

Integration of the RADEC Learning Model in Developing Social Interaction Abilities of PGMI Students

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Abstract

Social interaction skills are an important competency that students of the Elementary Madrasah Teacher Education Study Program (PGMI) must have, considering their role as prospective educators who are not only required to master cognitive aspects, but also social and collaborative skills. This study aims to analyze the integration of the RADEC (Read, Answer, Discuss, Explain, and Create) learning model in developing the social interaction skills of PGMI students at UIN Sulthan Thaha Saifuddin Jambi. This study uses a qualitative and quantitative approach, namely a combination or mixed methods approach with the Concurrent Embedded model that combines qualitative and quantitative data simultaneously, but with different weights. The results of the study indicate that the RADEC (Read, Answer, Discuss, Explain, and Create) learning model in developing the social interaction skills of PGMI students at UIN Sulthan Thaha Saifuddin Jambi shows a number of important findings that illustrate the effectiveness of this model in the context of 21st-century learning. RADEC provides greater space for students to develop communication, collaboration, and social adaptation skills in the academic environment. This statement is supported by the average results of the RADEC learning model implementation questionnaire which is in the good category at 85%. The average score for the social interaction skills questionnaire was 86%, which is considered excellent, indicating that the RADEC learning model positively contributes to the development of students' social interactions.

Keywords: Integration, RADEC, Social Interaction, Students



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Introduction

Social interaction is an important skill that needs to be developed in education (Abdulai et al., 2023; Sidi & Aisenberg Shafran, 2020). This skill is not only relevant for building good interpersonal relationships but also serves as the foundation for forming a harmonious and collaborative society (Dobija et al., 2023; Kristini, 2020). In an educational context, effective social interaction helps students learn to cooperate, respect differences, and resolve conflicts constructively. However, the development of social interaction skills is often not a primary focus of the learning process in schools (Avença et al., 2024; Chodzirin, 2016; Lorena & Sadiku, 2015).

Social interaction skills are a crucial aspect of 21st-century learning. Students are required to possess not only academic abilities but also social skills that support them in working collaboratively, communicating effectively, and solving problems collectively. In the context of higher education, developing students' social interaction skills is an integral part of learning objectives, particularly in preparing them to face increasingly complex global challenges.

However, learning practices in various universities still tend to focus on a one-way approach. The dominant lecture method often provides little space for students to actively participate in the learning process. As a result, students' social interaction skills are underdeveloped due to the limited opportunities for collaboration, discussion, and effective interaction with peers and lecturers. (Darmadi, 2015; Iskandar, 2008; Syafaruddin, 2003).

One major challenge is the learning approach, which is still dominated by conventional methods, which focus more on delivering material without providing sufficient space for active student participation. This approach tends to be less effective in training students to interact, discuss, or collaborate in groups. As a result, students do not receive learning experiences that can optimally hone their social interaction skills (Alawiyah, 2017; Mulyani, 2015).

The RADEC (*Read, Answer, Discuss, Explain, Create*) learning model offers a potential solution to address this problem. The RADEC model is designed to integrate collaborative, exploration, and creativity-based learning activities relevant to the development of social interactions. In this model, students are encouraged to read as a first step in understanding the material, answer questions to practice individual understanding, discuss in groups to strengthen social interactions, explain *their* findings to build self-confidence, and create *innovative* learning products (Pratama et al., 2019).

Through the discussions and collaborations that are at the heart of RADEC, students have the opportunity to interact with each other, exchange ideas, and work together to complete assignments. These activities provide a space for students to develop interpersonal skills such as communication, empathy, and conflict resolution. Furthermore, RADEC also encourages context-based learning, where students learn to connect knowledge to everyday life, thereby increasing the relevance and meaning of learning (Fatimah et al., 2024).

However, despite the RADEC model's immense potential, its implementation in developing social interaction skills has rarely been the focus of research. Most RADEC applications focus more on improving cognitive learning outcomes, while the affective dimension, such as social interaction skills, is often neglected. This gap needs to be addressed through further research (Salma Ihsani Philrizki et al., 2024).

This research was conducted to integrate the RADEC learning model in order to develop students' social interaction skills. The focus of this research is to explore the extent to which the RADEC approach can improve students' skills in communicating, collaborating, and building positive relationships with their peers. With this comprehensive approach, this research is expected to make a real contribution to the development of learning strategies that not only improve cognitive learning outcomes but also shape students' social character.

Table 1.
GAP Analysis Identification

Component	Existing Conditions	Ideal Conditions	GAP
Understanding social interactions	Passive students, lack of self-confidence	Active, confident students	Lack of learning activities that train interpersonal interaction.
RADEC implementation focus	Focused on cognitive aspects	Combining cognitive and social aspects	The need to modify RADEC activities to support social interactions.
Social skills results	Not measured	Measured specifically	There is no evaluation tool for social interaction skills.

