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Research Article

OPTIMIZING LEARNING THROUGH GAGNE'S THEORY: TEACHING VIDEO ANALYSIS FOR PROSPECTIVE TEACHERS

Syahrial[1], Asrial[1], Husni Sabil[1], Miftahul Zannah Azzahra[2], Ahmad Mansur Nawahdani[2]

[1] Faculty of Teacher Training and Education, Universitas Jambi, Jambi, Indonesia
[2] Master of Natural Science Education, Pascasarjana Universitas Jambi, Jambi, Indonesia
Corresponding author email: syahrial.karea@gmail.com

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Abstract
This study explores and describes the learning process of elementary school teachers and professional education students through the lens of Gagné's learning theory. Using a qualitative approach with a descriptive method, the research analyzes recorded learning sessions of students enrolled in the program. Data collection involves examining the recorded lessons, and the analysis follows a descriptive qualitative framework. The findings reveal that implementing Gagné's nine instructional events, particularly goal-oriented and active learning strategies, positively influenced student interaction and comprehension of the material. Although there were variations in the ability to recall prior knowledge, all recordings demonstrated significant efforts in delivering content effectively, providing thorough guidance, and offering constructive feedback to enhance knowledge retention and transfer. This study provides a fresh perspective on applying Gagné's learning theory in professional education, emphasizing its impact on teacher training. Unlike previous studies that often focus on theoretical aspects, this research offers empirical insights into how Gagné's instructional events can foster deeper engagement and understanding in real-world classroom contexts. Additionally, the study highlights students' diverse experiences in applying Gagné's principles, offering new strategies for improving teaching methods. The implications suggest that educators in teacher preparation programs can use these findings to design more interactive, structured, and outcome-oriented learning environments, ultimately enhancing the quality of education in teacher training programs.

Keywords: Analysis Study, Elementary School Teacher, Gagne's Learning Theory, Professional Education Program, Student Learning Process

INTRODUCTION

Learning in elementary school is a fundamental stage in children's development (Rini and Aldila 2023; Dessi & Shah, 2023; Fakhroni & Puotier, 2023; Worachak et al., 2024), where they begin to recognize the basic concepts of various scientific disciplines and build the foundation of academic

and social skills. At this stage, the approach used by educators greatly influences students' success in understanding lesson material and developing interest in learning (Alenezi 2020; Utami, Aminatun, & Fatriana 2020; Rasmitadila et al. 2021; Perdana, Zakariah, & Alasmari, 2023; Wulansari, Oktariani, & Pulungan, 2023). Various educational theories are applied to create an effective and enjoyable learning environment. One theory that is relevant and often used in learning in elementary schools is Gagne's learning theory (Gunawardana et al. 2020; Wulan et al. 2023), which emphasizes the importance of systematic and structured learning stages to maximize students' understanding and retention of information (Alharbi 2023; Fan 2023; Pangandaman, 2023; Saputro et al., 2023; Habibi, Jiyane, & Ozsen, 2024; Ridwan et al. 2024).

Learning theory is an important foundation in the development of effective learning strategies (Sihombing, & Sijabat, 2023; Alvisari, Lah, & Tun 2024). One of the theories that is often used as a reference in the world of education is Gagne's learning theory (Pandey 2020; Brayadi, Supriadi, and Manora 2022). Robert Gagne, a prominent educational psychologist, developed this theory to explain the stages in the teaching and learning process (Mustofa 2023). Gagne's theory emphasizes the importance of sequence and structure in learning to ensure effective knowledge transfer. In the context of primary school teacher professional education, the application of this theory is very relevant to improve the quality of learning (Bergmark 2023; Fairman et al. 2023; Hennessy et al. 2022).

