Jurnal Teknologi Pendidikan:
Jurnal Penelitian dan Pengembangan Pembelajaran
https://e-journal.undikma.ac.id/index.php/jtp/index

Oktober 2025 Vol. 10 No. 4
E-ISSN: 2656-1417
P-ISSN: 2503-0602
pp. 758-766

Initial Study of Learning Cycle 5E Based Learning Media Development to Improve Collaboration Skills in Elementary School

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Abstract:. This research is an initial study that aims to describe the condition of collaborative learning in elementary schools as a basis for developing learning media based on the Learning Cycle 5E model. The background of the research is based on the low collaboration skills of students and the unoptimal utilization of digital media and interactive approaches by teachers. The research method used descriptive quantitative and qualitative approaches with data collection techniques in the form of questionnaires (76 elementary school teachers), in-depth interviews (4 classroom teachers), and observations of 24 fourth grade students in Selagai Lingga District. The results show that 86% of teachers have not used technology-based media, 80% have not implemented interactive learning models, and 92% assess students' collaboration skills as low. The observation mean of 2.35 confirmed the weakness of five collaboration indicators: cooperation, flexibility, responsibility, compromise and communication. The Learning Cycle 5E model is considered relevant to increase students' active involvement, and the development of technology-based media such as Articulate Storyline III has the potential to strengthen collaborative activities in learning. Thus, the development of LC5E-based learning media is a strategic solution to improve students' collaboration skills contextually and applicatively.

Article History
Received: 20-07-2025
Published: 30-10-2025

Key Words :
Learning Media; Collaboration Skills; Learning Cycle 5E; Elementary School; Initial Study;

How to Cite: Hendra, P. Y., Yulianti, D., Adha, M. M., & Firdaus, R. (2025). Initial Study of Learning Cycle 5E Based Learning Media Development to Improve Collaboration Skills In Elementary School. Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran, 10(4), 758–766. https://doi.org/10.33394/jtp.v10i4.18221

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Introduction

21st century education brings great challenges for teachers and learners. It is no longer enough to master academic content, students need to be equipped with critical thinking, effective communication, creativity, and collaboration skills-known as the 4Cs (Arifah & Utami, 2023). Among these skills, collaboration occupies an important position as it is a prerequisite in social life, teamwork, and collective decision-making. Collaboration reflects learners' ability to work together in teams, convey ideas constructively, compromise, take responsibility, and adjust to group dynamics (Mawaddah et al., 2022; Ulhusna et al., 2020).

Collaboration skills in learning include a series of indicators that can be observed and developed systematically. Based on previous research and field measurements (Bakri & Adnan, 2021; Mawaddah et al., 2022), students' collaboration skills can be examined through five main indicators: cooperation, which is the ability to actively participate and help each

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E-ISSN: 2656-1417
P-ISSN: 2503-0602
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other in the team; flexibility, which is the willingness to adapt to changes in roles and group dynamics; responsibility, reflecting students' awareness in completing tasks and commitment to group goals; compromise, which is the ability to resolve conflicts and agree on joint decisions; and communication, which includes the skills to convey ideas clearly and listen to the opinions of others. These five indicators become the foundation in assessing the extent to which students are able to interact productively in a collaborative learning environment. Unfortunately, many teachers do not have learning strategies that are able to consistently foster these indicators, so media and learning approaches that directly stimulate students to develop these skills in an active and structured manner are needed.

However, learning at the primary school level still tends to be done traditionally. Teachers mostly use one-way approaches such as lectures and memorization, and still rely on textbooks as the main source of learning (Magdalena & Pawe, 2023). This condition causes the lack of active student involvement and limited strengthening of collaborative skills in the learning process. The lack of these skills has an impact on the underdevelopment of students' social and communication aspects, as well as their readiness to face real-life challenges that require cooperation and adaptability.

Meanwhile, advances in educational technology provide great opportunities in creating more participatory and enjoyable learning. Digital learning media can be an effective means to present materials visually and interactively. One relevant application is Articulate Storyline III, which allows teachers to combine text, images, audio, animation and quizzes into one attractive media (Qonita, 2023; Said, 2023). This kind of media can increase learning motivation and facilitate students' understanding of abstract concepts through direct engagement.

Pedagogical approach support is also needed so that the media can be used optimally. The Learning Cycle 5E model, which consists of engage, explore, explain, elaborate, and evaluate stages, offers a learning framework that encourages students to actively build knowledge through exploration and reflection (Wulandari et al., 2022; Pratama et al., 2023). Based on Piaget's theory of constructivism, this model encourages the creation of meaningful learning experiences, while stimulating social interaction and the development of collaboration skills through group work and discussion.

