UNNES JOURNALS

Kreano, Jurnal Matematika Kreatif-Inovatif
Volume 14, number 2, 2023, pp. 386-400

Exploring The Application of The Radec Learning Model (Read-Answer-Discuss-Explain and Create) in Improving Collaboration Skills of Low-Able Mathematics Students: A Case Study

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Abstract

Collaboration in learning mathematics is very important, in everyday learning the teacher does not settle for collaborative learning. At SMA TRI SUKSES itself the learning process is still only focused on the critical thinking skills of each individual student. So that the attractiveness of the students' mathematical abilities is still very visible. This study explores how a teacher implements learning interventions in the classroom and sees how students' abilities develop and looks at students' responses to applied learning. In this study I explored high school students in class XI SMA TRI SUKSES Lampung. - 34 male and female students, determined 4 students with the lowest mathematical ability to be observed and involved a teacher in the observation Using the RADEC learning model. Data collection was carried out through interviews, reflection on the teacher's journal, classroom observations, and learning observations by collecting data qualitatively using a purposive sampling technique in two trials. From the observation results, the application of the RADEC model was quite capable of helping students improve their collaborative skills, initially these low-ability students could only be silent and bowed during the collaboration process in learning, after the model was applied in a fun way and good motivation from the teacher and a group of students with low mathematical abilities seemed to have developed in their collaborative skills so that it affected students' mathematical and cognitive ability scores, which were originally an average of 76.75 and 79.5 to 80.25 and 82.5.

Keywords: RADEC; collaborative skills; intervention

Information of Article

Subject classification	*97C10 Comprehensive works on psychology of mathematics education*
Submitted	*7 June 2023*
Review Start	*9 June 2023*
Initial Review Finish	*9 June 2023*
Round 1 Finish	*22 June 2023*
Round 2 Finish	*9 July 2023*
Round 3 Finish	*7 August 2023*
Accepted	*7 August 2023*
Published	*1 December 2023*
Similarity Check	*7%*

Abstrak

Kolaborasi dalam pembelajaran matematika sangatlah penting, dalam pembelajaran sehari-hari guru tidak terpaku pada pembelajaran kolaboratif. Di SMA TRI SUKSES sendiri proses pembelajaran masih hanya terfokus pada kemampuan berpikir kritis setiap individu siswa. Sehingga daya tarik kemampuan matematika siswa masih sangat terlihat. Penelitian ini mengeksplorasi bagaimana seorang guru melaksanakan intervensi pembelajaran di kelas dan melihat bagaimana kemampuan siswa berkembang serta melihat respon siswa terhadap pembelajaran yang diterapkan. Dalam penelitian ini saya mengeksplorasi siswa SMA kelas XI SMA TRI SUKSES Lampung. - Siswa laki-laki dan perempuan sebanyak 34 orang, ditentukan 4 orang siswa yang kemampuan matematikanya paling rendah untuk diamati dan dilibatkan seorang guru dalam observasi tersebut. Menggunakan model pembelajaran RADEC. Pengumpulan data dilakukan melalui wawancara, refleksi jurnal guru, observasi kelas, dan observasi pembelajaran dengan pengumpulan data secara kualitatif menggunakan teknik purposive sampling dalam dua kali uji coba. Dari hasil observasi penerapan model RADEC cukup mampu membantu siswa dalam meningkatkan kemampuan kolaboratifnya, awalnya siswa berkemampuan rendah ini hanya bisa diam dan tertunduk pada saat proses kolaborasi dalam pembelajaran, setelah model diterapkan dengan cara yang menyenangkan dan motivasi yang baik dari guru dan kelompok siswa yang kemampuan matematikanya rendah nampaknya telah berkembang dalam kemampuan kolaboratifnya sehingga mempengaruhi skor kemampuan matematika dan kognitif siswa yang semula rata-rata 76,75 dan 79,5 menjadi 80,25 dan 82,5.

