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Enhancing Critical Thinking Skills through Group Investigating Models and "Datar" "Pakar" Media for Facing the 21st Century

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Abstract. The critical thinking skills of fourth-grade elementary school students have been found to be lacking, hindering their ability to effectively process information. This research aims to explore the impact of group investigation learning models supported by "Datar" and "Pakar" media on enhancing critical thinking skills in social science education. Employing an experimental "One-Shoot Case Study" method, the study involved pre-testing students, implementing the group investigation model with the media tools, and post-testing to measure improvements. Data were analyzed using the N-Gain formula. The results indicated a significant enhancement in students' critical thinking abilities, with an average N-Gain score of 0.61, categorized as moderate improvement. The study concluded that the integration of innovative learning models and interactive media significantly contributes to developing critical thinking skills essential for 21st-century education. This research underscores the importance of active, collaborative, and media-supported learning approaches in elementary education, offering valuable insights for educators and contributing to the advancement of educational methodologies aimed at fostering critical thinking skills in young learners.

Key words: critical thinking, interactive media, 21st-century education, group investigation

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INTRODUCTION

Education serves as a foundational support for nations (Juliya et al., 2021). Laksana (2021) emphasizes its role as a transformative force, cultivating capable individuals adept at navigating the evolving requirements of contemporary progress. The rapid advancement in science and technology introduces substantial alterations within the educational landscape (Damanik et al., 2022), leading to both beneficial outcomes that enhance Indonesia's educational standards and adverse effects (Zubaidah, 2016).

In response to the challenges of accelerating technology, especially in the world of education, students are demanded to have various skills of the 21st Century (Haryanto et al., 2022). 21st-century education requires students to have critical thinking skills in finding learning resources, receiving, deciphering, and analyzing information (Hasibuan & Prastowo, 2019) so that students are expected to be able to face sophisticated technology (Fitriyani & Nugroho, 2022). This statement is supported by Septikasari and Frasandy (2018), who believe that critical thinking skills are an ability students must face in 21st-century education.

In confronting the challenges of 21st-century education, there is an anticipation for social science education to undergo a transformation that significantly benefits the students' learning journey (Nopa et al., 2020). It plays a pivotal role in fostering the development of requisite skills (Utaminingsih, et al., 2023), in addition to providing students with essential social competencies (Nursahid, 2022), all of which are underpinned by robust reasoning and critical thinking abilities (Pratami et al., 2019).

In the educational sphere, social science instruction within schools was envisioned as a platform enabling learners to explore their identities and surroundings (Fanny, 2020). The environments in question span a variety of ethnicities, languages, and religions (Ariyani et al., 2021). This approach is embodied within the "Merdeka" curriculum, outlined explicitly in Chapter 6 of the fourth-grade Natural and Social Sciences textbook under Teaching Topic B: The Cultural Wealth of Indonesia. The educational aims delineated therein encompass (1) equipping students with the ability to recognize the myriad forms of cultural diversity present within Indonesia, (2) enhancing students' understanding of

the myriad factors contributing to such diversity, and (3) fostering in students a respectful attitude towards diversity within their milieu. According to Fitri et al. (2021, the curriculum materializes these objectives through interactive engagement with images depicting traditional attire, regional dances, and architectural styles from various Indonesian locales, thereby facilitating students' appreciation of cultural uniqueness, elucidation of preservation strategies for traditional attire, and the derivation of core principles and novel insights from textual analyses (Utaminingsih & Puspita, 2023).

Empirical observations in the field continue to reveal that the critical thinking abilities of fourth-grade students at the elementary level necessitate significant enhancement (Christina & Kristin, 2016). Students need help constructing information that can be obtained well, so their critical thinking skills still need improvement (Budianti, 2018). These findings indicate that learning objectives to implement one of the 21st-century skills have yet to be fully achieved (Jannah & Atmojo, 2022). A statement reinforced by Priyadi et al. (2021) is that 56% of students' critical thinking skills still need to be in the better category. They only reach essential skills of thinking levels C1 to C2. Berjamai and Davidi (2020) explain the factors that cause the phenomenon. One of them is the use of teacher-centred learning methods and lectures. Based on the phenomenon, critical thinking skills need further attention in learning the 21st Century (Christina & Kristin, 2016).

