

## CLASSROOM DISCOURSE ANALYSIS IN DIDACTICAL DESIGN OF LINEAR EQUATIONS IN ONE VARIABLE: THE DEVELOPMENT OF STUDENTS' CRITICAL THINKING SKILLS

Tina Yunarti<sup>1</sup>, Jihan Tama Farasiska<sup>2</sup>, Niki Pujarwati<sup>3</sup>, Santy Setiawati<sup>4</sup>

<sup>1,2,4</sup> Universitas Lampung, Indonesia

<sup>3</sup> SMPN 26 Bandar Lampung, Indonesia

[tina.yunarti@fkip.unila.ac.id](mailto:tina.yunarti@fkip.unila.ac.id)

**ABSTRACT** This study aims to analyze classroom discourse within the didactical design of linear equations in one variable, focusing on the development of students' critical thinking skills. The research employed a qualitative approach with an evaluative design. The main participants consisted of one mathematics teacher and 12 seventh-grade students (class VII-1) from a public junior high school in Bandar Lampung during the first semester of the 2024/2025 academic year. The students were grouped according to their mathematical abilities into high, medium, low, and mixed categories. Based on secondary data, the majority of the class consisted of students with low academic ability. Data were collected through observation, interviews, and documentation, while validity was ensured using triangulation techniques. Data analysis was conducted in three stages: data condensation, data display, and conclusion drawing and verification. The findings indicate that (1) the most dominant form of classroom discourse produced by students was questions and answers, highlighting the importance of designing learning activities that facilitate complex questioning and answering to support the development of students' critical thinking skills; (2) the most frequently observed indicator of critical thinking in classroom discourse was evaluation; and (3) students with medium-level mathematical ability were the most dominant in generating classroom discourse, which was influenced by factors of comfort.

**Keywords:** classroom discourse, didactical design, linear equations in one variable, critical thinking skills

**ABSTRAK** Penelitian ini bertujuan untuk menganalisis classroom discourse dalam desain didaktis persamaan linear satu variabel, dengan fokus pada pengembangan kemampuan berpikir kritis siswa. Penelitian ini menggunakan pendekatan kualitatif dengan jenis penelitian evaluatif. Partisipan utama terdiri atas satu guru matematika dan 12 siswa kelas VII-1 di salah satu SMP negeri di Bandar Lampung pada semester ganjil tahun ajaran 2024/2025, yang dikelompokkan ke dalam kategori kemampuan matematis tinggi, sedang, rendah, dan campuran. Berdasarkan data sekunder, kelas ini sebagian besar terdiri atas siswa dengan kemampuan akademik rendah. Data dikumpulkan melalui observasi, wawancara, dan dokumentasi, sedangkan keabsahan data diperiksa melalui teknik triangulasi. Analisis

data dilakukan melalui tiga tahapan, yaitu kondensasi data, penyajian data, serta penarikan dan verifikasi kesimpulan. Hasil penelitian menunjukkan bahwa (1) bentuk classroom discourse yang paling dominan ditunjukkan siswa adalah questions dan answers, yang mengindikasikan pentingnya perancangan aktivitas pembelajaran yang memfasilitasi interaksi tanya jawab kompleks untuk mendukung pengembangan keterampilan berpikir kritis siswa; (2) indikator berpikir kritis yang paling sering muncul dalam classroom discourse adalah evaluasi; dan (3) kelompok siswa dengan kemampuan matematis sedang menjadi yang paling dominan dalam memunculkan *classroom discourse*, dipengaruhi oleh faktor kenyamanan.

**Kata-kata kunci:** classroom discourse, desain didaktis, persamaan linear satu variabel, kemampuan berpikir kritis

## INTRODUCTION

Mathematics learning has a very important role in building students' critical thinking skills (Arisoy & Aybek, 2021), where a proper understanding of mathematical concepts serves as a fundamental prerequisite (Pahrudin et al., 2021). However, various studies have shown that many students experience obstacles in understanding mathematical concepts, especially in the material of Linear Equations in One Variable (PLSV) (OECD, 2019). For example, students find it difficult and confusing to distinguish between coefficients, variables, and constants. Students also have difficulty when equating both sides of PLSV (Ariansyah et al., 2021). This difficulty is often caused by the lack of meaningful interaction in the classroom (Ayuwanti et al., 2021) and learning activities that do not motivate students, especially students with low mathematical skills (Azmidar et al., 2017). Therefore, more effective learning is needed, built through appropriate learning design and conducive classroom interaction based on classroom discourse.