INTRODUCTION

From a didactic point of view in mathematics, learning difficulties or disabilities in mathematics are very important because they are related to educational inequality (Deruaz et al., 2020). Barriers to learning mathematics make it difficult to access and participate in various learning activities, therefore, teachers must find ways to support groups and give them equal opportunities to learn mathematics. This study is to introduce and show how interventions to support students with difficulties can help with learning difficulties in mathematics. This study focuses on developing 21st-century skills, namely student collaborative skills. collaboration skills are the skills of working together between two or more students to solve a problem by sharing responsibility, accountability, organization, and roles to achieve a common understanding of the problem and its solution Ahmad, 2018; Da Fonte & Barton-Arwood, 2017; Davis et al., 2018; Dooley & Sexton-Finck, 2017). In line with the opinion above, (Tuti & Mawardi, 2019) Collaborative Skills is a group learning process in which each member contributes information, experiences, ideas, attitudes, opinions, skills, and abilities to jointly improve mutual understanding among all members. Collaboration skills play a role in bringing people together to achieve a better life. Since the world is changing rapidly and thousands of people around us have different opinions and perspectives on different topics, students should familiarize themselves with these skills as early as possible.

The teacher explains material, students take notes, students ask if the material is not understood, the teacher gives assignments, and students read textbooks before the exam. Who knows this move? Yes, teachers must also be creative in using media, strategies, methods, and learning models, or to develop students' collaboration skills. Using various methods and models is more attractive to students because they can stimulate the learning process and can match student learning styles by absorbing learning material (Lestari et al., 2021; Unaenah & Rahmah, 2019). Seeing these problems Innovative learning models to instill and grow students' abilities. That's why it is proposed that the government use various foreign innovative learning models in learning activities. However, it is difficult for teachers to apply this learning model in practice. So that the learning process

does not change. the big one. Until now, Indonesia has not been satisfactory either in the fields of mathematics or science in nature and in the field of reading (Pratama et al., 2019). The results of comparative research in international forums indicate that so far there has been no learning that has been able to equip students with the various skills needed at this time. The results of the comparative studies also show the need for improvement in the learning process in Indonesia.

This research study was carried out at SMA TRI SUKSES, NATAR, LAMPUNG. This school was chosen after conducting discussions with the teacher who taught mathematics at the high school, where he experienced difficulties in improving his mathematical abilities at school. Previously students were taught using lecture methods and demonstration methods where the two methods are not sufficiently capable of helping low-ability students to be motivated towards the learning conveyed by the teacher in the classroom, so the teacher needs a method that will stimulate low-ability students' motivation so that they can pay more attention to the learning delivered in front of the class.

According to Sopandi (2019), the learning model from outside experts is an excellent learning model for the 20-21 century, but when applied in Indonesia it is sometimes not to the problems faced by education in Indonesia and the teaching staff will certainly have difficulty adjusting to the educational culture. which is applied to Indonesian students. Because Sopandi (2017) provides another alternative to the learning model and adapts more to the problems of education in Indonesia, namely the RADEC learning model *(read-answer-discuss-explain-create)* Sopandi et al (2019), argues that the RADEC learning model has certain learning characteristics that can strengthen not only conceptual understanding. These features include: 1). RADEC learning model can encourage Students actively participate in learning activities. 2) The Stimulating RADEC learning model independent learning in students. 3) RADEC learning model can contextualize something students know with what material they learn, 4) the RADEC learning model can connect what teaching materials are learned by applying them in real life, 5) the RADEC learning model emphasizes learning student-centered, creating active learning by asking questions, discussing, giving opinions and drawing conclusions related to the topic being studied,6) the RADEC learning model provides an opportunity for students before learning the task before learning to understand. First, study the material in depth.