The gap analysis shows that the RADEC model has significant potential for developing students' social interaction skills, but requires adjustments in learning design, facilitator roles, and social skills assessment. By closing this gap, RADEC can become a holistic learning model, supporting students' academic and social development in a balanced manner.

It is hoped that the results of this research will serve as a reference for teachers and education practitioners in designing more holistic learning, where cognitive, affective, and social aspects can develop in a balanced manner. Thus, the implementation of RADEC will not only serve as an alternative learning model but also as a tool for producing an intellectually intelligent and socially mature generation.

Methods

This research uses a qualitative and quantitative approach, namely a combination or *mixed methods approach*, to analyze the application of the RADEC learning model (*Reading, Answering, Discussing, Evaluating, and Creating*) in developing students' social interaction skills (Creswell, 2012; Sugiyono, 2019). The qualitative approach allows for a deep understanding of how students interact during the learning process using the RADEC model, as well as for understanding the perceptions, experiences, and dynamics that occur in that context.

Meanwhile, a quantitative approach was applied to obtain data in the form of numbers or percentages that illustrate the level of success of RADEC in developing students' social interactions. This combination allows researchers to gain a more comprehensive understanding, as qualitative data provides context and meaning behind student interactions, while quantitative data provides objective evidence regarding the extent to which the RADEC model is effective in developing social interaction skills.

The research used was a qualitative descriptive study using the *Concurrent Embedded* or unbalanced mixture model (Azhari et al., 2023). This study aims to describe and analyze how the RADEC model can improve students' social interaction skills. Through this method, researchers attempt to understand the phenomena that occur holistically without focusing on hypothesis testing or statistical measurements.

Concurrent Embedded Model is a research model that combines qualitative and quantitative data simultaneously, but with different weights. In this study, qualitative data serves as the primary data, while quantitative data is used as supporting (secondary) data to strengthen the findings. Quantitative data is collected and analyzed through indexing and categorization according to quantitative principles, using a rating *scale* .

The research took place at FTK U IN STS Jambi which is located at Simpang Sungai Duren, Jambi Luar Kota District, Muaro Jambi Regency, Jambi. The population used in this study were PGMI students in the fifth semester. The sampling technique used was non-probability sampling with purposive sampling technique , which is a sampling determination technique with certain considerations (Putri, 2018) . The considerations that researchers need are: VG semester students who will take part in the learning process using the RADEC model.

Results and Discussions

1. Implementation of the RADEC Learning Model as a Form of Developing Students' Social Interaction Skills

Read, Answer, Discuss, Explain, and Create) learning model in developing the social interaction skills of PGMI students at UIN Sulthan Thaha Saifuddin Jambi shows a number of important findings that illustrate the effectiveness of this model in the context of 21st-century learning (Widodo et al., 2024) . Based on the results of observations, interviews, and analysis of learning documents, it appears that RADEC provides greater space for students to develop communication, collaboration, and social adaptation skills in the academic environment.

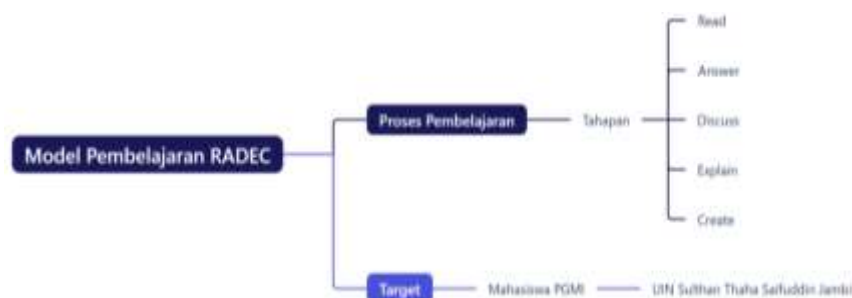


Figure 1. Implementation of the RADEC Learning Model

Further analysis revealed that the implementation of RADEC encouraged a more dialogic, active, and collaborative classroom atmosphere. Students were no longer passive recipients of information as in conventional learning models, but became active subjects constructing understanding through social interaction. This aligns with Vygotsky's social constructivism theory, which asserts that meaningful learning occurs through social activities, discussions, and scaffolding that encourage students to gradually build their knowledge. This theory emphasizes that learning occurs through meaningful social interactions (Kusumaningpuri & Fauziati, 2021).