Classroom discourse is a component of learning that includes teacher-student interaction and student-student interaction (Gonzalez, 2008). These interactions are conversational interactions between all participants that occur throughout the learning (Llyod et al., 2016). This classroom discourse includes various aspects, such as questions (Çelik Demirci & Baki, 2023), arguments, and reflections (Wang, 2015) that occur during the learning process. Through discourse, students have the opportunity to ask questions, explain their thinking, and criticize solutions provided by classmates and teachers (Hardman & Hardman, 2017). This is in line with Vygotsky's (1978) view which emphasizes that social interaction, including classroom discourse, plays a key role in students' knowledge construction. By understanding the interaction patterns in the classroom, teachers can adjust the teaching approach to be more inclusive and encourage all students to participate (Andiani et al., 2024). To understand interactions during the learning process in the classroom, teachers can use one approach known as classroom discourse analysis.

Classroom discourse analysis is an approach to analyzing classroom interactions that focuses on the interaction of teacher with students and students with other students (Tsany et al., 2024). Classroom discourse analysis has tremendous potential

to provide insights into classroom learning practices (Wagner, 2004). By analyzing the classroom discourse that occurs in their classroom, teachers can identify and address teaching problems, such as teaching strategies, materials, media, and classroom management (Sari et al., 2023). Thus, it is clear that analyzing classroom discourse is important in the classroom learning process, especially for a teacher to know what steps to take in order to improve the quality of learning in the classroom. Although classroom discourse analysis is very important in the learning process, in reality, teachers tend not to pay much attention to the classroom discourse that occurs in the classroom. This is consistent with what happened at at one of the state junior high schools in Bandar Lampung. Based on the results of interviews with mathematics teacher in class VII-1 at the school, it is found that teachers tend not to pay attention to the process of student interaction in the classroom, especially the interaction when students discuss in groups. The teacher focuses more on delivering the material and ensuring that students have done the assigned tasks.

Teachers can analyze classroom discourse if classroom discourse in the classroom can be generated. Effective classroom discourse can emerge when teacher engage students in meaningful discussions (Walshaw & Anthony, 2008). A meaningful discussion in which students question, analyze, and evaluate every statement involved (Sholikhah & Syah, 2024). When considered from the previous sentence, there are three important keywords in a meaningful discussion, namely questioning, analyzing, and evaluating. These three keywords are in line with the definition of critical thinking skills. Paul & Elder (2006) argue that critical thinking is the art of analyzing and evaluating thoughts with the aim of improving them. Critical thinking allows students to view a problem from various directions, question arguments, and draw conclusions based on available information and evidence (Puling et al., 2024). So, classroom discourse can be raised when students discuss solving problems that require critical thinking skills.

Activities when students discuss also provide opportunities for students to practice analytical thinking and evaluate arguments critically so that students' critical thinking skills can be stimulated through classroom discourse (Sholikhah & Syah, 2024). Thus, when analyzing classroom discourse, students' critical thinking skills can also be analyzed. Because through classroom discourse analysis, all aspects of mathematical thinking, including students' critical thinking skills can be discussed, seen and understood (Kooloos et al., 2022). Thus, classroom discourse can be an effective strategy in improving students' critical thinking skills, especially for those with low mathematical skills.

To support the creation of quality classroom discourse, it is necessary to plan learning through a didactical design. Didactical design is a systematic approach in designing the learning process to make it more suitable for students' characteristics (Brousseau, 2002). Didactical design can include learning scenarios that provide

cognitive challenges appropriate to students' level of understanding, thus enabling them to actively engage in mathematical discussions (Hendriyanto et al., 2024).