Studies related to the application of the RADEC model have been carried out by a number of researchers recently, among the results of the research conducted, namely: the use of the RADEC model can increase mastery of the concepts of science subjects: the human breath (Setiawan et al., 2020), improve critical thinking skills in material the nature of light (Karlina et al., 2020) and in the Indonesian context (Pratama et al., 2019), improve creative thinking skills and higher order thinking in energy learning (Sopandi, 2017) and develop cooperation and communication skills (Sukmawati et al., 2020), Application of the Radec Learning Model in Designing Cultural Diversity Learning Activities in Grade IV Elementary Schools(Fuziani et al., 2021), the effect of the read answer discussion explain and create (radec) model on thematic learning on student learning outcomes moderated by learning motivation (Halim, 2022), radec as an Innovation Model of Islamic Religious Education Learning Post the Covid-19 Pandemic in Elementary Schools (Iwanda *et al*., 2022),

the radec learning model (read, answer, discuss, explain, and create) from the perspective of forming a Pancasila student profile(Sutantri et al., 2023)the application of the radec learning model to improving students' critical thinking skills(Yulianti, Lestari, Rahmawati, et al., 2022), A group learning process in which each member contributes information, experiences, ideas, attitudes, opinions, skills and abilities to jointly enhance mutual understanding among all members. (Pratama et al., 2020).

Some of the studies above show that the RADEC model is very effective in increasing mastery of concepts, as well as critical and creative thinking skills in developing cooperative and communicative attitudes in students. However, this research has limited research conducted only on certain subjects at the elementary level, therefore this study will explore the application of the RADEC learning model to class XI high school students in developing their collaboration skills.

The following is RADEC. learning model syntax (Pratama et al, 2019) namely:

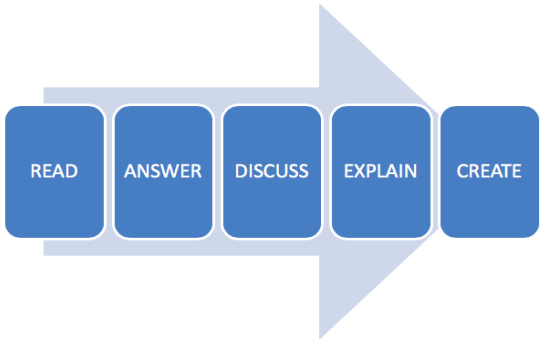

Figure 1. RADEC learning model syntax.

The steps in the RADEC learning model as follows (.

Table 1. RADEC modeling steps

Learning Stage Activity	
READ/read	
Educator	Learners
1. Equipping students with questions that are appropriate to the material to be studied at the upcoming meeting.	1. Exploring information from various sources, both books and print sources such as via the internet.
Answer	
1. monitoring and motivating students toreading and doing Assignments	1. answer learning Questions
Discuss	
1. Motivating students who are successful in carry out certain tasks to guide friends who didn't get it. 2. Motivate students who have not mastered to ask a friend or teacher. 3. Ensure communication between participants educate 4. Look at the group or who hasn't master the concept being studied.	1. Discuss in groups Answers to statements or assignments that have been worked on or discussed to the teacher.
Explain	
1. Confirm what the presenter explained correctly (if group work) and the teacher himself scientifically and all students understand that explanation. 2. Encourage other students to ask questions, refute, or add to what is already delivered by his friend and argued what was explained by the teacher. 3. Explain the essential concepts that have not been able to Mastered by students.	1. Students explain the Concept essential skills that he has mastered in front of the class or arguing directly with the teacher
Create or create.	
1. Inspire students to tell stories creative ideas or thoughts 2. Guiding students to realize ideas creatively, make reports and report them	1. Discuss creative thinking what they have thought about independently or with friends 2. Discuss ideas to Realize Right, make a report and report it

METHOD

This research uses a case study design study to collect relevant qualitative data. This case study study was chosen because the researchers wanted to investigate whether the syntax of the RADEC model used had an impact on low-performing students, especially when learning mathematics. This research was conducted on class XI students of SMA TRI SUKSES, NATAR, LAMPUNG. A two-tried purposive sampling technique was chosen where Merriam and Tisdell (2016) stated that qualitative case studies require purposive sampling at two levels when it comes to general questions whose interests are illuminated by an in-depth study of specific events. In this study I screened students of class XI IPS, which consisted of 17 male students and 34 female students. these students obtained 4 students with the lowest average cognitive abilities and skills, namely:

Table 2. Cognitive abilities

Name	Average Value	KKM	Another average friend
S1	77	75	80
S2	77	75	80
S3	76	75	80
S4	77	75	80