Interviews with students showed that they felt more comfortable communicating with their peers after participating in RADEC. Many students stated that this model helped them overcome shyness, improve their ability to express themselves, and expand their social networks in class. Learning became more engaging because it involved varied activities and encouraged each student's contribution. The following are the results of interviews with PGMI students at UIN Sulthan Thaha Saifuddin Jambi:

"Previously, my interactions with friends during lectures were usually limited to casual discussions and were not very focused. After participating in the RADEC learning model, I became more accustomed to working together in groups, especially when exchanging ideas and expressing opinions. Group discussions and presentations made me more active in speaking and learning to listen to my friends' opinions. Support from my group mates also made communication feel more comfortable. In addition, through RADEC we are accustomed to expressing opinions in a good way and respecting each other's differences. Overall, RADEC learning helped me communicate more effectively and collaborate with my peers in lecture activities." (Interview with 5th semester PGMI UIN STS Jambi students, December 15, 2025).



Figure 2. Student interviews after carrying out the learning process using the RADEC model

As a lecturer in the PGMI course, I also experienced the positive impact of implementing RADEC. They found the classes more lively, interactive, and conducive to in-depth discussions. As a lecturer and researcher, I found it easier to identify students who needed support because all students demonstrated more open participation. Thus, RADEC became an effective pedagogical tool in creating a humanistic and dialogical learning environment.

In the context of developing students' social interaction skills, RADEC has been shown to improve several key indicators, such as communication skills, collaboration skills, tolerance, and initiative in participation. Each stage of RADEC contributes specifically to the development of these skills, making this model considered comprehensive in supporting social learning objectives (Kurniyati et al., 2025).

Furthermore, RADEC also positively impacts student literacy development, including reading literacy (Ulfa et al., 2024) , critical thinking literacy (Ilham et al., 2024) , and digital literacy through the *Create stage* (Meidya et al., 2024). This increased literacy contributes to students' ability to engage in more meaningful academic conversations, ultimately enriching the quality of social interactions.

Other findings indicate that students with lower initial abilities actually benefit most significantly from RADEC. They feel more supported by the group and have a fair opportunity to contribute. This impact boosts their self-confidence and engagement in class social activities. The RADEC model has proven to be inclusive and able to bridge the ability gap between students.

In this case, students of the Elementary Madrasah Teacher Education Study Program (PGMI) UIN Sulthan Thaha Saifuddin Jambi in the lecture process, they are expected not only to understand educational theory, but also to be able to apply innovative learning models that are relevant to the needs of the 21st century. In this study, the RADEC learning model (*Read, Answer, Discuss, Explain, Create*) This is done through a gradual process. The RADEC learning model process is as follows:

a. Read Stage

In the *Read phase*, students begin to develop social interaction skills through pre-learning activities that require them to read learning materials independently. This reading activity not only strengthens their understanding of article structure, journal style, and relevant study content but also opens up communication with their group mates. Students exchange summaries, clarify unclear sections of the material, and engage in light discussions about initial ideas emerging from the reading. This initial interaction lays an important foundation for their active engagement in the subsequent phases. Some of the materials used as a basis for reading include a PowerPoint presentation on scientific article writing, several examples of independently downloaded articles, and journal search procedures using various websites.