Didactical design serves as a bridge between learning theory and classroom practice. It allows teachers to predict how students will respond to an activity that has been designed (Desmayanasari & Hardianti, 2021) so as to make students more active and enthusiastic in learning (Ria et al., 2023). Therefore, didactical design is needed as a learning planning tool that considers how classroom discourse can be generated by students who have low mathematical skills. Through this didactical design, teachers can also design questions that encourage exploration and discussion that lead to the development of students' critical thinking (Rahmawati et al., 2023). With the right didactical design, it is expected that students with low mathematical skills can better understand the concept of PLSV through meaningful interactions.

The urgency of this research lies in the need for more inclusive and adaptive learning strategies, especially for students with low skills in mathematics. By understanding the patterns of classroom discourse that occur in the didactical design of PLSV, teachers can design more effective learning interactions to help students overcome concept difficulties more systematically (Sebayang et al., 2024). The results of this study can contribute to the development of mathematics learning theory that is more based on classroom practice.

Based on previous studies, research on classroom discourse in PLSV didactical design is still limited, especially in the context of students with low mathematical skills. Some studies show that the implementation of classroom discourse can help improve students' understanding of mathematical concepts (Moschkovich, 2015). However, there are not many studies that specifically examine how discourse can be optimally utilized in didactical design to improve students' critical thinking in PLSV topic. In addition, classroom discourse analysis is often ignored by many researchers to be the focus of a study (Herna, 2018).

There is still very little research conducted in Indonesia on this analysis, especially in mathematics learning. Furthermore, there is no research that analyzed classroom discourse in learning that applies didactical design. In fact, NCTM (2014) has advocated a shift in the practice of learning mathematics in the classroom, especially in increasing the quantity and quality of classroom discourse and making it a routine practice in the classroom. Thus, there is a need for research on analyzing classroom discourse on PLSV learning that leads to students' critical thinking skills, especially students with low academic skills. Therefore, considering the facts that occurred in one of the state junior high schools in Bandar Lampung previously, research on the classroom discourse analysis is needed. Thus, the research question is, "How is classroom discourse in didactical design of PLSV topic in class VII-1 at one of the state junior high schools in Bandar Lampung?". This study aimed to analyze classroom discourse in didactical design of PLSV in class VII-1 at one of the state junior high schools in Bandar Lampung, with a focus on students' critical thinking skills.

## METHODS

This research is an evaluation research using a qualitative approach. The evaluation in this study is an evaluation of classroom discourse in didactical design of PLSV. The research was conducted for 2 meetings with each meeting lasting 70 minutes. The participants in this study were a mathematics teacher and 29 students of class VII-1 at one of the state junior high schools in Bandar Lampung in the odd semester of the 2024/2025 academic year. Furthermore, from all students in the class, 12 students were selected to analyze the classroom discourse that occurred in the group, with the provisions: 4 students with high mathematical skills, 4 students with medium mathematical skills, and 4 students with low mathematical skills. The selection of these students was based on the scores of daily tests and mathematics midterm exam. The 12 students were then randomly grouped into high mathematical skills students group, medium mathematical skills students group, low mathematical skills students group, and mixed mathematical skills students group.

The data analyzed in this study were data in the form of transcripts of conversations regarding classroom discourse that occurred in learning with the topic of linear equations of one variable in class VII-1. In analyzing the transcripts related to the forms of classroom discourse, the researcher used Bradford's (2007) coding, namely: (1) questions (Q), this includes the types of questions asked during classroom discourse; (2) answers (A), can be in the form of answers or responses to questions asked previously; (3) verifications (V), which is brought up to check or confirm answers or understanding; (4) explanations (Ex), in the form of explanations provided to clarify concepts, processes, or reasons for an answer or redirections (R), in the form of diverting attention from one topic or question to another topic or question; and (5) additional categories for answers that do not attempt to answer the question/non-attempt answers (N). Meanwhile, for the analysis of transcripts related to critical thinking skills, researchers adapted three indicators of critical thinking skills Facione (2023), namely: (1) interpretation, includes categorizing, explaining meanings, and clarifying meanings; (2) analysis, this includes examining ideas, identifying arguments, and analyzing arguments; and (3) evaluation, this includes assessing the credibility of a claim and evaluating the quality of arguments made using inductive or deductive reasoning. All coding was performed using NVivo software after transcripts of classroom discourse were obtained.