Table 3. Students' mathematical skills

Name	Average Value	KKM	Another average friend
S1	80	75	82
S2	80	75	82
S3	78	75	82
S4	80	75	82

By observing students who have cognitive abilities and mathematical skills, it turns out that we can see how the collaboration skills of these students either collaborate with the teacher or with other friends because collaboration skills are one of the supporting factors for success in getting good grades in cognitive skills and students' mathematical skills.After determining the students with the lowest average results or scores, then asking for collaboration with the homeroom teacher who handles these students, by collecting data through interviews, journal reflection and observing the worksheets of the four students and conducting class observations to see the collaborations carried out by the four students with other friends.The purpose of this study aimed to explore the use of the RADEC learning model on the development of cooperative skills of the weakest students and to explore the impact of using the RADEC learning model and exploring Solve or answer the following research questions: (1) How do teachers apply the RADEC learning model in the mathematics learning process? (2) Can the RADEC learning model develop the collaboration skills of students with the lowest mathematical abilities?

Data collection and analysis data for three weeks of intervention. We checkReflection on the teacher's journal, observing the process of learning activities, observing low-ability student worksheets, triangulation with lesson observation data and In-depth interviews to ascertain the influence of the RADEC learning model. Reflection on this journal used as the primary data of this study the class teacher wrote his journal reflection after he did lesson. Anecdotal notes and pictures taken during observation. Data sources are very important to see interactions between students and their progress in learning. After class observation, in-depth interviews were conducted to enable the teacher to do so to reflect on his experiences implementing the intervention and to explore his perceptions of the learning methods used.

Data from journal reflections, interview transcripts, and anecdotal notes were analyzed. Categories are made

based on indicators that emerge from the considered journal entries relevant to the research question. In the second step, interview data transcribed from anecdotal records. In the third step, data from the teacher's reflective journal, interview transcripts, and anecdotal notes of class observations compared and observed. In the final step, we evaluate the reliability of the theme by re-reading and re-analyzing the concept of learning methods to ensure the accuracy of the findings.

Data Collection and Analysis

The data were obtained from the results of in-depth interviews with Mrs.AN, looking at the results of the curriculum assessment that had been carried out by Mrs. Ani, observing class learning, seeing the work of the four students with low abilities, then triangulating the learning data and interviews.

After seeing the results of interviews, observations, and the work of the four students, then carry out relevant analysis in the application of the RADEC learning model and try to carry out the steps in implementing the learning model. The learning intervention using RADEC is carried out with several themes of learning mathematics and looking back at the results. interviews and observations were made of Mrs. Ani and the students as well as class observations to see if there were any new questions in applying the model. The RADEC learning model intervention process was carried out for 6 mathematics learning meetings at school.

RESULTS AND DISCUSSION

Results

After conducting various analyses new questions arise, namely: (1) Is the RADEC learning model suitable for low-ability students to improve their collaboration skills among other students who are far more active than the four students?

At this stage or section, the focus will be on the teaching process that will be performed by Ms. Ani by applying RADEC learning model. Describing the case and clarifying how she applies the steps in the RADEC learning model in class, it mainly focuses on students with mathematical abilities.

The results of the research at this stage are to answer questions in research problems with RADEC modeling which focuses on the mathematical development of low-ability students in some mathematics subject matter with five stages specifically: Read-Answer-Discuss-Explain-Create

Read

At the reading stage the teacher orders to read about the math material that will be studied at the next meeting, namely derivative, exponential, and logarithmic material,teacher encourages or motivates students independently to look for a case study design study to collect relevant qualitative data for the next lesson where at this stage all students are instructed to look for lesson profiles with predetermined themes either from books or other print media and by utilizing the internet. After the students have read, at the next meeting, reflect on the material they were assigned to read.