More innovative and engaging pedagogical approaches for social science students in elementary education are needed. (Sutarsa & Puspitasari, 2021). However, learning could be optimal if students actively participate in the learning process (Utaminingsih, et al., 2023). In pre-research Gombang Elementary School in Blora, This circumstance becomes apparent when educators provide opportunities for learners to pose questions and express their viewpoints. However, only a limited number of students engage in inquiry and discourse. Students can provide alternative problem solutions and only reach the cognitive domain C1 - C3.

In light of the issue identified, a plausible approach to enhancing critical thinking abilities may involve the innovation of learning models (Eviyanti et al., 2020) the learning model that is effective, active, innovative, creative, and fun learning (Utaminingsih, 2023). Through learning innovation, students will be more involved in the discussion process (Zulaeha, 2015) to construct knowledge and increase their critical thinking skills (Christina & Kristin, 2016). Innovation could be realized in education by overhauling the learning model (Syaifudin et al., 2017). Selecting a suitable model will clarify the content of the theory, guiding students to be enthusiastic and active (Budianti, 2018). The choice of pedagogical models should be engaging and tailored to align with the distinct attributes of the student demographic (Utaminingsih, et al., 2023). Characteristics of students in fourth-grade elementary school, like working in groups and playing (Meriyati, 2015). It is implied that educators must develop a classroom-centered pedagogical approach tailored to students throughout the educational process. (Oktafikrani, 2020).

The group investigation is a learning model where students are divided into small groups to do activity investigation, discussion, and resolve problems on information provided by the teacher (Wahid, 2019). Wayudi et al. (2019) have articulated that the group investigation model emphasizes student participation, enabling them to explore, strategize, implement, present, and assess the assigned topics. Students were anticipated to construct knowledge through such a model, augmenting their critical thinking abilities (Eviyanti et al., 2020). Christina and Kristin (2016) corroborate this by stating that the group investigation approach facilitates students' ability to analyze and devise solutions to problems, which fosters the development of critical thinking skills similarly. Budianti (2018) observed analogous outcomes, noting that this educational model encourages students to be active and inventive during discussions, promoting the exchange of ideas among group members and thereby enabling problem resolution. Then, students build critical thinking skills. Based on the background above, this research aims to study the enhancement of critical thinking skills by investigating group learning models in social science among elementary school students.

METHODS

The research method used in this study is the experimental method, “One-Shoot Case Study”, which involves observing a group after being given a specific treatment. In the context of the research “Improving Critical Thinking Skills with Group Investigation Models, “Datar” and “Pakar” Media to Face the Society 5.0 Era”, this method can be applied by providing treatment in the form of learning

using group investigation models supported by “Datar” and “Pakar” media. The purpose of this study was to measure the improvement of students' critical thinking skills after being given such treatment.

The subjects in the study were all four-grade students. The research subjects were then treated by implementing a group investigation model with the support of the “Datar” and “Pakar” media. Subjects were pre-tested before treatment, and after completion of implementation, post-test questions were given to evaluate critical thinking skills after the learning process was completed. Critical thinking test instruments have been developed before and declared valid and reliable.

The N-Gain formula is used to measure the improvement of critical thinking skills. The N-Gain formula is as follows:

$$\text{N} - \text{Gain} = \frac{\text{Tpos} - \text{Tpre}}{\text{Tmaks} - \text{Tpre}}$$

Information:
Tpos : Average score posttest
Tpre : Average score pretest
Tmax : Ideal maximum score

The N-Gain score obtained by the equation can be analyzed for criteria using the gain score interpretation presented in Table 1.