The data collection techniques used in this study were observation, interview, and documentation. Meanwhile, the instruments used in this study were field note sheets and interview guidelines. The researcher used a qualitative descriptive method to analyze the data obtained from the voice recorder and field notes. The researcher conducted three data analysis processes according to Miles et al. (2014), which include: data condensation, data display, and drawing and verifying conclusions. When conducting data analysis, researchers have triangulated to check the credibility of the data. The triangulation used is method/technique triangulation,

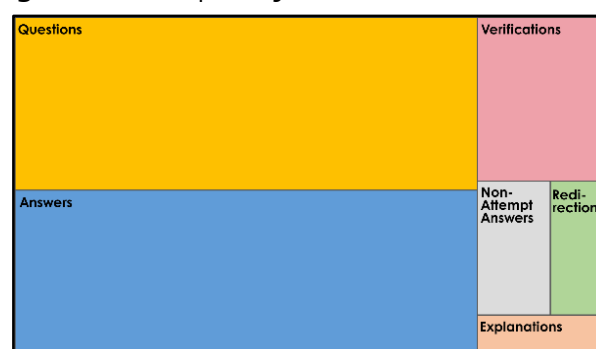
which is by comparing data obtained from all data collection techniques, which include observation, interview, and documentation.

## FINDING AND DISCUSSION

At each meeting, the research focused on analyzing the classroom discourse that occurred in 12 students, namely: (1) ST06, ST08, and ST09 as members of the high mathematical skills students group (hereafter referred to as Group 1); (2) SS11, SS14, and SS17 as members of the medium mathematical skills students group (Group 2); (3) SR22, SR24, and SR25 as members of the low mathematical skills students group (Group 3); and (4) ST02, SS16, and SR29 as members of the mixed mathematical skills students group (Group 4).

The learning that was conducted during the research was by applying didactical design. In both meetings, the guided practice model was used with the assignment method. In the first meeting of the study, students solved story problems related to numbers, for example, "I am a number. If I add 5 then the result is 7. What number am I?". Meanwhile, in the second meeting, students solve contextual story problems related to age, such as "Amir is 2 years older than Badu. If Badu is 7 years old, how old is Amir?". The exercise problems were solved by students using puzzles. Puzzles are used as a tool to apply concepts related to finding important information in the problem. Students work in groups to solve the puzzle complete with problem solving steps to get the answer to the problem.

Based on the voice recording that has been conducted during 2 meetings, there are a total of 36 classroom discourse transcripts. From all the transcripts, a chart of the forms of classroom discourse that emerged during the research is depicted in Figure 1. The chart is divided into 6 sections, where each section represents each form of classroom discourse that emerged during the research. The size of each section indicates the frequency with which the form of classroom discourse appeared, the larger the size, the higher the frequency.



**Figure 1.** Forms of Classroom Discourse that Emerged during the Research

The dominance of the question form during the classroom discourse shows that students actively ask questions during group discussions. This result is in line with research conducted by Salsabila et al. (2023) which shows that questions are the most used key element in building interaction in the classroom. Students who

dominantly asked questions were SS16, SS11, and ST02. However, the questions asked by students are closed-ended questions. Consider the following fragment of the transcript.

ST09 : *What number am I? Questions 10.*

ST06 : *Does this mean 3F? Questions*

ST09 : *F3.*

ST08 : *Isn't the number first A1, then the variable? Questions*

ST06 : *Yes indeed, the numbers first.*

ST09 : *3F...*

ST08 : *And then? Questions*

ST09 : *Minus 5...*

SS11 : *3B minus 5..., plus...*

SS14 : *12 divided by 3? Questions*

SS11 : *Hah? 12? Questions*

SS14 : *Divide by 3.*

SS11 : *12 divided by 3? Questions 6. Uh, I can't.*

SS17 : *It should be able to!*

SS14 : *It should be able to!*

SS11 : *How much? Questions*

SS14 : *4 right? Questions*

SS11 : *7 plus 5 how much? Questions 12.*

The fragments of the transcript above occurred when the student tried to answer the question "I am a number. If I am multiplied by 3 and then the product is subtracted by 5, then the result is 7. What number am I?". The problem is the second practice problem given after previously students were asked to solve the problem using a puzzle. To work on the problem, students are given colored markers to indicate any important information in the problem. This is part of the didactical design designed to familiarize students with the information that can be obtained from PLSV problems in a simple way.