Robert Gagne developed a learning theory that identifies specific stages in the learning process (Abadi and Ghotbaddini 2023). This theory emphasizes that effective learning requires a clear sequence and structure (Amin 2021; Aziz et al. 2023; Thompson et al. 2021). Each stage is designed to build a strong foundation before moving on to more complex concepts. In the context of teacher professional education, an understanding of this theory is very important (Barrett 2021; Moore, Coldwell, and Perry 2021; Resch, Schrittesser, and Knapp 2024). Students of the Teacher Professional Education Program need to master this method to teach their students more effectively.

Gagne's learning theory consists of nine instructional steps known as the "Nine Events of Instruction" (Sari and Anam 2022; Yulinda, Yundayani, and Juhana 2024). These steps include gaining attention, informing learners of the objective, stimulating recall of prior learning, presenting the content, providing learning guidance, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer (Wasfy et al. 2021; Zain et al. 2022; Aziz et al. 2023; Putri & Maundeni, 2024). Each step is designed to assist teachers in creating an optimal learning environment (Alamri et al. 2020; Taqqiyyuddin, Barzegar, and Islam 2024). In practice, these steps can be tailored to the specific needs of the learner. This is an important basis for analyzing the content of the recording of the student learning process of the teacher professional education program (Juuti et al. 2021; Romijn, Slot, and Leseman 2021; Wilson, Ritzhaupt, and Cheng 2020).

The learning process in the teacher professional education program has a crucial role in preparing competent and professional teachers (Tang et al. 2020; Aryadi, Sudaryono, & Karim, 2022; Bergmark 2023; Herawati, Khairinal, & Idrus, 2023; Putri & Mufit, 2023; Sihombing, & Sijabat, 2023). Teacher professional education program Elementary School students must be able to master various pedagogic and didactic skills required to teach in elementary schools (Nychkalo et al. 2020; Wachidi, Rodgers, & Tumanov 2020; Zhumash et al. 2021). In this case, Gagne's learning theory offers a systematic framework to support the development of such skills (Brieger, Arghode, and McLean 2020; Suryonegoro, Wuryastuti, and Dewi 2024). Recordings of the learning process provide a real picture of how this theory is applied in a classroom context. This study aims to dig deeper into the application.

Previous research conducted by Yoon et al about "Video learning analytics: Investigating behavioral patterns and learner clusters in video-based online learning", The research found that active learners showed higher learning achievement than passive learners (Yoon et al. 2021). There are differences in research conducted by Yoon et al The current research carried out by researchers is that previous research focused on analyzing behavioral patterns and learner clusters in video-based online learning, but has not studied in depth how certain learning theories, such as Gagne's learning theory, can be applied to increase the effectiveness of the learning process (Yoon et al. 2021; Asrial et al., 2023). Gap yang muncul di antara kedua penelitian ini terletak pada aspek analisis: penelitian sebelumnya lebih berorientasi pada analisis perilaku siswa secara data-driven menggunakan analisis pembelajaran, sementara penelitian sekarang lebih menekankan pada penerapan teori pembelajaran dalam desain video pengajaran, tanpa mengintegrasikan analitik perilaku siswa secara langsung. The current research fills the gap by providing a new perspective on how the principles of Gagne's theory can be applied to

improve interactions and learning outcomes in professional education contexts, which has not been explored in previous video learning analytics research.

Previous research conducted by Bieman, Ridder, and Gent (2020) Previous studies have focused on the use of deep learning-based video analysis to measure and analyze physical phenomena in physics models. This study emphasizes the technical aspect, namely how deep learning technology can be applied to obtain accurate data from videos about movement or change in a scientific context. In contrast, the current study focuses on the application of Gagne's learning theory in teaching videos to improve the instructional effectiveness of pre-service teachers. The main gap between the two studies is the approach and purpose: the previous study is more oriented towards video analysis technology for measurement purposes in physics, while the current study focuses more on learning theory and instructional design in an educational context. The previous study does not discuss the pedagogical aspect, while the current study does not focus on complex video analysis technology or techniques.