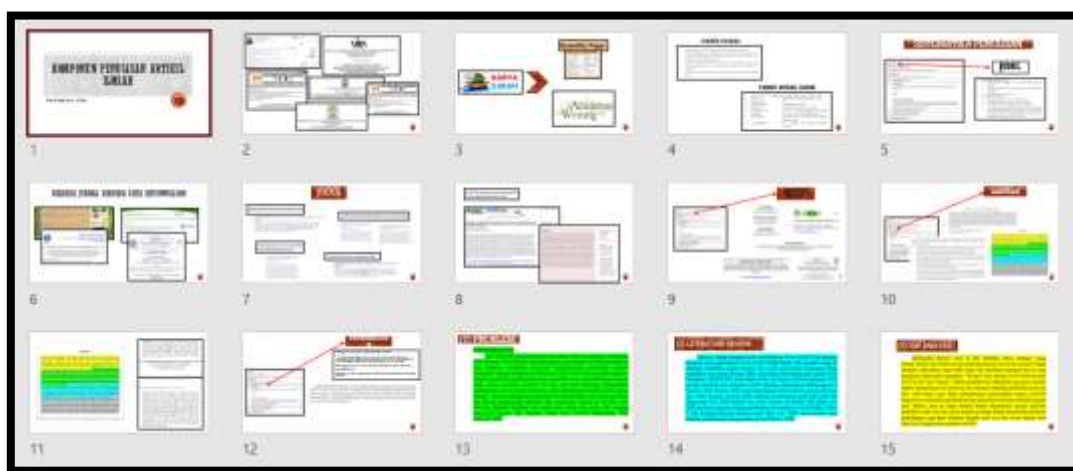


Figure 3. Powerpoint on writing scientific articles

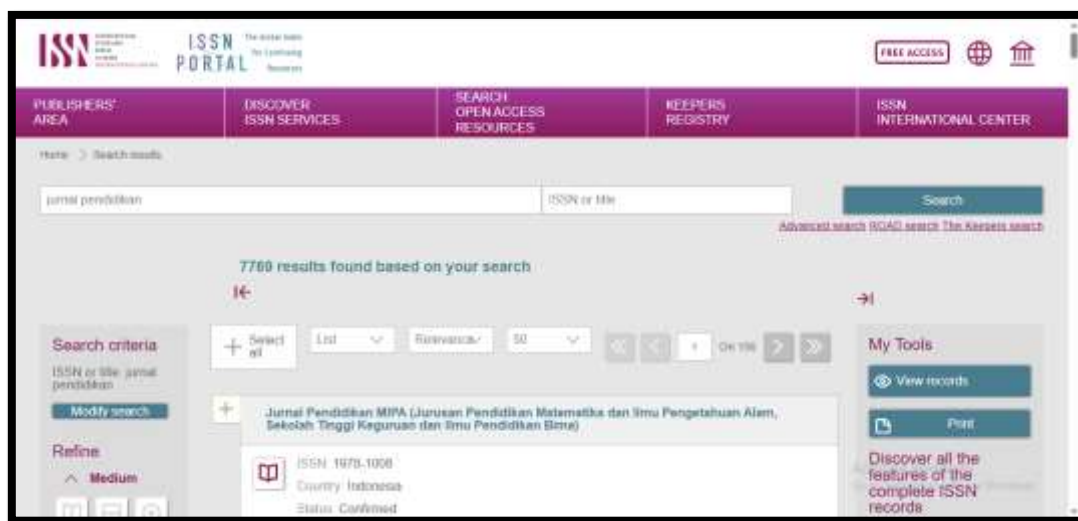


Figure 4. Searching for ISSN journals

Students are guided to develop a baseline understanding through reading materials specifically focused on writing scientific articles. PowerPoint presentations on scientific article writing were chosen as the primary source because they provide a systematic conceptual framework for article structure, academic language rules, scientific writing ethics, and journal publication procedures. This material serves as an important foundation for students to develop a unified baseline understanding before engaging in discussions and collaborative work.

In addition to PowerPoint presentations, students are also asked to access and read several examples of scientific articles from relevant journals. This activity aims to familiarize students with the academic culture and traditions of scientific publication at universities. Through reading articles, students begin to recognize the quality standards of scientific work, the journal's style, and the scientific argumentation patterns that characterize academic writing. This activity positions students not merely as readers but as potential writers of scientific articles.

Read phase is consciously designed to guide students toward the ultimate learning goal: the ability to produce publishable scientific articles. This aligns with the implementation of the Tri Dharma of Higher Education, particularly in the education and research aspects. Students are not only equipped with theoretical understanding but also trained from an early age to engage in research and scientific publication activities as part of the campus' academic culture.

Furthermore, through the reading process, students begin to prepare themselves for more mature discussions. Understanding the content of the reading encourages them to share ideas or initial impressions with their peers. This initial exchange of ideas also forms the basis for developing the article titles they will present at the beginning of the activity. Thus, the Read phase not only serves to enhance academic literacy but also serves as an initial means of establishing a shared understanding of the research theme and focus of the articles to be written.

During this stage, students are also trained to ask questions of their peers or lecturers, either directly or through class forums. These questions are a form of constructive social interaction because they demonstrate that students are actively seeking to understand the material more deeply. This ability to ask questions also helps them refine the concept and focus of the title of their upcoming article.

These statements are supported by observations of 28 students, which show that the implementation of the Read phase in the RADEC learning model provides very strong support for student learning readiness. A total of 86.43% of students rated the Read phase as very good, indicating that pre-learning reading activities can help students understand the initial material, the structure of

scientific articles, and the context of the studies to be discussed. This phase encourages students to come to class with prior knowledge, thus making the learning process more focused and meaningful.

This calculation comes from the formula $\text{Percentage} = (\text{observation score}) / (\text{total score}) \times 100\%$ which is then entered into the criteria for the level of achievement of the RADEC learning model implementation stage assessment, as follows:

Table 2.

Level of Achievement of the Assessment of the Implementation Stage of the RADEC Learning Model

No	Level of Implementation	Information
1	86-100%	Very good
2	76-85%	Good
3	60-75%	Enough
4	55-59%	Not enough
5	<54%	Less than once

Overall, the *Read stage* serves as a gateway for the emergence of students' social interaction skills and the development of article ideas. Through reading, summarizing, asking questions, exchanging insights, and discussing initial ideas for article titles, students learn that the social process of learning begins before they enter the classroom. This stage lays the cognitive and social foundation for moving on to the *Answer stage*.

b. *Answer Stage*

In the *Answer stage*, each student in the group is directed to answer the provocative questions given by the lecturer, such as: What is the focus of the research problem?, What method is used?, and How is the scientific article systematic? Individual answers to these questions form the initial basis for group discussion, while also helping students identify conceptual and technical difficulties in writing articles.