Table 1. N-Gain Value Categories $\langle g \rangle$ (Wahab et al., 2021)

Value $\langle g \rangle$	Criteria
$\langle g \rangle > 0.7$	Tall
$0.3 \leq \langle g \rangle \leq 0.7$	Keep
$\langle g \rangle < 0.3$	Low

RESULTS AND DISCUSSION

Implementation The Model

Students are given a pre-test before learning is carried out. Learning activities during the study apply the group investigation model that has been designed. In addition, the syntax of the Group Investigation learning model was applied with the help of learning media, namely “Datar” and “Pakar”. “Datar” and “Pakar” media are equipped with their properties, which consist of complete material, as well as material that has been cut into pieces that will be used in the learning process, as well as questions in the form of quizzes to deepen understanding of concepts and practice critical thinking skills. The questions in the quiz are wrapped in games that can attract students' interest and concern. The “Datar” and “Pakar” media are presented in Figure 1.

Figure 1. “Datar” and “Pakar” Media Display

All activities during the learning process were contained in syntax. The syntax of the media-assisted group investigation model is presented in Table 1.

Table 1. Syntax of Group Investigation Model Collaborated with Media

Teacher	Phase	Learners
The teacher asks students to rotate the media to point to an envelope containing questions The teacher takes a question from the colour of the selected envelope The teacher reads questions to all group members	One: Problem Giving	One of the selected group members came forward to play Datar media Students listen to questions read by the teacher
The teacher asks students to remember the information that has been collected carefully, discuss with group members about the problems raised (questions)	Two: Response Exploration	Before answering questions, students construct and discuss the information and knowledge gained with other group members.
The teacher asks to raise their hands for the group who already know the answer to the question asked.	Three: Realization of Response	The group raises their hands after summing up and constructing the knowledge gained.
The teacher analyzes the entire process of conducting the quiz, from the question-and-answer session, preliminary round, final round and up to the awarding of rewards.	Discussion and analysis of the learning process	Students listen to the teacher and join the discussion.
Teachers provide input to students The teacher reviews the material Teachers double-check students' knowledge Teacher assigns home assignments	Five: Activity Evaluation	Students began to role-play until it was completed

The learning process runs according to the syntax that has been compiled. Students are very attentive and interested as the process progresses. They feel interested, and all students are involved in the learning process. The learning process is fun. An overview of the questions in the quiz is presented in Figure 2.

Figure 2. Quiz Question Display

In phase five (learning evaluation), there is an activity "the teacher checks students knowledge." The teacher carried out the activity and asked students individually before pasting media images to the "Pakar" media that had been pasted on the wall. Students who answer the question correctly will embed a media image at the end of the branch on the "Pakar" media. Before pasting images into media, teachers test their critical thinking skills verbally. After students answer the questions, students can attach pictures to branches according to cultural locations. The results of attaching learners to the "Pakar"

media are presented in Figure 3.

Figure 3. Results of Sticking Cutting Media on "Pakar" Media

Posttest students in the second hour after the learning process is complete. The results of evaluating students' critical thinking skills are presented in Table 1.

Table 1. Pretest and posttest results

No.	Pretest	Postest
1	55	85
2	60	87
3	50	76
4	45	75
5	57	80
6	55	78
7	58	82
8	62	88
9	60	92
10	57	83
11	55	88
12	56	80
13	40	70

The results of the N-Gain gain are presented in Figure 4.