The novelty of this study is that empirical insights are obtained about the effectiveness of the implementation of Gagne's instructional measures in real situations, which can be the basis for the development of more innovative and efficient learning strategies. In addition, this study makes a practical contribution by offering specific recommendations for improving the learning process in the primary school teacher professional education program, as well as advancing an understanding of optimal teaching and learning dynamics. This novelty not only has the potential to improve the quality of education in primary schools, but also enriches academic literature in the field of pedagogy and didactics, especially related to the application of Gagne's theory in a professional learning environment.

This research is important to improve the quality of learning in the primary school teacher professional education program, ensuring that prospective teachers acquire effective pedagogic skills. Analysis of learning process recordings can identify strengths and weaknesses in the application of Gagne's learning theory, providing a solid basis for improving learning strategies. The urgency of this research also lies in efforts to create an optimal learning environment, which is essential to prepare competent and professional teachers. In addition, the findings of this study can be a valuable reference for other teachers in implementing Gagne's theory in various educational contexts. Based on the above explanation, the purpose of this study is to find out and describe the learning process carried out by students of the elementary school teacher professional education program based on Gagne's learning theory.

RESEARCH METHOD

This study used a qualitative approach with a descriptive method to analyze the recordings of the learning process of students in the elementary school teacher professional education program. This type of research was chosen because it allowed the researchers to explore and understand the application of Gagne's learning theory in depth and contextually (Carbone et al., 2023; Majid 2023). Through the analysis of the content of the recordings, the researchers were able to identify and describe the Gagne instructional steps applied by teachers, as well as students' responses to the method. The data generated from this qualitative research provided rich and detailed insights into the dynamics of learning, which were not only based on numbers or statistics, but also on broader narratives and contexts (Ananth and Maistry 2020; Debnath et al. 2020; Nur Istiqomah 2023). This descriptive approach allowed the researchers to provide a comprehensive overview of the effectiveness and challenges in the application of Gagne's learning theory in the primary school teacher professional education program.

The sample of this study uses a random sampling approach involving three video recordings of the learning process from various sessions in the elementary school teacher professional education program. This approach ensures that each recording is randomly selected from a larger population, thus representing a fair variation in the teaching context (Mweshi & Sakyi 2020; Banning 2021). By randomly selecting, researchers can avoid selection bias and improve the representation of objectivity in the analysis of the application of Gagne's learning theory in daily learning practice (Bochkay et al. 2023). The selection of the three videos as samples was based on the completeness of the steps of the learning process carried out and the narrative stating the steps being carried out in the video.

This research procedure will began with the initial step of identifying and selecting three recordings of the learning process of students in the elementary school teacher professional education program. Once the video is selected, the next stage will involve collecting data through analysis of the video content. The data will be analyzed with a descriptive qualitative approach (Doyle et al. 2020;

Mezmir 2020), where the video will be analyzed by paying attention to the principles of Gagne's learning theory which consists of 9 steps (Iqbal, Siddiqie, & Mazid 2021; Putra et al. 2022). The research procedure in this study can be seen in the following figure:

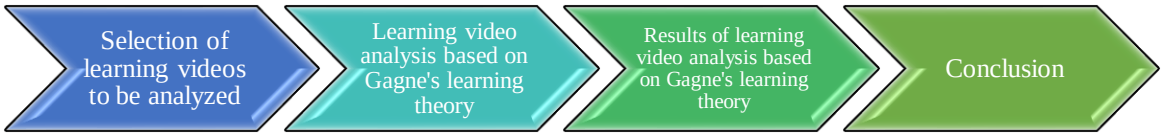

Figure 1. Research Procedure

The data collection technique in this study will involved the analysis of the recording of the learning process of students of the elementary school teacher professional education program. The videos will be studied carefully with a focus on various aspects, including structure, delivery methods, clarity of content, and suitability with Gagne's learning theory.