Help students understand information provided in pre-course questions. The pre-instruction questions are questions related to the topic. Preschool questions should include a variety of questions from low to high thinking skills According to Pratama (Pratama *et al*, 2019).The lesson, questions are asked before the teacher completes the learning based on the teaching material.Students must an-

swer the questions after reading practice. Students carry out reading activities independently outside the classroom. It is based on the idea that students can master some information on their own and without the help of others. Subject matter that is not yet known to students can be explained to other students or the teacher can explain it during learning.

Answer

In this step students answer questions about preschool education from the teacher. The developed pre-learning questions incorporate concepts from topics presented in students' reading materials during the reading phase. The teacher encourages students to answer pre-class questions based on the information obtained at the reading stage(Yulianti, Lestari, & Rahmawati, 2022). The teacher's preliminary questions are used to develop students' understanding of the reading and concepts being taught, allowing students to provide simple explanations (primary explanations) about the topics read and explained. A simple explanation (basic explanation) is an indicator of critical thinking skills. Also at this stage, students practice cultivating Spontaneity and autonomy in finding answers from the sources they are reading (Setiawan et al., 2020). In addition, using these study questions, teachers can collect, and rank concepts based on students' answers, giving them an idea of how well they know. (Lestari & Widodo, 2021).

In the answer stage, usually, after students have read and searched for the theme of the material given by the teacher, which was carried out independently outside of school, they will answer the questions that were given at the previous meeting, then they will answer on a worksheet and the teacher will see how far their knowledge of material to be studied. During the observation of this study, I asked Ibu Ani to ask students to answer questions in turn facing the teacher, because to be able to see the interactions and activities of low-ability students in answering questions. So, at the answer stage, Ibu Ani asked students to answer the questions randomly by lining up in front of the class according to the theme of the material given the previous week.

At this stage, Mrs. Ani asked students to state their search results by reflecting on the results of their searches outside of school on the mathematics subject matter to be studied and answering questions that had been made according to the students' searches that they had made in the worksheets. This also aims to motivate students with low abilities so they can be active and independent in the learning process, so they are not left behind with other friends.

Figure 2. Students answering questions

When interviewing Ibu Ani in this process, she explained:

"at this stage before starting the lesson, I made a game by asking questions according to the theme that I had conveyed in the previous meeting (namely reading and studying the material according to the read stage). I did this according to the stages in the RADEC learning model to see where knowledge of students, especially students who are identified with low ability in mathematics, namely where students who can answer correctly will get a reward at the end of learning.

Mrs.AN further explained:

"The students looked very excited about what I was saying, as well as the 4 students who were studied with low mathematics abilities. However, if you pay attention, if the other students are excited and even want to start the game immediately, the four students tend to be shy in their expressions and deliver the answer."

At the answer stage, the method that has been applied by Mrs.AN is enough to make students more motivated in finding out or reading the material to be studied. Not only does it affect students with good math skills, but it also has a positive impact on students with low abilities. Of the four students who were previously in the learning process before the application of the RADEC model who tended to be more silent and only listened to their other friends, after being required to participate in answering questions these students showed progress in interaction. tend to be afraid when answering the questions given. This is very good for the next learning process were increasing the motivation of the teacher and his friends and giving the same room as other students will certainly greatly help improve the collaboration skills of these low ability students.

Discussion

During at this point, students discuss the answers to questions in groups. At this point, students can discuss their answers with other members of the same group. At this point, the teacher must ensure that there is an exchange between the students in each group to get the correct answer. By observing the group's activities, teachers also find out which groups do well in the subject they are studying. This also allows the teacher to find out which group or groups have creative ideas to apply concepts being studied (Pratama *et al*, 2019). The teacher divides students with different cognitive abilities into groups of smart, active, passive, and thrifty students. The teacher is all students in the group participate in the discussion.In the discussion stage, students' knowledge and thinking skills are further trained and developed. This phase stimulates indicators of critical thinking to build basic skills (basic support) and draw conclusions (Satria & Sopandi, 2019).

The group discussion process is not only carried out in the classroom as well as outside the classroom, but this is also intended so that students can further explore their creative ideas in solving the problems of the material to be worked on. During the discussion process students can not only discuss among themselves in groups only but also can discuss directly with the supervising teacher regarding the obstacles in the problem solving process.