Figure 5. Learning Process Using the RADEC Learning Model *Answer Stage*

The process of answering these questions requires students to think critically and independently, while still allowing for academic collaboration through confirmation or brief discussions with group members. Before submitting answers, students often compare opinions, assess the relevance of arguments, and agree on certain concepts. This activity fosters individual responsibility before they actively contribute to group work.

In addition, students learned to organize their answers in written form or through concept maps/brief summaries, so that their ideas were conveyed clearly and structured. When there were differences in answers, students engaged in dialogue to find common ground without causing

conflict, building a healthy and collaborative social dynamic. This statement was supported by observations showing that 81.4% of students were in the good category. This finding indicated that students were quite capable of responding to pre-learning questions based on the reading material they had studied. The activity of answering questions independently trained students to express their initial understanding and identify parts of the material that had not been mastered. However, some students still needed further guidance to convey answers more analytically and in-depth.

Thus, the Answer stage not only hones students' cognitive abilities in understanding the material and preparing articles, but also strengthens their interpersonal communication skills, sense of responsibility, and readiness to actively participate in the Discuss stage.

c. Discussion Stage

The Discussion stage is the core of the social interaction skills development process in the RADEC model. In this stage, students discuss in groups to agree on the title and focus of the article, divide writing roles (introduction, methods, results, discussion), and harmonize understanding and resolve differences of opinion. This activity requires students to exchange opinions intensively, defend arguments, and collaboratively build new understanding. The dynamics of the discussion require them to actively listen, convey ideas clearly, and be assertive while still respecting their interlocutors.

Students learn to respond objectively to differing opinions without creating tension, enriching interactions drawn from diverse backgrounds and experiences. Furthermore, they develop intellectual empathy; for example, when they hear a friend struggling to understand material, they are compelled to help explain. This pattern of mutual assistance strengthens cooperation and social solidarity among group members, making discussions a space for the growth of shared values.

Discussions also train students to understand group dynamics, including role assignments, managing speaking time, and developing shared conclusions. These social skills are highly relevant for prospective PGMI teachers who will be required to facilitate discussions in elementary school classrooms. Lecturers act as facilitators, providing scaffolding if the group encounters difficulties, ensuring discussions remain productive and inclusive.

In the Discussion phase, students engage in intensive group discussions to focus and solidify the title of the article to be developed. This discussion begins with each student sharing their reading comprehension from the Read phase and their initial responses from the Answer phase. This discussion then continues with an exchange of ideas regarding the topic's relevance, the novelty of the issue, and the title's suitability to the research objectives and the scope of the intended journal. The title fixation process occurs through dynamic social interactions, where students share their opinions, provide academic reasons, and respond to title suggestions from other group members. Differences of opinion often arise, whether related to variable selection, research context, or title wording. However, through open discussion and logical argumentation, students learn to agree on a title that is considered most representative of the article's content. The following is a list of student article title fixations:

Table 3.
Fixation of Student Article Titles

Group No.	Article Title Name
Group 1	Thematic Learning in Elementary Schools: A Review of History, Concepts, and Principles as a Foundation for Learning Practice
Group 2	Deep Learning Approach in Thematic Learning of the Independent Curriculum: Comparison of Concepts and Implications in Elementary Schools
Group 3	Analysis of Learning Outcomes (CP) and Learning Objective Flow (ATP) in the Implementation of the Independent Curriculum in Elementary Schools
Group 4	The Role of Theme Mapping and Theme Networks in Supporting Inter-Subject Integration in Elementary Schools
Group 5	Analysis of Independent Curriculum Integration Strategies Between Subjects in Elementary Schools/Islamic Elementary Schools

Group 6	Designing Thematic Teaching Modules with a Deep Learning Approach in Elementary Schools
Group 7	The Role of Authentic Assessment in Implementing an In-Depth Learning Approach in Elementary School Thematic Learning
Group 8	Deep Learning Approach in the Development of Literacy and Numeracy in Elementary School Thematic Learning
Group 9	The Role of Differentiation in Thematic Learning to Accommodate the Diversity of Students in Elementary Schools/Islamic Elementary Schools
Group 10	Challenges and Solutions for Strengthening the Pancasila Student Profile in Thematic Learning in Elementary Schools
Group 11	Opportunities and Challenges of Integrating Local Wisdom into Thematic Learning in Elementary Schools
Group 12	Transforming Thematic Learning Based on Digital Technology with an In-Depth Learning Approach: Opportunities and Challenges in Elementary Schools
Group 13	Strategies for Integrating Islamic Values in Thematic Learning of the Independent Curriculum

In this stage, interpersonal communication and teamwork skills are highly evident. Students are trained to express ideas politely, respect the opinions of their peers, and accept criticism as part of the academic process. The lecturer acts as a facilitator, providing conceptual guidance to ensure the finalized title has a clear focus, measurable variables, and conforms to scientific writing standards. The Discussion phase received very positive feedback, with 86.07% of students in the excellent category. Observations showed that group discussions encouraged active social interaction, such as exchanging opinions, presenting arguments, and reaching consensus on shared ideas. Students learned to work collaboratively and respect differences in perspective among group members. This phase served as a crucial opportunity for developing students' communication and academic collaboration skills.