The data analysis technique in this study followed a descriptive qualitative approach (Ataro 2020; Lester, Cho, & Lochmiller 2020; Ananda, 2023). The data from the learning process recordings were parsed and analyzed to identify various aspects, such as structure, teaching methods, and content clarity, paying attention to the principles of Gagne's learning theory. Gagne's learning theory consists of 9 steps Gagne (1988) consisting of:

Getting Attention

The first step or principle in gagner learning theory is to arouse interest and focus students' attention on the material that will be delivered by the teacher. This activity aims to attract students' attention and involve them in the learning process (Filgona et al. 2020; Sutarto, Sari, and Fathurrochman 2020). This can be achieved through the use of attractive and relevant stimuli. For example, by asking a question or problem.

Inform Learning Objectives

The second step or principle in gagner's learning theory is to convey learning objectives to students with a clear presentation (Sari and Anam 2022). Students need to know a number of learning objectives or specific competency targets that they are expected to master (Antamoshkina, Zinina, and Olentsova 2020). Clear communication about these goals helps focus learners' attention and motivates them to learn (Filgona et al. 2020).

Provoking Memories of Previous Material

The third step or principle in gagner's learning theory is to recall the knowledge material that has been learned before. Reactivating students' memories of previous material will help them connect new information with their existing mental framework (McDaniel, Einstein, and Een 2021). By reviewing relevant concepts or experiences, students can better understand the knowledge they have gained regarding a subject matter (Altmeyer et al. 2020; Kristidhika et al. 2020).

Presenting Content

The fourth step or principle in gagner learning theory is to convey learning content or materials. Instructional content is presented to learners in a structured and organized manner (Shamsuddin and Kaur 2020). The material must be logically ordered, cut into manageable units, and delivered using appropriate learning strategies such as lectures, visuals, or multimedia.

Providing Guidance

The fifth step or principle in gagner learning theory is to provide guidance or guidelines for learning to students. Learners need guidance and support to understand and acquire new knowledge or skills (Kwangmuang et al. 2021). This activity involves providing clear explanations, examples, demonstrations, and instructions to help students understand the content (Kulgemeyer 2020).

Driving Performance

The sixth step or principle in gagner learning theory is to encourage or respond to students in order to show the results of their learning performance. Students are given the opportunity to practice

what they have learned (Kim 2020). This active participation helps to reinforce newly acquired knowledge or skills and allows for feedback and correction if needed (Lipnevich and Panadero 2021).

Give Feedback

The seventh step or principle in gagner's learning theory is to provide feedback to students to assess their performance in learning. Learners need to receive feedback on their performance, which indicates whether or not they have achieved the desired learning outcomes (Pitt, Bearman, and Esterhazy 2020). Feedback helps learners assess their progress in the learning process, while identifying areas for improvement, and reinforcing their understanding (Hill and West 2020; Molloy, Boud, and Henderson 2020).

Assess performance

The eighth step or principle in Gagner's learning theory is to measure and evaluate learning outcomes. This activity involves assessing the performance of students to determine the extent to which they have achieved the learning objectives (Leenknecht et al. 2021). Various assessment methods such as quizzes, tests, or practical exercises, can be used by teachers when evaluating their students' progress (Morris, Perry, and Wardle 2021).

Improve retention and transfer

The ninth step or principle in gagner's learning theory is to strengthen the retention and transfer of learning (Hassan and Baloch 2020). This last activity focuses on improving long-term retention and transferring learned material into real-world contexts. Strategies such as providing opportunities for students to review learning outcomes, apply their knowledge to various different situations, and develop understanding can be used by teachers in this phase (McDaniel and Einstein 2020).

The analysis will also use a rating scale of 1-10, where the categories can be seen in the table 1.

Table 1. Learning assessment scale

Scale	Category
1-2	Very little
3-5	Less
5-8	Good
9-10	Very good

RESULTS AND DISCUSSION

The results of the analysis of the recording of the learning process of students of the elementary school teacher professional education program are presented in the following table 2.