In the discussion process, Mrs. AN divided the groups based on gender because she considered the comfort of low-ability students who sometimes still looked confused and shy and combined with students who certainly had different characters so that the discussion process was more continuous, and it could be seen

how students' collaboration skills developed. Gender grouping was carried out. with the psychological considerations of students, where students at their age tend to have sensitive feelings when they must deal with the opposite sex so they are afraid that increasing their motivation in arguing during discussions will hinder. Because sometimes teenage students when dealing with the opposite sex feel awkward.

When we made observations when the discussion process was carried out, we saw how the collaboration skills of each group that had been made, there was still a very visible gap between students who actively interacted and students who only listened quietly.So that with the above conditions these students need growth motivation, where growth motivation or metaneeds encourages students to realize their potentials(Meliala, Timoteus S.; M.Sastrapratedja,supervisor;Soerjanto Poespowardojo,1988).At this stage, it can be seen that low-achieving students find it difficult to show their contribution from their point of view. In fact, when given their motivation to answer questions about derivatives, they seem ambiguous and tend to fear being wrong. These children who are bad at math often keep their heads down and smile only when talking to other children in the class. These children must be motivated first so that they want to give their opinion and the encouragement of their peers to want to speak up in the discussion.

Figure 3. during the student discussion process

Because there are still visible gaps in the discussion process, Mrs. Ani tries to Encourage students to read and complete the assignment. Encourage students who succeed on specific tasks to mentor their unsuccessful friends, motivate students who do not master to ask their friends or the teacher, ensuring communication between students, and paying attention to groups or those who have not mastered the concept being studied so that each student's collaboration skills are successful and work properly and forcing low-ability students to want to participate in the discussion process.

After the motivation was given to these students, we could see developments in the discussion process where students who were initially more interactive provided motivation and space for students who seemed hesitant to convey ideas of course in a friendly way so that these students would not feel pressured and give appreciation for the ideas he has conveyed. So that communication in discussions runs continuously and group collaboration goes well.

After learning we interviewed Ani's mother regarding this discussion process:

"During the discussion process I formed groups with various abilities and characteristics of students, to see collaborative interactions between groups. At first, the individual student tendencies were far more prominent than the collaboration of each group, but after being motivated to work together and motivating students who seemed to only be silent to participating it turned out that the discussion ran smoothly and was able to find ideas in solving material problems in mathematics and of course taking into account student psychology so that the delivery of ideas was not pressured and of course fun for all students."

At the discussion stage by motivating students to collaborate with each other it turned out to be enough to help students slowly improve their students' collaboration skills, especially the four students who had low ability scores. , after being motivated and appreciated by other friends, the two students looked doubtful and shy just like they were holding answers. However, the other two students developed quite well by showing collaborative interactions, even though it was still in a very minimal portion.

Explain

At the explain stage, students are given the opportunity to demonstrate the results of their discussions related to the learning theme material provided by the teacher. Here, representatives of students who have studied indicators of learning explain key concepts to the class. In this activity, Teachers also provide that the instructor's causes are scientifically correct and accepted by other students. In this activity, the teacher also encourages other students to ask questions and debate or complement the words of their friends from other groups and help friends who are presenting prepare the required components. At this stage, the teacher can also use it To explain important concepts that not everyone understands. The student specified in the discussion step. When explaining, teachers can explain with illustrations, videos,