Thus, the Discussion stage not only serves as a space to consolidate the substance of the article but also serves as an important tool in developing students' social interaction skills. The resulting fixation of the article title is the result of co-construction of knowledge through dialogue, collaboration, and mutual agreement in RADEC-based learning.

d. *Explain Stage*

In the *Explain stage*, each group presents their draft article, argumentation, and adherence to the journal template to other groups or the class. This activity demands advanced communication skills, as students must convey information clearly, structured, and easily understood. The presentation process is a crucial tool for honing social interaction and academic communication skills.



Figure 6. *Explanation Stage*

Students presenting as presenters learn to manage their self-confidence, engage the audience, deliver arguments confidently, and respond to peer questions. Social interaction develops through question-and-answer sessions, where students must respond to feedback, questions, or constructive criticism openly and professionally, without becoming defensive. Lecturers provide academic reinforcement and clarification, ensuring the learning process remains focused and scientific.

Furthermore, the Explain phase strengthens solidarity within the group. Group members provide support, both through feedback before the presentation and appreciation afterward. This supportive pattern builds positive relationships, increases trust among students, and strengthens academic collaboration. Through this activity, students not only learn to explain the material but also build academic relationships through dialogue, collaboration, and mutual respect.

Explain stage serves as a crucial bridge to the Create stage in the RADEC learning model. Through presentations and academic dialogue, students receive direct, constructive feedback from both peers and lecturers. This input serves as a basis for collective reflection to improve the article's structure, argumentative clarity, and adherence to scientific writing standards and the target journal's template.

The social interaction established in the Explain stage does not stop with oral communication activities, but continues into the group decision-making process. Students collectively discuss the criticism and suggestions received, agree on necessary revisions, and divide roles in refining the article. This process requires the ability to work collaboratively, be open to the opinions of others, and share responsibility for the quality of the scientific work produced. In the Explain stage, 85% of students performed well. Observations showed that the presentation and Q&A activities trained students to convey ideas verbally in a more structured and confident manner. However, not all students demonstrated the same courage in explaining or responding to questions, so this stage still requires reinforcement, particularly in building self-confidence and academic communication skills.

Thus, the Explain stage serves as a conceptual and social foundation before students enter the Create stage. This stage ensures that the final product is not simply the result of individual work, but a reflection of collaborative processes, healthy academic communication, and meaningful social interactions within RADEC-based learning.

e. Create Stage

Create phase is the final stage of RADEC learning, encouraging students to produce creative products based on their previous learning. In this phase, students refine their articles based on discussions and feedback, then revise them according to journal standards and submit them to a scientific journal. The final product, a submitted scientific article, is the result of collaborative learning.

Create activities are conducted collaboratively, thus requiring strong social interaction skills. Students must divide tasks, coordinate, and work together to produce quality work. In this process, they learn to appreciate the abilities and competencies of each group member, synthesize ideas, and create a shared product.

The creative process also intensively trains communication skills. Students need to establish timelines, work collaboratively, and effectively convey criticism and suggestions when evaluating work before finalization. Being open to constructive feedback and criticism is a crucial part of learning, strengthening interpersonal communication and fostering a collaborative work culture.

Create stage represents the pinnacle of RADEC learning, where students not only discuss and develop concepts, but also produce tangible products. The social interactions that occur throughout the process, from idea to final project, are crucial for successful learning, while equipping PGMI students with collaborative and professional skills relevant to the world of education. The tangible products produced are scientific articles that have gone through a similarity check to ensure the work's originality, and have been submitted to scientific journals, as follows:

