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# Introducing Reflective Teaching Practice in Remote School: Teacher-Student Interaction Patterns

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**Abstract:** This study aimed to analyze classroom interactions in the reflective teaching practice based on learning objectives and types of interactions, types of student questions and answers, and gender and student achievement. Teacher-student interactions, particularly in reflective learning, have been discussed in depth in urban schools. However, few studies reported the interactions between teachers and students in remote areas. The data collected for this cross-sectional study are part of a broader longitudinal research project. The participants comprised 46 students and 4 teachers from 3 remote schools representing 3 districts in Indonesia. The results showed that most of the teacher-student interactions in reflective teaching practice contained feedback that focused on students' correct and incorrect answers yet rarely discussed how students got answers. Teacher reflection was evaluative by discussing matters related to learning objectives. While reflections have not yet been related to the teacher's method. This study also reported that gender and achievement did not affect the reflective teaching practice.

**Keywords:** Interaction Patterns; Reflective Practice; Remote School

## Introduction

Social and humanities researchers have focused their attention on the effects of teacher-student interactions on problem-solving, learning, and conceptual change (Abdelaziz & Al-Ali, 2020; Cole, 2023). In learning science, the interaction between teachers and students can facilitate student learning. For socio-constructivists, learning is a social, active process that involves others. It forms ongoing interactions between students and teachers that assist students in acquiring the necessary skills and knowledge (Asakereh, 2018). The learning process consists of a series of steps that students take, building interactions initiated by the teacher, which ultimately lead to self-regulation and self-development of students through the internalization process (Pareto & Willermark, 2022). In addition, socio-constructivists argue that interaction mediates higher-order thinking, thus playing an important role in teaching and learning.

However, several studies have found that discourse in classroom situations does not always support learning. Most of the class time is devoted to teacher explanations, with little time spent on teacher-student interactions or group discussions. Teachers make statements or ask factual questions 84% of every meeting. The classroom is dominated by the teacher's talk and the student's answers to the teacher's demands. The dominance of teacher talk reinforces the dominance of the transmissive method of knowledge, controlled by the teacher, with students having little autonomy and involvement in their learning. The previous study gave rise to the structure of the explanation of the material by the teacher, which follows the structural model of classroom conversation. The exchange of opinions in

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teaching is used to convey material content (Agustina, 2020; Arcoverde et al., 2020).

Some interactions between teachers and students have been reported in several studies (Barker et al., 2022) in the social and exact fields. The term IRF structure is known which consists of initiation (I), response (R), and finally, the feedback step (F). This structure is characteristic of teacher-controlled discussions, in which they initiate interaction by asking their students closed questions (I), in which they expect a certain response (R), which they then respond to (F), eventually conforming with the previously obtained results. This interaction also contains two structures that are at the initiative of students. In the initial interaction, students get verbal responses from the teacher, called IR structures. The second is the IF structure, where students convey information to students, and the teacher provides feedback. Evidence provided through preliminary studies suggests that classes are often dedicated to teaching rather than learning to produce the goals that are intended to be primary goals. In this scenario, the conversation in the classroom turns out to be teacher-centered (Marlina & Hamdani, 2023a).

Studying interactions in the classroom, in elementary school classrooms in the UK, France, India, Russia, and the United States, it is often found that IRF exchanges are used in classrooms, with the majority being teacher-initiated (Compen et al., 2021; Herdiana et al., 2022). Nevertheless, he observed that student participation and cognitive engagement differed across countries based on teachers' pedagogical approaches. Based on these results, the interaction between teachers and students should be able to aim to discuss joint learning activities; reciprocity—teachers and students listen to each other, share ideas and offer different points of view; support them by helping each other in a supportive environment without fear of making mistakes; and cumulative—involving ongoing discussions to build their knowledge on their own and each other's ideas (Bükki & Fehérvári, 2021; Cai et al., 2022).

Finally, by asking open-ended questions, the teacher encourages problem-solving, not just explanation and memory, so such an approach has a purpose, with the educational goal always on the teacher's mind. Good teacher-student interactions positively impact primary school children's overall achievement, engagement, and learning and help students develop core skills such as listening and debating, formulating questions, and developing critical thinking (Baran et al., 2019; Marlina, 2023). Usually, teachers spend a lot of time in class questioning their students, considering this as a strategy that allows students to participate in class, stay active, and become interested in the content they teach. However, most of the questions teachers ask are factual, and little time is provided for students to consider their answers; however, the best students are often given extra time to consider their responses. Suppose the teacher's conception or belief is focused on teaching the content, and the role of the learner is to memorize the content. In that case, it makes sense to ask lots of factual questions to check whether the student has learned the information transmitted. These questions increase students' prior knowledge (Ahola et al., 2023; Compen et al., 2021).