Various studies have highlighted the effectiveness of constructivist approaches and digital media, but most have not specifically examined the development of LC5E-based learning media to improve collaboration skills of elementary school students, especially based on the results of field needs studies. Herein lies the novelty of this research - an approach that combines empirical data on teacher and student needs with innovative media development based on theory and technology. This research does not merely design learning media, but addresses the gap between conventional learning practices and the demands of 21st century education.

To obtain an overview of the real conditions in the field, an initial study was conducted involving 76 teachers in Selagai Lingga Subdistrict through questionnaires, 4 class teachers of SDN Gilih Karang Jati through interviews, and 24 students of class IVa through observation. The questionnaire results showed that 86% of teachers have not used technology-based media, and 80% have not implemented interactive learning models due to

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limited equipment and lack of training (Noptario et al., 2024; Aditya & Wahyudi, 2024). In addition, 93% of teachers stated that students' collaboration skills have not been the focus of learning, while 92% assessed that students' collaboration skills are still low.

Interviews and observations reinforced these results. The teacher mentioned that students had difficulty in working together, sharing responsibilities, and resolving group conflicts. The observation results showed that collaboration skills were at an average score of 2.35, classified as low, especially in the indicators of flexibility, communication, and responsibility.

By considering the results of the initial study, the development of Learning Cycle 5E-based learning media is a relevant strategic solution. This media is expected to be able to help teachers present learning that is interactive, fun, and able to foster students' collaborative skills systematically and measurably. Therefore, this article aims to describe the initial study as the basis for developing Learning Cycle 5E-based learning media to improve collaboration skills of elementary school students.

Research Method

This type of research is an initial study in order to develop learning media based on the Learning Cycle 5E model. The research is included in the Research and Development (R&D) approach with an initial stage design in the form of a field needs study. The research activities were carried out in April-May 2024, located in Selagai Lingga District, Central Lampung Regency. The research subjects consisted of 76 elementary school teachers who responded to the questionnaire, 4 classroom teachers of SDN Gilih Karang Jati who were interviewed in depth, and 24 students of class IVa elementary school as the group observed in group learning. The sampling technique was purposive (Sugiyono, 2019), with consideration of teachers who actively teach grade IV and students who have been involved in collaborative activities.

Data were collected using three main instruments: questionnaires, interviews and observations. Questionnaires were used to obtain data on the utilization of media and learning models applied by teachers, as well as their attention to students' collaboration skills. Semi-structured interviews were conducted to reveal teachers' perceptions of the barriers and opportunities of collaborative learning. Student observations were conducted during group learning activities, using an observation sheet with five indicators of collaboration skills: cooperation, flexibility, responsibility, compromise, and communication (Bakri & Adnan, 2021; Mawaddah et al., 2022). Data analysis was done descriptively quantitatively and qualitatively, through frequency tabulation, average score calculation, and thematic analysis to interpret the pattern of field findings as a basis for developing Learning Cycle 5E-based media.

Results and Discussion

Results

1. **Educator Questionnaire Results**

   The initial study was conducted by distributing questionnaires to 76 primary school teachers in Selagai Lingga sub-district. The aim was to obtain data on learning needs related to the use of media and learning approaches applied. The questionnaire results show that:

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E-ISSN: 2656-1417
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a. 86% of teachers have not utilized technology-based learning media in the teaching and learning process. Teachers tend to use conventional methods with textbooks as the main teaching material.
b. 80% of teachers have not implemented interactive learning models, such as Learning Cycle 5E or project-based approach. Most teachers are not familiar with the structure of these alternative models.
c. 93% of teachers stated that students' collaboration skills have not been an explicit focus in the learning process. Group activities are often conducted, but not systematically directed to develop students' cooperation and communication.
d. 92% of teachers assessed that the level of students' collaboration skills is low, indicated by the difficulty of students adapting in groups, limited communication, and lack of a sense of responsibility for the results of joint work.

This data indicates that there is a considerable gap between the demands of 21st century education that emphasizes the development of soft skills, including collaboration, and the learning practices that occur in primary schools. Teachers have not been supported by media and approaches that encourage collaboration skills in a direct and structured manner.

2. Teacher Interview Results

In-depth interviews were conducted with four classroom teachers at SDN Gilih Karang Jati who represent the local learning context. The teachers reported that:

a. Students often have difficulty working together in groups. Some students appear dominant, while others are passive.
b. In group activities, there are still unresolved conflicts, indicating low compromise and communication skills.
c. Teachers do not have access to interactive and flexible learning media. Most learning activities still use the lecture method and written question exercises.
d. Teachers realize the importance of technology-based learning but lack the knowledge and skills to design appropriate media.
e. They mentioned that learning is still individualized and does not optimally encourage interaction between students.