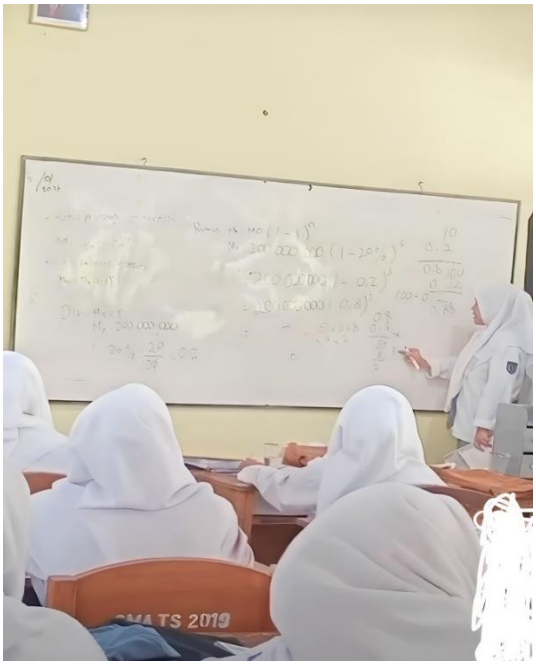

Figure 4. when students demonstrate the results of the discussion

When carrying out the demonstration results of the discussion I analyzed the role of students with low mathematical abilities, where the development of collaboration which was shown from the interaction during the presentation process was developing quite well. In which, these students who were initially afraid, doubtful, and seemed shy began to open and are willing to speak out in conveying the results of their discussions and are willing to help their friends who are demonstrating in demonstrating and answering questions from other group mates even though their answers are still very minimal and sober. However, here it can be seen where with a good motivational approach, collaboration between students and teachers who do not show favoritism is enough to help low-ability students to develop in improving their collaboration skills. In fact, not only developing collaboration skills, at this stage it turns out that

students' cognitive abilities and mathematical skills show quite good changes.

Create

At this stage, teachers help students learn how to use the acquired knowledge to develop ideas or creative thinking. Creative thinking can be formulated as questions and problems, or productive thoughts about the creation of other creative works. As in the previous read and answer stages, pre-class questions are about generating creative ideas or thoughts for students after independently studying the material provided. Inspiration provided by teachers can come as examples of research, problem solving, or other work done by people. They then discuss more creative ideas they can add and implement. As an additional source of inspiration for students, teachers can give examples of creative plans that neither they nor others realize, depending on the type of development, ideas can be implemented. Present alone or in a group. Because of the original idea, this job is theoretically more difficult for students, in addition, the idea can be implemented successfully or unsuccessfully. Moreover, the implementation of the idea can be inside or outside the classroom, it can be short or long. During this point, dominant students are trained to think, work together, and communicate. He learns to find creative ideas, implement ideas, plan implementation, implement plans. Due to original ideas, this work is theoretically a greater challenge for students, besides, ideas can be implemented successfully or unsuccessfully. Moreover, the implementation of ideas can be done inside or outside the study hall and can be short or long. At this point, dominant students are trained to think, collaborate, and communicate. He learns to find creative ideas, execute ideas, plan execution, and behead plans. Because of the original idea, this effort is theoretically a higher challenge for the student, and the implementation of the idea can be successful or unsuccessful. Moreover, the application of intelligence can take place inside or outside the classroom and can be short-term or eternal. At this stage, dominant students are trained to think, participate, and communicate. He learns to find creative ideas, implement ideas, plan implementation, implement plans.

At the create stage, Ani tries to ask her students to implement their creative ideas in groups to see the further development of low-ability students in exploring their collaboration skills and to see the progress of these students in understanding mathematics learning.

Table 4. The value of students' cognitive abilities and mathematical skills after applying the RADEC model

Name	Students' cognitive value Before deployment the RADEC model	Students' cognitive value after implementation the RADEC model	Skill value Students before the What are the RADEC models	Skill value Students after the what is the RADEC model
S1	77	80	80	82
S2	77	81	80	82
S3	76	80	78	82
S4	77	80	80	84
	76,75	80,25	79,5	82,5

Figure 5. Students explain the results of creative ideas in learning mathematics.

In this last stage, quite good developments were carried out by students of

class XI IPS SMA TRI SUKSES, students were able to demonstrate their collaboration skills quite well, starting from compiling creative ideas that had been designed and poured into an application or media. It is also very expected that the four students with the lowest mathematical abilities can be seen starting to be able to interact and participate quite well in composing creative ideas. This was also conveyed by Ms. Ani during the interview session:

"It's really very proud when I see all my students can interact and collaborate quite well in compiling creative ideas in solving problems in mathematics, of course this learning model in my opinion is quite relevant to be applied to my students because it is continuous with the learning problems that I face."