A study revealed that teacher questions in the classroom, especially those related to the level of questions and the complexity of the questions, are directly related to student achievement. Conversely, if teachers focus on a student-centered or learning-oriented approach, they will be more preoccupied with supporting student autonomy and individual differences during the learning process. In this scenario, high-level questions can encourage deeper understanding (Asakereh, 2018; Brouwer et al., 2016).

Based on Bloom's revised Taxonomy, the teacher's question levels are categorized as follows lower order (remembering, remembering, and understanding), apply (show, modify, compare), analyze (verify, justify, interpret); and creating (combining, constructing, developing, formulating). The researchers observed the prevalence of low-level questioning strategies that resulted in lower student cognitive functioning levels. Regarding the complexity of the questions, analyze the data along a continuum of teacher-focused feedback starting from a focus on the correct answer. They found a positive correlation between students' cognitive level and the complexity of the questions (Husamah et al., 2022; Ibrohim et al., 2020). However, examining classroom interactions and teacher questions, in particular, emphasizes that, to provoke student participation in effective interactions, it is more important how teachers react to student responses, coupled with the intent of their questions, rather than the types of questions asked. Against this background, it becomes clear that teacher-student interaction should be aimed at the collaborative construction of knowledge (Marlina & Hamdani, 2023b). In the discussion, the teacher's explanation is as important as the student's talk. The questions asked by the students during the learning process help them to engage in dialogical argumentation. They claim that students' questions encourage critical dialogue and can support students' argument construction by stimulating the co-elaboration and justification of their point of view (Nur et al., 2023).

If student questions can be of use to students, teachers should encourage discussion and debate in class discourse. It becomes important for teachers to

challenge their students to ask questions and make statements to resolve doubts or seek answers, as it helps them to expand their thinking. Moreover, teacher responses to student questions are an important tool in maintaining interaction that facilitates increased mathematical thinking and reasoning among students (Ayanwale et al., 2023). So, as this author suggests, classroom talk promotes student learning under certain circumstances. Asking students to talk about science fosters their understanding and builds on their thinking processes and capacity to reason. Recent research in the interaction domain supports the concepts of dialogic speech and dialogic feedback (Gröschner, 2018; Özüdoğru, 2022). In line with this study, interaction is central to learning when teacher comments allow students to improve their learning strategies. Effective interaction involves a dialogical process involving students and teachers. Students must understand the meaning of student-teacher interactions and use that information to close the gap between what they know and what they are expected to know.

**Table 1.** Focus on Interaction Between Teachers and Students

| | Focus on Interaction |
|---|---|
| 1 | At the task and product (FT) level: Interaction focuses on how well the task is completed or done. |
| 2 | At the process level (FP): Interactions at this level describe processes and strategies students need to complete assignments. |
| 3 | At the level of self-regulation (FR): Interaction states how students assess and organize their actions toward learning goals. |
| 4 | At the self-level (FS): Personal interactions usually reveal positive or negative evaluations of students. The contents of the FS include praise and criticism. |

Such a process needs to generate opportunities for students to participate actively in their learning and to talk about their understanding of the task they must perform. Students must understand, assess and act on the information provided by the teacher. Different perspectives inform the definition of interaction. For many years interaction was understood as the transmission of information. In this approach, the learner is seen as a passive recipient of what the teacher says, regardless of the learner's level of understanding or ability to act, based on the feedback provided by the teacher (Brouwer et al., 2016; Özüdoğru, 2022). Recently, and in contrast to more traditional approaches, researchers have strengthened the argument that feedback should be seen as a socially constructed dialogical communication process. In this socio-constructivist view, feedback's main purpose is to promote self-regulation. The conceptual model of interaction takes into account self-regulatory goals. They consider that three questions need to be addressed in a feedback interaction. The first, "where are the students going?" relates to the goals that the students must master. The second, "how are you students?" relates to the current level of student achievement. The third, "where next?" is the most important for students because it describes the learning strategies they need to choose to master goals and facilitates self-regulation in the process (Ledger & Fischetti, 2020; Özüdoğru, 2022).

This interaction gives students access to more detailed information about the processes needed to complete tasks, promotes deeper learning, and increases self-efficacy (Gröschner, 2018). The self-regulation level focuses on developing students' skills in monitoring their learning process, facilitates greater student confidence to engage with assignments, and promotes student autonomy (Table 1).