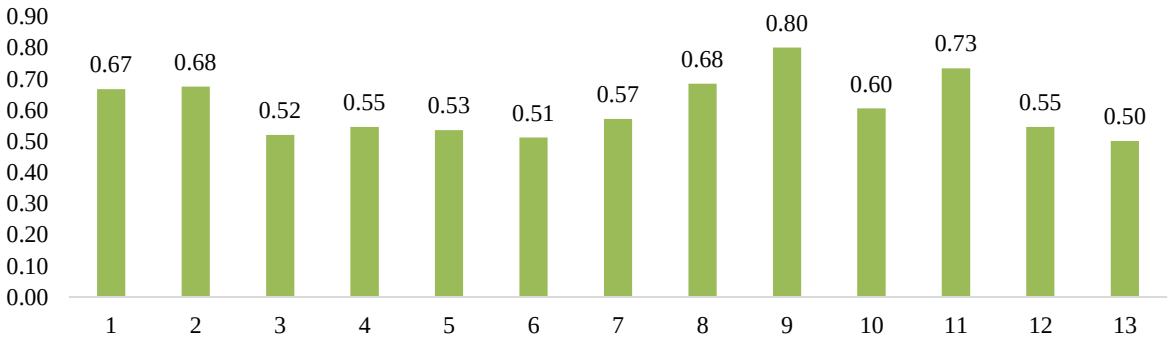

Figure 3. N-Gain Results of Each Student

Media-assisted Group Investment Model "Improving Critical Thinking Skills"

The average value of N-Gain obtained is 0.61. This value shows a significant improvement in critical thinking skills in grade IV students with moderate criteria after participating in learning using the group investigation model with the help of "Datar" and "Pakar" media. Improving critical thinking skills in students can be interpreted as a positive impact of applying group investigation learning models supported by appropriate learning media. The group investigation model allows students to be actively involved in the learning process and to collaborate, discuss, and solve problems together, which are essential components in developing critical thinking skills.

The "Datar" and "Pakar" media used in learning likely provide a rich stimulus to spark students' curiosity, facilitate exploration of concepts, and deepen their understanding of the material being studied. The model, combined with materials and media, refers to static sources of printed or visual information, in addition to sources of information or teaching materials that are more interactive or may involve the presence of instructors or experts in a particular field as part of the learning process. Several previous studies have shown that applying group investigative learning models can effectively improve students' critical thinking skills. For example, research by Eviyanti et al. (2020) found that investigation-based learning can improve students' ability to argue scientifically, an essential aspect of critical thinking. Another study by Budianti (2018) also emphasizes the importance of active and collaborative learning in developing critical thinking skills. Thus, the group investigation learning model with the help of "Datar" and "Pakar" media effectively improves the critical reasoning skills of grade IV students. It aligns with previous studies emphasising the importance of active, collaborative learning and was supported by appropriate learning media to develop critical thinking skills.

The group investigation learning model also emphasizes the importance of the teacher's role in innovative learning to improve critical thinking skills. Remember, the ability to think critically is an ability that must be possessed in education in the 21st century. It was also conveyed by Purwanti et al. (2022), who said that critical thinking skills are necessary for students in the 21st century. The ability to think critically is a provision for students facing social problems (Christina & Kristin, 2016).

The study results align with research by Wahid (2019) that the learning model investigation group is one of the cooperative learning models that convey the possibility of students' critical thinking. This investigative group model is considered effective in improving the efficiency of learning and the process of compiling student knowledge. This learning model can monitor students' development of critical thinking skills, finding root problems, and solving problems logically to prepare for intense global competition (Budianti, 2018). In addition, participating in international competitions requires students to be communicative, collaborative, creative, innovative, think critically, and be able to solve problems in the real world (Eviyanti et al., 2020).

According to Hasanuddin et al. (2021), teachers can combine learning models with learning media during the learning process. Media is vital in learning because it can help students understand the information taught (Syaribuddin et al., 2016). Media is one of the learning tools that can provide stimulus and experience. Furthermore, students can make the same observations to get the correct information (Khairini & Yogica, 2021). The learning media in this study are "Datar" (Smart Wheel) and "Pakar" (Tree of Various Cultures). To interest students in the learning process, teachers use the medium "Datar". However, most importantly, in this "Datar" medium, game questions can stimulate students to improve their critical thinking skills.