From the fragments of the transcripts, it can be seen that the questions asked by students are simple closed-ended questions. This can be a reflection to design strategies that can encourage students to ask more complex questions, because by encouraging students to ask a variety of complex critical questions will encourage the development of students' deeper and more meaningful thinking in questioning (Chin & Osborne, 2008).

Furthermore, answers have the second highest frequency in classroom discourse. This could have happened because the questions asked, either by the teacher or

their group mates, would trigger other students to answer. The reason is because there is a common understanding that it is the norm to respond (usually in the form of an answer) to questions posed directly (Stivers, 2022). All students have been seen to be able to bring up this form of answers and the students who dominantly answer are SS11, SS16, and ST02.

Then, the form of verifications which occupies the position of the 3rd most emerged form of classroom discourse represents the efforts of students and teachers to confirm the truth of answers or arguments. The opportunity for the emergence of this form of verifications can be greater in group discussions in accordance with the results of Bradford's research (2007) which shows that peer discourse provides an additional channel for conceptual development and verification. From the transcripts, it can be seen that this form of verification can be raised by all students. The dominant students who did verification were SS17, SS11, and ST02.

- SS11 : Loading, sorry, hehe. 1 plus min 9?  
SS17 : Minus, 8.  
SS11 : 8. Ih! What? 8, off course! *Verifications (Joking)*. Then...  
SS17 : Divide by 4.  
SS14 : Ih instead of min?  
SS11 : What? Min from where? 4 lah! *Verifications*  
SS14 : It's min.  
SS11 : Oh yeah, min 8 *Verifications*, what...  
SS17 : Oh yeah. *Verifications*  
SS14 : Xixixi (laughing).  
SS17 : Plus..., 4, How much?  
SS11 : Wait...  
SS14 : Divide! 2.  
SS11 : Yes 2, -2. I am -2. *Verifications*

The above transcript took place during Group 2's discussion to find the answer to the question "I am a number. If I am multiplied by 4 and the product is + 9, then the result is 1. What number am I?". After successfully solving the problem discussed in the previous transcript, Group 2 continued the discussion for this problem. From the transcript above, it can be seen that the verifications form is used by students to check each other's opinions. The more often students verify, the higher the potential for avoiding misconceptions. However, students often find a misconception if the students involved in the discussion also do not have the right concept understanding because the existence of misconceptions can complicate and hinder the learning process of students (Fanggi et al., 2023). Therefore, the role of the teacher here is needed.

- SS17 : Mam, is this problem multiplied or subtracted?  
Teacher : Why?  
SS11 : Oh that means, mam, the Y is combined with 2, right? So 2Y.  
SS17 : Yes, 2Y is subtracted? Multiplied?  
Teacher : It's multiplied by 2.  
SS17 : Multiplied?  
SS11 : 2Y, Prabu..., 2Y multiplied by, then...  
SS17 : Eh.  
Teacher : Yes, what is 2Y? 2 time Y, right? *Verifications*  
SS17 : Oh, yes.  
SS11 : Not like that?  
Teacher : Yes, it's like that.  
SS11 : Combined, right?  
SS17 : 2Y, minus? It means minus?  
Teacher : Then?  
SS11 : Yes, 2Y minus 5 Prabu. Then it's equal to 7.

The teacher's presence in the group discussion as in the transcript above is part of the didactical design, which is planned as a didactical intervention when students feel the need for the teacher's presence to help students' difficulties. In the transcript above, the teacher conducted verification that helped students to confirm their understanding of mathematical notation. In the end, the students were able to determine the form of the linear equation in one variable shown by SS11. Here the role of the teacher is needed, that through the verification process, students managed to get an understanding of the problem at hand and avoid conceptual errors. This is in accordance with the statement of Hamzah et al. (2021), that teachers must always be relevant in ensuring that students' misconceptions can be immediately eliminated. This process creates an interactive and supportive learning environment, where students can learn from mistakes and strengthen their understanding of the material being taught.