The existence of gender bias in teacher-student interactions in science has been a concern of researchers. Female students were consistently treated differently in science classes, and teachers paid more attention to male students. Research on classroom interactions in primary and secondary schools shows that male students receive more attention from teachers and are given more time to talk in class when compared to female students (Anderson, 2021; Bilici et al., 2013). In addition, their findings suggest that the types of interactions teachers have with boys differ from those with girls. In their study, teachers provided boys with more interaction, including praise, criticism, help, and correction, while mostly providing confirmatory feedback to girls. Boys are more likely to be rewarded for correct answers or given reinforcement to improve their learning than girls. According to these researchers, educators are generally unaware of the presence or impact of this bias. Teachers in science classes provide more interaction for boys than girls. In his study, low achievers, regardless of gender, did not participate in class discussions like high achievers. Gender is not important in mediating academic achievement (Cancino & Towle, 2022). In addition to the gender, needs, and performance level of students, there are other possible factors that can determine the form of teacher interaction, namely the nature of student responses.

*Research purposes*

The purpose of this study was to examine the teacher-student interaction, especially to characterize the focus of the interaction used by teachers in a particular area and whether it differed according to the type of interaction, the purpose of the lesson, the type of questions used by the teacher, the type of answers given by the students, and student's gender and previous

achievement. The focus of feedback can be categorized into four main levels: on task, aimed at the process; focuses on self-regulation, and self-directed. They claim that "the degree to which the interaction is directed affects its effectiveness." Interaction at the level of process and self-regulation is the most effective in promoting achievement.

To characterize teacher interactions during active learning, we examined the focus of the interaction, particularly the four levels of feedback (task, process, self-regulation, and self-level), and four research questions guided our research, how are the characteristics of teacher-student interactions related to teacher-student interactions (tasks, processes, self-regulation, and self) during active learning during science lessons in secondary schools? do the characteristics of teacher feedback (F move) differ according to? classroom interaction patterns (IR-F or SF) and lesson objectives (introducing new content, practice—assessment)? (the types of questions asked by the teacher (open or closed) and the types of answers given by the students (true or other than true and ccording to the gender (male or female) and previous achievement (lower, average, or higher) of the student, is the feedback's target?).

## Method

The data collected for this cross-sectional study are part of a broader longitudinal research project. The methodological choices for the case studies allowed us to achieve a deeper understanding of the data collected, a better understanding of participant behavior and contextual and socio-cultural influences on participant behavior during observations. We used multiple case sampling to add validity to our later findings. We selected five cases under study, a minimum for adequacy of multiple-case sampling, consisting of five teachers and their 47 students attending classes from four secondary schools in remote West Kalimantan areas. The main reason for choosing remote schools as places of learning is to ensure that students in remote areas also receive the same interactions with schools in urban areas. To ensure maximum sampling of variation, teacher selection also took into account years of professional experience and teacher gender to see if the main pattern observed in one teacher would apply to another; the teachers selected (one male and four female) had between 1 and 5 years of experience. Class sizes vary between 9 and 17 students per class. Three teachers had their respective classes for the first time, and two had accompanied their classes for more than 1 or 2 years. 13 male students and 24 female students. The proportions of girls and boys were similar in all classes. Figure 1 shows the research flow.

Table 2 shows the total minutes of recording from each teacher. Introduce new content, practice, or assessment, types of questions (open or closed) used by the teacher, types of answers given by students (true or other than correct), gender of students (male or female), and previous achievements (lower, average, or higher). This study aimed to analyze teacher-student interactions, more specifically, to characterize the focus of teacher interaction in remote schools and to determine whether it changed according to the type of interaction (IRF or SF) and lesson objectives. One of the contributions of the current research is the use of multivariate statistics to answer complex questions involving more than two variables. The log-linear analysis aims to fit the simpler model to the data in the contingency table without losing substantial predictive power.

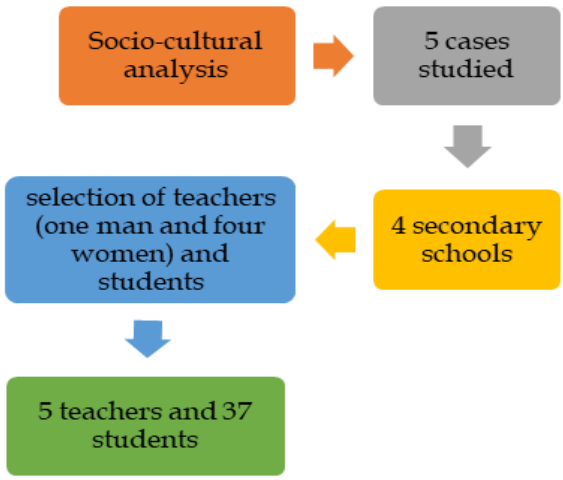



**Figure 1**. Research flow

**Table 2.** Number of Lessons and Minutes Recorded by Each Teacher

| Category | TA | TB | TC | TD | TE | Total |
|---|---|---|---|---|---|---|
| Number of subjects | 3 | 5 | 4 | 8 | 4 | 24 |
| Total of recording (minute) | 349 | 450 | 307 | 351 | 310 | 1767 |