Discribe things can be concretized through learning media, and complex things can be simplified (Meriyati, 2015). The learning process with concrete media fascinates students because they feel happy and easy to understand the information learned (Utaminingsih, et al., 2023). The selection of suitable learning media will clarify the material's content so that students are always enthusiastic and active (Syaribuddin et al., 2016). In addition, it effectively increases the efficiency of learning and the process of student preparation knowledge (Christina & Kristin, 2016). According to Wahid (2019), this model guides the development of critical thinking skills, finding root causes, and solving problems logically in preparation for intense global competition. In addition, to face international competition, students must be more innovative, creative, communicative, and collaborative, think critically and analytically, and solve problems in life that lead to a high level of thinking (Budianti, 2018). Students can communicate practical, critical, and dynamic thinking and solve problems through that ability (Utaminingsih, et al., 2023).

The investigation group of the learning model is student-centred, and the teacher acts as a facilitator (Dhina & Mubaroq, 2013). The teacher provides theoretical learning to each group. The material given to students can be separated (Taohid, 2022). It aims to enhance student collaboration with Social Science learning goals and skills of the 21st Century (Indraswati et al., 2020). Through questions that are packaged attractively by the teacher, students will create a conducive and fun atmosphere because students do new things, so the course will be exciting and fun (Zulaeha, 2015). Questions will provide a stimulus for them to identify problems (questions), analyze and discuss with group members (the process of building information that has been received), and then draw interesting conclusions (answering questions from many questions) (Wahid, 2019). The knowledge transfer process follows the character of students grouping studies because stimulating critical thinking skills is an activity that must be done by teachers (Budianti, 2018). By applying the model, students absorb the knowledge provided more efficiently so that the investigation process group can improve students' critical thinking skills (Christina & Kristin, 2016).

Critical thinking and 21st Century Skills

In 21st-century education, the importance of critical thinking skills for primary school students must be addressed, given the ever-changing global environment and emerging new challenges (Utaminingsih, et al., 2023). These skills become the foundation for students to develop adaptability, problem-solving, and innovation that they will need in the future (Wahyuseptiana et al., 2022). Starting the development of critical thinking skills from an early age allows students to internalize the thought processes necessary to analyze information, evaluate evidence, and make logical decisions (Azizah et al., 2018).

In this fast-paced information age, elementary school students were exposed to various sources of information, not all reliable or accurate (Utaminingsih, et al., 2023). Teaching critical thinking in the early stages of education helps students distinguish between facts and opinions and understand the importance of using evidence to support arguments (Kusmaharti & Yustitia, 2022). This ability is essential to build information literacy and prevent the spread of misinformation.

Furthermore, by instilling critical thinking skills, elementary school students are taught to approach problems more creatively and innovatively (Budianti, 2018). They learn to look at problems from multiple perspectives, look for alternative solutions, and are fearless in taking untested approaches (Narindra, 2021). These skills enhance their academic abilities and prepare them to become original thinkers and innovators of the future (Armansyah et al., 2022).

In addition, critical thinking is essential in developing primary school students' social and emotional skills (Purwanti et al., 2022). By practising critical thinking, students learn to listen to the views of others, appreciate different perspectives, and develop empathy. The ability to interact with others effectively and with deep understanding is an essential aspect of personal and professional success in the 21st century. Integrating critical thinking into the elementary school curriculum requires an innovative and student-centric approach, where students engage in project-based learning, problem-solving, and activities that encourage questioning and exploration (Suciono, 2020). Through this approach, students acquire knowledge and apply it critically and creatively, which is the essence of relevant education in the 21st century.

CONCLUSION

The comprehensive analysis of the educational intervention employing group investigation methods supported by "Datar" and "Pakar" media tools in the fourth-grade classroom setting underscores the effectiveness of such innovative pedagogical strategies in fostering critical thinking skills among young learners. This approach not only engages students in a more collaborative and interactive learning process but also equips them with the essential cognitive tools needed to navigate the complexities of the contemporary world, highlighting the significant role of critical thinking in educational development and its broader implications for preparing students to meet the challenges of the 21st century with adaptability, creativity, and a deepened capacity for problem-solving.

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