Table 2. Results of the analysis of the learning process of students of the elementary school teacher professional education program on record A of the building forms material

Steps of Gagne's Learning Theory	Assessment Scale			
	1-2 (Very Little)	3-5 (Less)	6-8 (Good)	9-10 (Very Good)
Get attention			✓	
Inform learning objectives			✓	
Provoke memories of previous material		✓		
Presenting content				✓
Provide guidance			✓	
Drive performance				✓
Provide feedback			✓	
Assess performance			✓	
Increase retention and transfer			✓	

Based on the analysis of the learning process of students of the elementary school teacher professional education program in record A of the building forms material, it was obtained that at the beginning of learning until the end the teacher always tries to attract students' attention by giving

triggering questions, using interesting learning media, doing ice breaking and discussing problems together. Furthermore, the teacher has conveyed the material to be studied but does not specifically mention what the purpose of the learning is. In addition, the teacher also did not provoke memories of previous material. In the recording, the teacher has presented content, provided guidance and encouraged performance well, this can be seen when the teacher displays learning media in the form of videos, gives examples in real life and uses props to explain the building form material, and provides opportunities for students to use the props to practice what they have learned.

In the recording, it can also be seen that the teacher gives group assignments and worksheets that will be completed by students, and students are free to ask questions about the assignments and worksheets. After the worksheets are collected, the teacher checks the answers and discusses them together with the students in the class. At the end of the activity, the teacher reflects, namely the teacher and students conclude the learning together. Based on these activities, the steps to provide feedback, assess performance and increase retention and transfers have been relatively good.

Table 2. Results of analysis of the learning process of students of the elementary school teacher professional education program on recording B of the rhyme material

Steps of Gagne's Learning Theory	Assessment Scale			
	1-2 (Very Little)	3-5 (Less)	6-8 (Good)	9-10 (Very Good)
Get attention			✓	
Inform learning objectives				✓
Provoke memories of previous material		✓		
Presenting content				✓
Provide guidance			✓	
Drive performance			✓	
Provide feedback			✓	
Assess performance			✓	
Increase retention and transfer			✓	

Based on the analysis of the learning process of students of the elementary school teacher professional education program in the recording of the poem material B, it was obtained that at the beginning of the learning it was seen that the students were less enthusiastic, but as the learning process progressed, the teacher always tried to interact with the students so that the level of student attention increased. The learning objectives have been conveyed very well by the teacher, this can be seen when the teacher conveys any purpose of learning the rhyme material. In the recording, there are no activities or interactions that provoke students' memories of the previous material. In presenting content and providing guidance has been very good, this can be seen from the presentation of material carried out by teachers with the help of learning media in the form of power points and videos about songs in regional languages which are examples of the material being studied, besides that teachers are also active in provoking students to express their opinions.

In the step of encouraging performance and providing feedback, it is also on a good scale, this can be seen from the assignment of group assignments to students. After completing the group assignment, each group is directed to come to the front of the class and convey what they have completed. As for the steps to assess performance and increase retention and transfer, it is also on a good scale. This can be seen during the presentation of the results of group work in front of the class, where the teacher immediately corrected the group's answers by discussing them with other students. In addition, at the end of the lesson, a reflection was also carried out where the teacher asked again what lessons the students had learned during the learning process.

Tabel 3. Results of the analysis of the learning process of students of the elementary school teacher professional education program on record C of folding symmetry material on flat buildings

Steps of Gagne's Learning Theory	Assessment Scale			
	1-2 (Very Little)	3-5 (Less)	6-8 (Good)	9-10 (Very Good)
Get attention			✓	
Inform learning objectives				✓
Provoke memories of previous material		✓		
Presenting content			✓	
Provide guidance			✓	
Drive performance				✓
Provide feedback			✓	
Assess performance			✓	
Increase retention and transfer			✓	

Based on the analysis of the learning process of students of the elementary school teacher professional education program in the C recording of the folding symmetry material on the flat building, it was found that in the aspect of getting attention was considered quite good, showing that the teacher succeeded in attracting the interest of students, but sometimes students did not focus on the material presented so that the teacher had to try to take their attention again by doing ice breaking. The provision of information about learning objectives was considered very good, which showed that the teacher had conveyed the learning objectives before entering the exploration of the material. However, the aspect of provoking memories about the previous material is considered lacking, this can be seen in the recording there is no flashback for the previous material. Thus showing the need for improvement in connecting new material with pre-existing knowledge.