Next is the non-attempt answers form, which occurs when students say something that does not attempt to answer the question or is just an irrelevant remark. Note the words "uh easy man..." uttered by SS11 in the following transcript fragment. The following transcript is a conversation that took place to solve the question "Amir's age is 2 years older than Badu's age. If Badu is 7 years old, how old is Amir?". Before the discussion, the teacher guided students to find information from the problem and determine it using puzzles. This is part of the didactical design that aimed to make students understand and be able to construct their own understanding if they encounter PLSV problems like this, what information is important and can be used

to form the right equation. The following transcript illustrates the students' discussion to form an equation that fits the problem.

SS11 : 7 plus min 2.

SS17 : 1, 2, 3, 4, 5, 6, 7, plus...

SS14 : Isn't this minus?

SS17 : Yes, minus. 1, 2, 3, uh why 3 anyway? Is it 2? 1, 2. 5 lah. Aih, right 7, 1, 2, 3, 4, 5, 6, 7, after that minus 2.

SS11 : No... -5 isn't it? 5?

SS14 : Oh yes -5...

SS11 : No, not negative, positive!

SS14 : Yes positive...

SS11 : You said negative earlier.

SS14 : Negative and 5.

SS11 : After that, what is this?

SS14 : Done. This is the result..

SS11 : Uh easy man...Non-attempt answers

SS17 : Aih, not. No, lie, not like this. It's like this isn't it? Is it just like this?  
(1 minute later)

SS11 : Well, Amir is 2 years older than Badu.Redirections

SS17 : If Badu is 7 years old, how old is Amir? 5 years old.

SS14 : No, he is older than Badu, Badu is 7 years old.

SS11 : Yes!

SS14 : Two years different.

SS11 : That means 9 years old. That means the process is also wrong!

SS17 : Just delete the process.

SS11 : So how do you do it?

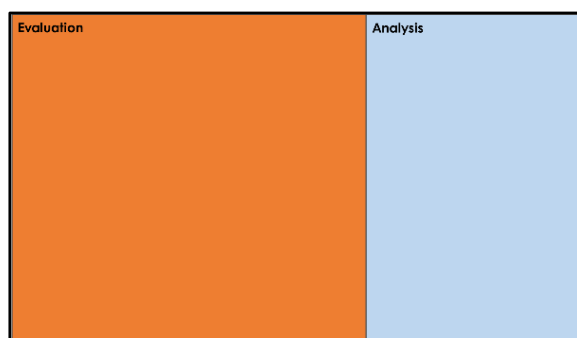
The next form of classroom discourse is redirections. The frequency of occurrence of this form is quite low, but this form is still important so that classroom discourse can remain well directed. In accordance with the opinion of Drageset in Gustafsson (2024), that redirections can help keep students' discourse on the right track. Note the form of redirections done by SS11 in the transcript above. After a minute of no discussion, SS11 redirected the group's attention to refocus on discussing the problem. This shows that the form of redirections still plays a role in the occurrence of classroom discourse in student group discussions.

Furthermore, the form of classroom discourse that appears the least is explanations. Explanations require students to elaborate an answer or argument. This form is closely related to higher-order thinking, as students need to link relevant

information, construct logical arguments, and communicate their thinking process explicitly. Since the frequency of explanations was far below that of questions and answers, this indicates that the discussion was still focused on simple and basic questions and answers. This result is in line with the results of research by Bradford (2007), that students tend not to verify and explain answers during discussions. However, this can also be an opportunity for teachers to be able to facilitate students to discuss more “how” and “why” a concept or answer can appear or be obtained.