After all the steps for implementing the RADEC learning model are implemented by considering the results of observations, interviews, and developments in the value data of students with low ability in mathematics after applying the RADEC learning model as follows: from the data above, we can conclude that improving students' collaboration skills using the RADEC learning model can actually play a role in improving the cognitive abilities and mathematical skills of students who initially have low scores or mathematical abilities.

Discussion

in this study the application of the RADEC learning model can improve students' mathematical collaboration skills, where increasing student collaboration skills also affects students' cognitive abilities and mathematical abilities, where the scores of low-ability students are initially only at 76.75 points to 80, 25 as well as points and 79.5 becomes 82.5.

ompetence collaboration is the ability to work together and share responsibilities and roles to achieve common goals related to a problem and its solution (Davis et al., 2018; Fitriyani et al., 2019). In the learning process, students must have collaborative skills because they are useful for supporting learning (Ulhusna et al., 2020). Students with collaborative skills may simultaneously make individual contributions at different times or in different places, or separately from other group members (Falcione et al., 2019).

In this study, after all stages of the RADEC learning model were applied in improving students' collaboration skills, the design of this model must have specifications for more accurate implementation steps, because when conveyed to educators regarding the application of this model we have to re-design how the learning process takes place in accordance with The steps given. This study also found that in the discussion stage educators must have a motivational design that will build their students' collaboration skills by considering the psychology of low-achieving students when expressing ideas and creative thinking and motivating and monitoring other students so they can collaborate and help guide students who do not understand the concepts being studied.

Implication

In subsequent research with the use of the radec learning model, especially the application of learning to high school students, consideration of student character and problems in learning must certainly be given more attention, because where every step in this learning model every student is required to be initiative and collaborative in solving problems and creating creative ideas in completing the tasks

given. Thus, data collection techniques using two-tried purposive sampling are one technique that is suitable for use, because researchers can detect certain implications in students before the learning model is applied so that the results, we expect at the beginning of the study are appropriate.

Limitation

In this study, of course, there are still many limitations, such as the sample size and research focus which is still relatively narrow, and the processing and observation of the data used is still not optimal and the constraints of student psychology in interactive which of course must make the planning process of implementing RADEC modeling must be more creative and innovative when applying the learning model. However, if all steps can be carried out properly, of course, this modeling has the potential to develop students' collaborative skills.

CONCLUSION

Applications of the RADEC learning model to high school students with low abilities can stimulate collaborative interactions if the steps are implemented according to design and apply them innovatively. The RADEC learning model can be one of the solutions that can be applied by teachers to improve their students' mathematical abilities, because this model is designed according to with the problems faced by the learning system in Indonesia. The most important consideration is when the implementation of this model can stimulate students' interest in participating in learning, and the steps contained in this model can create abilities evenly among students, where students are required to communicate with each other and collaborate to create creative ideas when solving problems in mathematics.For the development of students who initially had low abilities, with application of the RADEC model improve their collaboration skills, it turned out that with discussions in the modeling students' collaboration skills improved quite well. The thing that was worried about when doing the analysis at the beginning of the study was that these low-ability students it will actually be retarded by other students who are more interactive in fact it can be handled with the motivation given by the teacher and friends, which of course is fun motivation without being cornered.The thing that was feared when doing the analysis at the beginning of the study where these low-ability students would actually be retarded by other students who were more interactive could in fact be handled with the motivation given by the teacher and their friends, which of course was fun motivation without being cornered.The thing that was feared when doing the analysis at the beginning of the study where these low-ability students would actually be retarded by other students who were more interactive could in fact be handled with the motivation given by the teacher and their friends, which of course was fun motivation without being cornered.

By developing the collaboration skills of these low-ability students, it also improves their scores on their cognitive abilities and mathematical skills. Of course, this case study research still has many shortcomings, given the limited sample size and very narrow research focus. However, the implications of the question "*Is this learning model able to improve the collaboration skills of students with low abilities?*"From the case studies conducted, this learning model has the potential to improve the collaboration skills of low-ability students in high school.

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