Table 4.
List of Student Submissions

Group No.	Turnitin Results	Journal Name Submission Location
Group 1	15%	Journal of Islamic Elementary Education https://e-jurnal.unisda.ac.id/index.php/mida
Group 2	26%	Basicedu Journal https://basic.org/index.php/basicedu
Group 3	21%	Elementary School Facilities https://journal2.um.ac.id/index.php/wsd/
Group 4	28%	Risalah: Journal of Islamic Education and Studies https://jurnal.faiunwir.ac.id/index.php/Jurnal_Risalah
Group 5	34%	Indonesian PGSD Journal https://journal.upy.ac.id/index.php/JPI
Group 6	31%	Al-Hikmah: Journal of Education and Religious Education https://ejournal.uniks.ac.id/index.php/Alhikmah/index
Group 7	27%	El-Bannar: Journal of Education and Teaching http://ojs.staibanisaleh.ac.id/index.php/ElBanar
Group 8	21%	Dikdik: Joint Journal of Educational Sciences https://jurnal.literasisains.id/index.php/DIDIK
Ex 9	36%	Bunayya: Journal of Elementary School Teacher Education https://jurnal.stit-al-ittihadiyahlabura.ac.id/index.php/bunayya/index
Group 10	13%	Judikdas: Indonesian Journal of Elementary Education https://etdci.org/journal/judikdas/index
Ex 11	32%	Curriculum: Journal of Education https://ejournal.iaingawi.ac.id/index.php/kurikula
Ex 12	21%	Adabuna: Journal of Education and Thought https://ejournal.uiidalwa.ac.id/index.php/adabuna
Ex 13	7%	At-Tanbih: Journal of Islamic Religious Education https://ejournal.staimmgt.ac.id/index.php/tanbih

In addition to producing tangible products, the Create stage of the RADEC model also emphasizes the importance of academic integrity through a similarity check process. This stage is crucial in ensuring that student work is truly original, free from plagiarism, and adheres to scientific writing ethics. Through this process, students not only learn to write but also understand the value of academic honesty and intellectual responsibility in producing scientific work.

The implementation of similarity checks in RADEC serves as an educational tool that builds student awareness of the importance of proper citation, correct paraphrasing, and ethical use of reference sources. This also trains students to be more critical and reflective about the quality of their writing before submitting it to a scientific journal. Furthermore, the scientific article submission process provides strategic benefits for both students and lecturers within the context of the Tri Dharma of Higher Education.

Create phase also achieved the highest results, with 88.93% of students in the excellent category. This finding indicates that students are able to integrate all RADEC phases to produce a tangible product in the form of a scientific article. The creation process encourages more intense collaboration, clear role allocation, and shared responsibility in completing assignments. This phase not only strengthens conceptual understanding but also develops students' professional skills relevant to the academic culture and the demands of the Tri Dharma of Higher Education.

Thus, the Create stage in RADEC is not only product-oriented, but also serves as an authentic learning platform that integrates communication skills, collaboration, academic ethics, and a culture of research in a sustainable manner. To clarify the comparison of achievements at each stage of the RADEC learning model, the results of the student questionnaire are presented in the form of a percentage graph as follows:

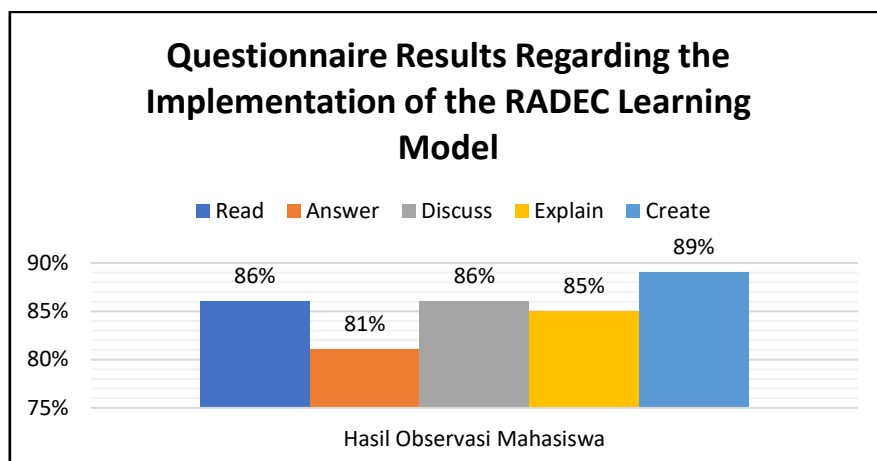


Figure 7. Results of Student Questionnaire Regarding the Implementation of the RADEC Learning Model

The graph shows that all stages of RADEC are in the good to excellent category, with percentages above 80% at each stage. The Create stage has the highest percentage, at 89%, indicating that students are most optimal in producing learning products through collaborative work. The Read and Discuss stages also show very strong achievements, at 86% and 86%, respectively, confirming that readiness for independent learning and group interaction are important foundations for successful RADEC learning.

Overall, the graph shows that the implementation of the RADEC learning model is able to create a progressive learning flow, where students' abilities develop gradually from cognitive readiness to the ability to produce scientific work. This statement is supported by the average results of the RADEC learning model implementation questionnaire which is in the good category at 85%. This data visualization also confirms that RADEC is effective in supporting the development of student social interactions, although mentoring strategies are still needed at certain stages to achieve optimal equality of student participation.