This finding corroborates the questionnaire results that classroom learning has not been fully directed to foster collaboration, either through learning strategies or the use of digital media.

3. Student Observation Results

Observations were conducted on 24 students in class IVa in group learning activities. The observed aspects included five indicators of collaboration skills: cooperation, flexibility, responsibility, compromise, and communication (Bakri & Adnan, 2021; Mawaddah et al., 2022). The observation results showed that:

a. The average score of students' collaboration skills was 2.35, on a scale of 1-4. This score is categorized as low.
b. In the cooperation indicator, students have not shown active contribution in the group. Some tend to work alone or follow instructions without initiative.
c. On the flexibility indicator, students seemed difficult to adapt when roles in the group changed. They are not used to receiving dynamic tasks.
d. On the responsibility indicator, many students do not complete group tasks independently and often depend on more active members.

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e. On the compromise indicator, group decisions are often taken by certain individuals without fair discussion.
f. On the communication indicator, students do not yet have the skills to convey ideas clearly or listen to input from their group mates.

The observation findings provide concrete evidence that students' collaboration skills have not been formed optimally and need to be stimulated through the right learning approach.

Discussion

The results of the initial study show that the collaboration skills of elementary school students are still relatively low. This was reflected in the observation results which showed an average score of 2.35 on a scale of 1-4, covering five main indicators: cooperation, flexibility, responsibility, compromise and communication. Teachers also confirmed the low active participation of students in group learning and the lack of meaningful interaction in the classroom. This finding is reinforced by the results of questionnaires and interviews which state that teachers have not used technology-based learning media optimally and have not implemented interactive learning models systematically.

Collaboration skills are one of the core competencies in the 21st century education framework established by the Partnership for 21st Century Learning (Trilling & Fadel, 2009). Collaboration goes beyond working in groups and involves interpersonal skills, effective communication, willingness to share responsibilities and skills to resolve conflicts constructively (Saavedra & Opfer, 2012). Unfortunately, learning practices in primary schools still tend to be teacher-centered and oriented towards academic achievement, so social skills such as collaboration have not been widely fostered through learning activities.

Each collaboration indicator shows different symptoms. Cooperation is the cornerstone of group activities, but many students tend to be passive and do not understand how to contribute to the shared process. Some students showed individualistic attitudes or waited for instructions, rather than sharing tasks and roles independently. Research by Johnson & Johnson (2009) states that effective collaboration promotes higher learning outcomes than individual learning, as it strengthens social relationships and enriches perspectives of understanding.

Flexibility, which is the ability to adjust roles and accept changes in the group, has also not developed optimally. Many students find it difficult to adapt themselves to the dynamics of the task or the opinions of friends. In fact, flexibility is needed to deal with a constantly changing and heterogeneous learning context. Shore & Barkacs (2017) state that flexibility in teamwork can increase productivity and speed up the problem-solving process due to healthier adaptation between group members.

The next indicator, responsibility, shows that most students have not shown commitment to the shared task. Responsibility in a collaborative context not only means completing a piece of work, but also maintaining the quality of contributions and supporting the achievement of group goals. According to Riebe et al. (2010), responsibility skills in teamwork should be cultivated through habituation of reflection and feedback among group members.

Compromise as the ability to resolve conflicts in a healthy and fair manner is also not yet dominant. Students often defend their own opinions or let other group members make decisions without deliberation. In the learning process, compromise is not only the

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E-ISSN: 2656-1417
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negotiation of opinions but also the ability of empathy and self-control in accepting differences. This supports Gokhale's (2012) findings that compromise practice in groups helps shape open-mindedness and improve students' social skills.

Communication, as the last indicator, determines the quality of collaboration. However, observations show that many students do not have the skills to convey ideas clearly or listen actively. This limited communication causes miscommunication in group discussions and leads to the domination of certain individuals. According to Huber & Carter (2019), communication skills are at the core of social and academic competencies in collaborative learning, and should be developed through explicit learning and a supportive environment.

Seeing the weaknesses in these five indicators, a learning approach is needed that can foster collaboration systematically and actively. One relevant approach is Learning Cycle 5E, which consists of five stages: Engage, Explore, Explain, Elaborate, and Evaluate (Bybee et al., 2006). This model is designed to provide student-centered learning experiences and encourage exploration, interaction, and reflection. The Engage stage allows teachers to provoke curiosity and connect learning to students' experiences. At this stage, students begin to share ideas and build initial discussions. Explore invites students to work in groups to explore new information, and this is a key stage to foster cooperation, flexibility and communication. The Explain stage allows students to communicate the results of exploration, thus strengthening communication and a sense of responsibility in conveying understanding collectively. In the Elaborate stage, students develop concepts further, practicing collective argumentation and completing advanced tasks that require compromise and reflection. Finally, the Evaluate stage provides an opportunity to assess the process and results of group work, and form metacognition about the collaborative learning that has taken place. Not only does the LC5E model provide a framework for active learning, but it is also a profound way to gradually shape social skills. Research by Özdemir & Özdemir (2020) showed that the implementation of LC5E had a positive impact on students' engagement in group work and improvement of their communication skills.