In addition, the presentation of the content received excellent ratings, which reflected the quality of the material presented. Where the teacher uses learning media in the form of power points to help deliver the material to be studied (Susanto et al. 2022; Worachak et al., 2024). Mentorship, performance encouragement, feedback, performance appraisals, and increased retention and material transfer were all rated good. This shows that overall, the learning process is effective and supports the academic development of students (Almulla 2020; Blau, Shamir-Inbal, and Avdiel 2020; Asrial et al., 2023). This can be seen during the group assignment, where the teacher always monitors and guides students to fill out the worksheets that have been given. In addition, the teacher also asked that each group present the results of their group discussion in front of the class so that it can be discussed together. However, improvements are needed in the aspect of provoking memories about previous material so that learning becomes more holistic and integrated.

Based on the analysis of the learning process on the recording of the A material of the forms of awakening, teachers consistently try to attract students' attention through various methods such as triggering questions, interesting learning media, ice breaking, and discussion of joint problems. Although the material to be studied is delivered, the learning objectives are not specifically mentioned, and there is no attempt to provoke memories of the previous material. Teachers successfully present content well, provide guidance, and encourage student performance using videos, real-life examples, and props. Group assignments and worksheets are given, followed by checking and discussing together. A joint reflection at the end of the activity showed that feedback, performance appraisals, and increased retention and transfers were well done (Bhat et al. 2022; Yohanie et al., 2023; Zakiyah, Boonma & Collado, 2023).

Based on the analysis of the learning process of students of the elementary school teacher professional education program on the recording of the poem material, it was found that the students were initially less excited, but the active interaction of the teacher increased their attention. The learning objectives are conveyed very well, although there is no interaction to provoke the memory of the previous material. The presentation of content and guidance is excellent, using learning media such as power points and videos. Encouraging performance and providing feedback are also assessed both through group assignments and class discussions. Performance assessment and retention are also effective, with direct reflection and correction that receive positive responses from students (Wang and Zhang 2020; Sihombing, & Sijabat, 2023; Riswanto et al., 2024).

Based on the analysis of the learning process of students of the elementary school teacher professional education program on the C recording of the folding symmetry material on a flat building, it can be seen that the aspect of getting attention is considered quite good. Teachers managed to attract students' interest even though sometimes students were not focused, so ice breaking was needed to attract attention again. The provision of information about learning objectives is considered very good because the teacher conveys it before the material. However, the aspect of provoking memories about previous material is considered lacking because there is no flashback of previous material. The presentation of the content is considered very good with the use of PowerPoint learning media. The aspects of providing guidance, performance encouragement, feedback, performance assessment, and improving retention and material transfer were all assessed as good, demonstrating the effectiveness of the learning process and support for students' academic development. Teachers monitor and guide group assignments, as well as encourage the presentation of discussion results for students (Kusuma, 2020; Heilporn, Lakhal, and Bélisle 2021; Suwarni, 2021; Repriani et al., 2022; Fitriana & Waswa, 2024).

Based on the results of the analysis of the three recordings of the learning process, the importance of Gagne's theory becomes clear in the context of teaching effectiveness. Gagne's theory underlines the importance of organizing structured learning steps to achieve learning goals in a systematic manner. Although the teachers in these recordings managed to attract students' attention with various methods such as trigger questions and interesting learning media, the need to convey specific learning objectives and provoke memories of previous material has not been fully met. This shows that by paying more attention to the principles of Gagne's theory, teachers can be more effective in designing and executing learning that is not only engaging but also ensures that the learning objectives are clearly understood and achieved by students.