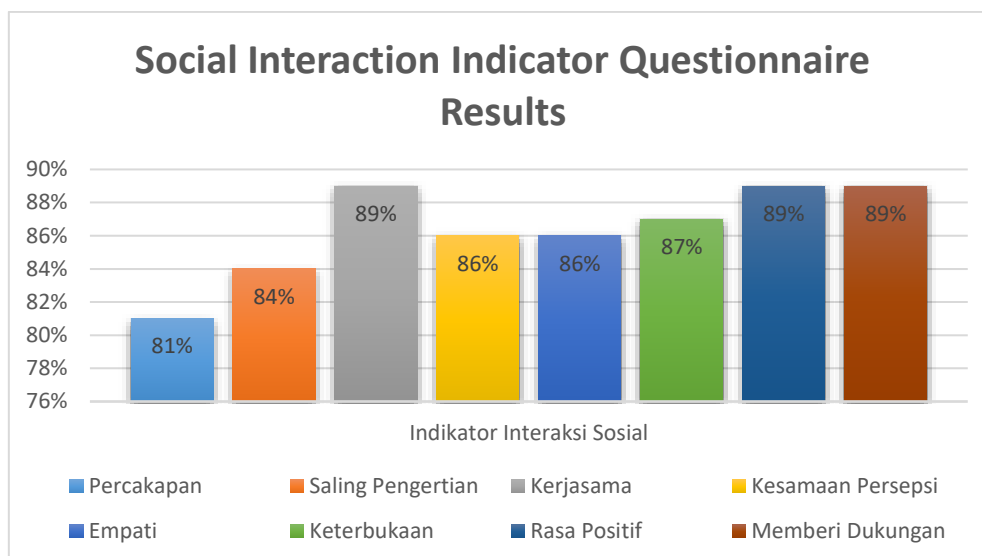


Figure 8. Results of the Social Interaction Ability Indicator Questionnaire

Based on the results of the student social interaction questionnaire presented in the Figure, it can be seen that all social interaction indicators are in the good to very good category, with achievement percentages ranging from 81%–89%. This finding indicates that the implementation of the RADEC learning model is generally able to support the development of social interactions of PGMI students. The "conversation" indicator obtained a percentage of 81%, which indicates that students are quite active in conducting oral communication during the learning process, although there are still some students who are not yet fully brave enough to express their opinions spontaneously. Meanwhile, the "mutual understanding" indicator reaching 84%, indicating that students are starting to be able to understand their friends' points of view and appreciate differences of opinion in group discussions.

The "cooperation" indicator showed the highest percentage, namely 89%, which indicates that students are able to work collaboratively in completing learning tasks. This high achievement is in line with the characteristics of the RADEC model which emphasizes group work in the *Discuss* and *Create* stages. Furthermore, the "common perception" and "empathy" indicators each obtained a percentage of 86%, which indicates that students are quite capable of aligning understanding and showing concern for the conditions and difficulties of their group mates. The "openness" indicator was at a percentage of 87%, which reflects the students' relatively open attitude in receiving input, criticism, and suggestions during the discussion and presentation process. In addition, the "sense of positive" and "providing support" both reached 89%, indicating a conducive learning atmosphere, mutual support, and full of trust between students.

Overall, the average score for the social interaction skills questionnaire was 86%, which is considered very good, indicating that the RADEC learning model positively contributes to the development of students' social interactions. The high scores on indicators of cooperation, positive feelings, and social support indicate that RADEC is effective in creating a collaborative learning environment. However, the relatively low conversation indicators indicate the need for further mentoring strategies to increase students' courage in communicating actively and equitably.

Conclusion

Implementation of the RADEC Learning Model as a Form of Developing Students' Social Interaction Skills that the RADEC learning model (*Read, Answer, Discuss, Explain, and Create*) in developing the social interaction skills of PGMI UIN Sulthan Thaha Saifuddin Jambi students shows a number of important findings that illustrate the effectiveness of this model in the context of 21st century learning. Based on the results of observations, interviews, questionnaires and analysis of learning documents, it

appears that RADEC provides greater space for students to develop communication, collaboration, and social adaptation skills in the academic environment. This statement is reinforced by the average results of the RADEC learning model implementation questionnaire which is in the good category of 85%. And the average results of the social interaction ability questionnaire are at 86% where this figure is included in the very good category which means that the RADEC learning model contributes positively to the development of students' social interactions.

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Acknowledgment

This research, entitled "Integration of the RADEC Learning Model in Developing Social Interaction Skills of PGMI Students at UIN Sulthan Thaha Saifuddin Jambi," was funded by the Litapdimas program of the State Islamic University of Sulthan Thaha Saifuddin Jambi. The author would like to thank the leadership of UIN Sulthan Thaha Saifuddin Jambi and all parties who have provided support, facilitation, and trust so that this research can be carried out well. Thanks are also extended to all respondents and related parties who have contributed directly or indirectly to the completion of this research.