The dominant form of explanations appeared in the discussion of Group 1. Meanwhile, the least explanations appeared in the discussions of Groups 2 and 3. All students with high mathematical skills can bring up this form. Only SS11 (Group 2) and SS16 (Group 4) students with medium mathematical skills who gave rise to these explanations. Meanwhile, only 1 student, SR24 (Group 3), a student with low mathematical skills was able to bring up this form. From these data, it can be generalized that a student's mathematical skills can affect his/her ability to provide an explanation. This can happen because “explaining” is included in the indicators of several mathematical skills, such as critical thinking skills (Facione, 2023) and mathematical communication skills according to Sumarmo in Suhenda & Munandar (2023). This was not influenced by who his discussion partner was, because even though SR29 was in a discussion group with 2 other students who had “medium” and “high” mathematical skills, SR29 still couldn't come up with many explanations.

Theoretically, the results of the analysis of the forms of classroom discourse that appear in each transcript are in line with the IRF (Initiation - Response - Feedback) classroom discourse framework of Sinclair and Coulthard in Suherdi (2010). In this study, questions form as initiation, answers and explanations as response, and verifications as feedback. Meanwhile, the indicators of critical thinking skills that emerged during the study can be described by the chart shown in Figure 2.



**Figure 2.** Indicators of Critical Thinking Skills that Appeared during the Research

Critical thinking skills are needed to be able to process information, select, weigh, and interpret information appropriately with logical reasons (Lieung, 2019). The evaluation indicator, which has the highest frequency in this study, indicates students' ability to assess the quality of arguments, verify the truth of information, or weigh the relevance of information based on certain criteria. In this indicator,

students tend to question whether another student's answer is valid, logical, and acceptable.

The dominance of this evaluation indicator is influenced by the group discussion pattern which emphasizes the assessment of the validity of the answers proposed by their groupmates. This is in accordance with the definition of evaluation itself, one of which is the ability to assess one's opinion (Facione, 2023). Students tend to be accustomed to criticizing other students' answers or seeking information from the teacher, rather than making an in-depth initial interpretation. The research subjects who can bring up the form of evaluation are SR24, SR25, SS11, SS14, SS16, SS17, ST02, ST09.

In the first meeting, all groups were recorded as showing the evaluation. The form of problems given to students in this meeting was non-contextual story problems such as "I am a number. If I add 5 then the result is 7. What number am I?". Evaluation at this meeting was mostly raised when students determined the appropriate form of PLSV to solve the problem. This shows that "story" problems have a greater potential to generate evaluation from students. This is in line with the statement of Nanga et al. (2023), that by giving story-shaped problems, students' literacy skills can increase, which will then have an impact on increasing students' critical thinking skills. Furthermore, at the second meeting, only Group 3 and Group 4 succeeded in bringing up the evaluation indicator.

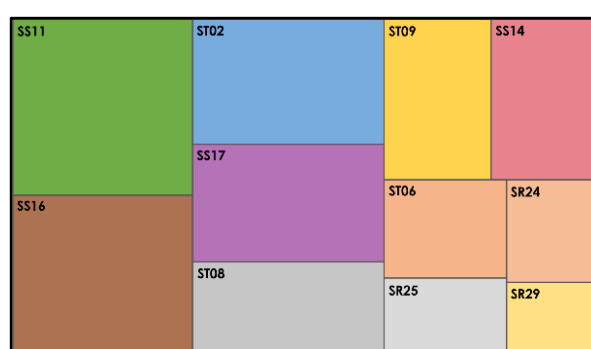
Meanwhile, the low frequency of the analysis indicator under the evaluation indicator shows that students' ability to break down information into small parts and identify logical relationships or structures is not as good as their evaluation ability. The research subjects who were able to bring up this indicator were SR24, SR29, SS11, SS16, ST02, and ST08. At the 1st meeting, all groups were recorded to bring up the analysis indicator. Meanwhile, at the 2nd meeting, only Group 4 managed to bring up the analysis indicator. The analysis indicators raised in this study were dominantly raised when students explained the steps of solving PLSV problems to their group mates.

In addition, the indicator of critical thinking skills that was never recorded as being raised by students was interpretation. In accordance with the definition of interpretation according to Facione (2023), the non-appearance of interpretation indicators in this discourse indicates that students have not been able to express the process of interpreting their understanding explicitly in the discussion. If students can analyze and evaluate without "appearing" to fulfill the interpretation indicator, the analysis and evaluation carried out will be less meaningful. This indicates that the analysis and evaluation are not accompanied by the interpretation of meaning.