Interviews with several students regarding the application of Gagne's theory in direct instruction showed mixed experiences. Students expressed that the application of the steps in Gagne's theory helped them understand concepts more clearly and in a structured way. Several students felt more engaged in the learning process, with one student noting, “The method used made me more active and motivated me to participate.” In addition, students reported that having constructive feedback from instructors who followed Gagne's principles was helpful in understanding the material and applying the knowledge in class. However, several students also noted challenges, such as difficulty following some steps without additional explanation. These findings suggest that the application of Gagne's theory in direct instruction provides significant benefits, but there are aspects that need to be addressed to improve the overall learning experience for students.

In addition, Gagne's theory also highlights the importance of using a variety of learning techniques that focus on providing good guidance, driving students' active performance, and constructive feedback. Although there is success in these aspects of the recordings, such as the use of group assignments and collective reflection, further development in provoking memories of previous material can improve retention and transfer of students' knowledge more effectively (Filgona et al. 2020). By applying the principles of Gagne's theory more thoroughly, the learning process can become more holistic and support students' academic development more effectively (Aziz et al. 2023).

According to Gagne, Incident Study can trigger learning and cognitive processes in students, which then function as a stimulus to develop various abilities and skills in students. (Amalia and Suryaningtyas 2023). Gagne's theory suggests that learning materials should be organized in a sequential manner, where mastering one topic facilitates the understanding and learning of the next, more advanced topic. Gagne's 9 events of instruction serve as a valuable framework for designing, planning, and creating meaningful learning experiences that incorporate active learning (Chen and Johannesmeyer 2021).

Research on Gagne's learning theory in the context of the study of the analysis of the recording of the learning process of students in the primary school teacher professional education program has a substantial impact in informing more effective teaching practices. By studying how Gagne's principles are applied in everyday teaching, this research helps identify strengths and areas of improvement in learning approaches (Sari and Anam 2022). The implications of this research can strengthen practical knowledge for educators, improve the quality of teaching, and promote more focused and focused learning oriented towards clear learning outcomes for students and teachers in the field.

One of the limitations that may occur in research on Gagne's learning theory in learning, especially in the study of the analysis of the recording of the learning process of students in the elementary school teacher professional education program, is the limited generalization of findings.

These studies may only cover limited variations of specific learning experiences or contexts in primary schools, so the findings may not be fully applicable widely in a variety of other educational settings. In addition, additional factors such as differences in student individuality or teacher teaching styles can also influence the results of the study, which needs to be considered in more depth to gain a more comprehensive understanding of the implementation of Gagne's theory in a broader learning context.

CONCLUSION

Based on the analysis of the learning process from the three recordings, it can be concluded that the implementation of various active and goal-oriented learning strategies has contributed positively to student interaction and achievement in understanding the material taught. While there were variations in approaches and successes in recalling previous material, all recordings showed a strong effort in presenting the content well, providing in-depth guidance, and providing constructive feedback to improve student retention and knowledge transfer. This conclusion emphasizes the importance of a systematic and planned approach in designing effective learning, in accordance with the principles of tested learning theories such **as** those proposed by Gagne's theory. Further research may expand the scope to identify more deeply how the integration of specific steps from Gagne's theory, such as initial stimulation, information presentation, and reinforcement, can affect student learning achievement on a variety of contexts and other topics in the primary education curriculum. The implications of this research can strengthen practical knowledge for educators, improve the quality of teaching, and promote more focused and focused learning oriented towards clear learning outcomes for students and teachers in the field.

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AUTHOR CONTRIBUTIONS

Syahrial: Conceptualization, design, writing, supervision. Asrial: data acquisition, data analysis / interpretation. Husni Sabil: concept and design, statistical analysis. Dwi Agus Kurniawan: concept and design, statistical analysis. Miftahul Zannah Azzahra: writing, drafting manuscript. Ahmad Mansur Nawahdani: writing, drafting manuscript. Elza Triani: writing, drafting manuscript.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

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