However, in order for this model to be optimally implemented in elementary schools, learning media that support the integration of the LC5E stages effectively are needed. This is where digital media plays an important role. The Articulate Storyline III application is one solution that allows teachers to design interactive, visual, and LC5E logic-based content. Through this media, each stage can be realized in the form of simulations, group activities, individual reflections, and feedback that support the development of collaboration indicators.

The advantages of digital media lie not only in its technological aspects, but also its adaptive ability to students' learning styles. According to Sung et al. (2016), mobile and visual-based learning tends to increase students' motivation and participation, especially those with visual or auditory learning styles. In addition, interactive media allows teachers to conduct data-based evaluation, such as tracking student activity in groups, discussion logs, as well as the use of self-reflection features. The integration of the LC5E model with digital learning media is a strategic step to create learning that is not only academically meaningful, but also encourages social character building. If developed contextually, this media can reach students in various regions, including non-urban areas, which so far still face limitations in learning innovation. The OECD report (2018) emphasizes that collaboration-based learning supported by technology is one of the keys to success in shaping 21st century skills at the basic education level.

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This initial study became a strong foundation for the development of media integrated with the LC5E syntax. It not only identifies the weaknesses of students' collaboration skills in detail, but also provides pedagogical and technological directions for their improvement. Learning that encourages teamwork, communication, shared responsibility and flexibility is a long-term educational investment in shaping the adaptive, empathetic and productive generation of the future. This initial study became a strong foundation for the development of media integrated with the LC5E syntax. It not only identifies the weaknesses of students' collaboration skills in detail, but also provides pedagogical and technological directions for their improvement. Learning that encourages teamwork, communication, shared responsibility and flexibility is a long-term educational investment in shaping the adaptive, empathetic and productive generation of the future.

Conclusion

Based on the results of initial studies that have been conducted through questionnaires, interviews, and observations of elementary school teachers and students in Selagai Lingga District, it is known that the collaboration skills of fourth grade students are still relatively low. The lack of use of technology-based learning media and the non-implementation of interactive learning models also strengthen the gap between the demands of 21st century learning and actual learning practices in the classroom. The observation results show that collaboration indicators such as cooperation, flexibility, responsibility, compromise, and communication have not developed optimally. This finding shows the urgency of presenting a more innovative learning approach, based on students' experience and social interaction. The Learning Cycle 5E model is proven to be relevant as a pedagogical framework that can support active, meaningful and collaborative learning. When combined with technology-based media such as Articulate Storyline III, learning can be more contextual, interactive, and encourage student engagement in building social competence. Therefore, the development of LC5E-based learning media is a potential solution to overcome students' weak collaboration skills while answering the needs of teachers in developing adaptive and structured technology-based learning.

Suggestion

1. For Teachers Intensive training and mentoring is needed regarding the implementation of the Learning Cycle 5E model and the utilization of digital learning media so that teachers can design learning that encourages active student collaboration.
2. For Learning Media Developers Learning media development should be oriented to the indicators of collaboration skills, designed according to the LC5E stages, and compatible with the devices available in elementary schools.
3. For Further Researchers It is recommended to continue this research to the development stage and test the effectiveness of LC5E-based media on improving students' collaboration skills with a Research and Development design and a quasi-experimental approach.
4. For Government and Education Policy Makers It is necessary to support the policy of implementing technology-based collaborative learning models in elementary schools

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through the provision of infrastructure, teacher training, and integration of models such as LC5E into the school operational curriculum.

Acknowledgment

First and foremost, I would like to express my sincere gratitude to all those who have supported and contributed to the completion of this initial study entitled "Initial Study of Learning Cycle 5E-Based Learning Media Development to Improve Collaboration Skills in Elementary School." I extend my deepest appreciation to my academic supervisors, whose guidance, insights, and encouragement have been invaluable throughout this research process. I am also thankful to the participating elementary school teachers and students who generously gave their time and input, which greatly enriched this study. Special thanks to my colleagues and peers for their constructive feedback and moral support during the development of this research. Lastly, I am grateful to my family for their unwavering encouragement and understanding throughout the journey. This study would not have been possible without the collective support of these individuals. Thank you.

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