However, the fact that evaluation indicators dominate over analysis and interpretation does not mean that this result is negative. In fact, the dominance of evaluation in classroom discourse shows that students dare to offer critical opinions in order to validate or refute arguments/answers that are deemed inappropriate.

The challenge is how to balance the tendency of this evaluation indicator with the other two indicators of critical thinking skills, namely analysis and interpretation so that students' critical thinking becomes more comprehensive. Thus, students can be more critical in expressing their ideas and opinions and be able to develop their potential (Widiastuti et al., 2022).

Furthermore, the activeness of the research subjects during the occurrence of classroom discourse can be depicted in the chart as listed in Figure 3. From the chart, it can be seen that the order of research subjects who are most active in generating classroom discourse is SS11, SS16, ST02, SS17, ST08, ST09, SS14, ST06, SR24, SR25, SR29, and SR22. What is noteworthy is that SR22 never gave rise to classroom discourse at all.



**Figure 3.** Activeness of Research Subjects in Classroom Discourse

It was found that based on their mathematical skills, students with medium mathematical skills tended to be more actively involved in group discussions. SS11, SS16, and SS17 were even more active than students with high mathematical skills, except ST02. SS14 was also among the students who were active in the discussion, however, unlike the other students with medium mathematical skills, SS14 was not "that active". Based on the observation, the researcher saw SS14 as a student who tended to choose to be silent and only spoke when he felt the need to speak. From the interview results, SS14 stated that SS14 felt confident to speak during the discussion. The other Group 2 members also did not ignore SS14. So, what happened during the discussion was only influenced by SS14's character. This is where the role of the teacher is needed to encourage and ensure that students always have the motivation to engage in learning activities (Sari et al., 2022), one of which is during discussions.

Then, students who were active in generating classroom discourse besides SS11, SS16, and SS17 were ST02, ST08, ST09, SS14, ST06, SR24, SR25, and SR29. During the observation, the researcher saw ST02, ST06, ST08, and ST09 as active students when discussing in their groups. Likewise, researchers saw SR24, SR25, and SR29 including students who were active in discussions, although not as active as students with high and medium mathematical skills. The interview results showed that all of these active students felt comfortable during discussions with their groups. This is in line

with the results of research by Hasibuan et al. (2024) which revealed that comfort is one of the factors that influence interaction between students.

The only student who never generated classroom discourse was SR22. During the observation, the researcher saw that there was an argument in Group 3 which made SR22 not bring up classroom discourse at all. The interview results also support the statement that when students feel uncomfortable in the group, students tend not to want to interact. Again, we can say that the comfort factor is very important in the smooth running of group discussions.

The results of the research during the 2 meetings showed that Group 2 generated the most classroom discourse. From the observations and interviews, it was found that SS11, SS14, and SS16 felt comfortable during the discussion. In addition, there was no disagreement in the group and the three of them were very respectful of each other. Similar to the members of Group 2, the members of Group 4, namely SR29, SS16, and ST02 also felt comfortable during the discussion. Furthermore, the group that generated the 3rd most classroom discourse was Group 1. Finally, the group that generated the least classroom discourse was Group 3. The members of Group 3 were uncomfortable to discuss, therefore they tended to choose to be silent and work on their own tasks.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the research and discussion, the following conclusions were obtained: (1) all forms of classroom discourse, which include questions, answers, verifications, explanations, redirections, and non-attempt answers were successfully raised by students. The dominant forms of classroom discourse are questions and answers. This implies the importance of designing learning activities that facilitate students in conducting more complex question and answer sessions to support the development of their critical thinking skills; (2) the indicators of critical thinking skills recorded to be raised by students in classroom discourse are only analysis and evaluation indicators with the dominance of evaluation indicator; (3) the order of the dominant groups that gave rise to classroom discourse was the group of students with medium mathematical skills, the group of students with mixed mathematical skills, the group of students with high mathematical skills, and the group of students with low mathematical skills. This study found that comfort is one of the factors that can influence student participation during discussions. In order for students to conduct discussions comfortably, teachers need to ensure that there are no problems between members of the groups formed.

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