that can clearly visualise the concept of pressure, increase learning motivation, and actively engage students through an interactive multimedia approach. These findings not only demonstrate teachers' readiness to use new media, but also emphasise that they view the development of interactive media as a direct solution to overcome the conceptual difficulties faced by students. In terms of facilities and skills, the aspects of readiness and technological support showed a positive value of 80 per cent. This figure indicates that school facilities such as computers and internet networks are adequate and most teachers have basic skills in using design applications or creating digital media. However, teachers still acknowledge the need for training to improve their technical skills in developing technology-based learning media, so that support in the form of mentoring and capacity building is an important factor for the optimal use of technology.mTeachers' views on the use of Canva as a media development platform also show very encouraging results. With a score of 100 per cent, all teachers stated that they were familiar with the basic functions of Canva, were interested in using it, and believed that this application could help produce interesting and interactive learning media. This enthusiasm indicates that the selection of Canva as a media development tool will be well received and has a great chance of being implemented effectively.

Overall, these findings illustrate that teachers are not only aware of the limitations of current learning practices, but also have a strong readiness to make changes. The challenges in teaching pressure-related material encourage teachers to seek more innovative solutions, while the availability of basic tools and skills provides a sufficient foundation for digital media development. Full support for Canva further strengthens the direction of development, making the development of Canva-based interactive multimedia a strategic step to improve the quality of science learning, particularly in helping students understand the concept of pressure more easily, attractively, and meaningfully.

The results of this study confirm that science learning, especially on pressure material, requires urgent innovation so that the learning process can meet the demands of the times and the characteristics of students. The questionnaire data showing low understanding of the concept of pressure among students (30%) is in line with the findings of teacher interviews, which stated that the delivery of material has been heavily reliant on conventional methods. Teachers revealed that learning is usually conducted through lectures, simple discussions, and the use of textbooks or PowerPoint slides, without adequate visual support. When asked about the available media, teachers stated that the media used "does not sufficiently help students understand the concept of pressure in depth, because it only consists of static images and examples from books." This statement reinforces the results of

the student questionnaire, which shows that current learning is not yet fully engaging and has not been able to optimally improve conceptual understanding.

The teachers also acknowledged that students' difficulty in understanding the relationship between force, surface area, and pressure is one of the biggest challenges. The teachers mentioned that "students often find it difficult to imagine how force can affect pressure on different surfaces, especially if it is only explained verbally without direct experiments or animations." The difficulties experienced by students are supported by literature findings that students experience many obstacles in visualising the phenomenon of hydrostatic pressure (Danar et al., 2026) and that the use of interactive media such as PhET simulations has been proven to significantly improve students' understanding of pressure concepts in Grade VIII (Sriyani et al., 2023). Furthermore, Piaget's cognitive development theory states that secondary school students are in the formal operational stage, where they begin to be able to think abstractly but still require concrete experiences and visualisation as scaffolding in learning (Bakara et al., 2015). Therefore, it can be concluded that students do need media, but teachers stated that time constraints and technical skills made it "difficult to create interactive media themselves."

This finding is in line with Vygotsky's constructivist theory, which emphasises the importance of scaffolding or learning support. Teachers explicitly mentioned that students would find it easier to understand pressure-related material if they were provided with animation-based media or simulations that showed the process of force and pressure changes gradually. This statement is supported by various studies. For example, Chang (2017) in his article How to augment the learning impact of computer simulations? The designs and effects of interactivity and scaffolding asserts that simulation designs combined with scaffolding strategies—such as guiding questions or driving questions—can significantly improve students' understanding of complex scientific concepts. Similar results were also shown by Ferty et al. (2019) in their study Physics Education Technology Simulation Assisted of Scaffolding Approach. Although not specific to pressure material, this study proves that the use of simulations with a scaffolding approach can improve students' critical thinking skills in physics learning, so that students are better able to reason the relationship between variables in science concepts.

Furthermore, in interviews, teachers explicitly mentioned that students would find it easier to understand pressure material if they were provided with "animation-based media or simulations that could show the process of gradual changes in force and pressure." This need was reflected in the teachers' answers when asked about the most effective type of media: "Interactive media featuring animations, simulations, or experiment videos are needed so that students can learn while observing." All of these statements are in line with the questionnaire findings, which showed a score of 100% on the aspect of learning media needs. In terms of technological readiness, teachers explained that school facilities were relatively adequate: "The school has a computer lab, internet access, and enough projectors to support digital-based learning," although teachers still need to improve their skills in utilising these devices. Teachers admitted that they only had basic skills in using design applications, so training was greatly needed. When asked about Canva,

the teacher stated that they "are familiar with Canva and have tried making simple posters," and assessed that Canva has advantages because "it is easy to use, has many attractive templates, and can be accessed for free." The teacher also expressed their willingness to use Canva as an interactive learning medium if given training, because "Canva is very helpful in creating interesting media without having to master complex graphic design." The teacher's expectations for the development of Canva-assisted interactive learning media are very clear. They hope for "media that can visualise the concept of pressure in a realistic way, increase student motivation to learn, and make it easier for teachers to prepare materials." The teacher added that support in the form of technical training, the provision of supporting devices, and assistance in media design are very important for the optimal use of Canva.

The integration of the findings from the questionnaire and interviews reinforces the urgency of developing interactive learning media using Canva. The gap between the current learning conditions and the needs of students and teachers emphasises the importance of technology-based innovation. Based on Mayer's multimedia cognitive theory (Rahayu et al., 2024), learning is more effective when information is presented through a combination of visual and auditory channels. Canva allows teachers to create animated content, images, and videos that are in line with this principle, while providing flexibility for students to learn at their own pace. With the readiness of technological facilities, student enthusiasm, and teachers' willingness to adapt, the development of Canva-based media is not only a technical solution but also a strategic step to improve the quality of science learning. This media is expected to help students understand the concept of pressure in a more concrete, interesting, and contextual way, while encouraging active engagement in the learning process in line with the characteristics of the digital native generation.

4. Conclusion

Based on the needs analysis at SMP Negeri 4 Lalan, there is a strong urgency to develop Canva-assisted interactive multimedia on pressure material. This need arises from the gap between current learning practices and the expectations of students and teachers. Students face challenges in understanding abstract concepts due to conventional, lecture-based instruction and static media, while teachers and students alike express a high demand for interactive, visually engaging materials. The development of Canva-based media is therefore seen as a strategic solution, supported by adequate technological readiness and teacher enthusiasm. Such media can bridge the gap between traditional learning and 21st-century education, enabling students to grasp pressure concepts more concretely and effectively through engaging, multimedia-based learning experiences.

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