Note: TA= Teacher A, TB= Teacher B, TC= Teacher C, TD= Teacher D, and TE= Teacher E

## Result and Discussion

Classroom interaction between students and teachers can be seen as an important aspect that receives careful attention in study (Helmi et al., 2023; Hikmawati et al., 2021; Maesaroh et al., 2023). Classroom interactions have received careful attention and have always been a

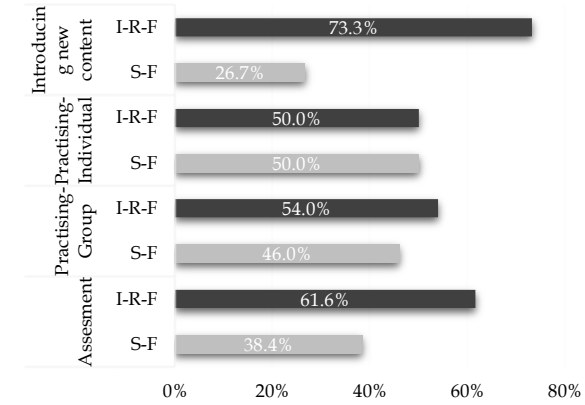
fruitful subject of study (Nuraisyah et al., 2022; Rosidah et al., 2021; Zakirman et al., 2023). In this regard, it is believed that classroom interaction can be used to build knowledge and improve students' skills (Ardi et al., 2021; Matsun et al., 2021; Nafiah et al., 2023). In line with this, interaction not only facilitates learning development but also the self-development of students and teachers (Herdiana et al., 2022). Classroom interactions between students and teachers provide opportunities for students to speak and/or express their voices. In other words, classroom interaction in the teaching and learning process can be seen as a valuable tool to help students in preparing their skills for real-life interactions.

A total of 237 units of analysis were examined and classified into two categories related to the pattern of interaction. Of these, 175 interactions were initiated by teachers (IRF) and the remainder by students (SF). Interactions are also categorized according to teaching activities. After observing the interactions, we found that teachers sometimes focused the interactions on one level in just one utterance. The analysis revealed that in 4.8% of interactions, the teacher decided not to interact; in 13.2% of interactions, teacher interactions are at the self-level (alone or in combination with other levels of interaction). In 69% of interactions, teacher interactions were focused at the task level (16.9% combined with the process level). Only 12.9% of interactions focused at the process level, independently. We did not observe any interactions with interactions at the self-regulatory level. Table 3 shows the focus of the observed interactions.

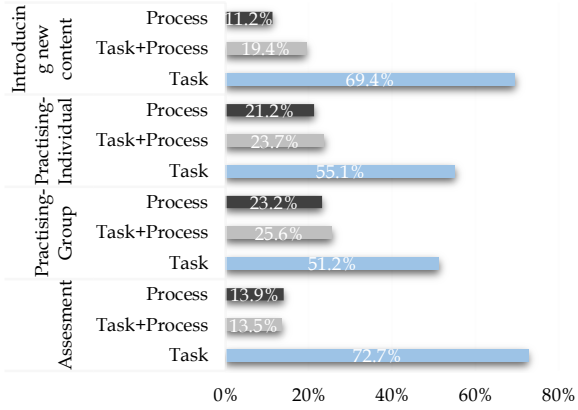
Learning objectives with an interaction focus describe a positive relationship (Dewaruci & Hanurawan, 2022; Marlina et al., 2017). In a graphical representation of these interactions, we observe that the proportion of interactions at the task level in lessons to introduce new content and assessments is higher than in lessons with different objectives. When the lesson's goal is to practice new content, the likelihood of teachers using task-level interactions is slightly lower for individual work (Bosman, 2021; Lian et al., 2021). Furthermore, the likelihood of teachers using process-level interactions is higher when the goal is to practice new content (Butani et al., 2020). The use of task interactions accompanied by practice processes in group work was significantly lower when the goal was student assessment (Husamah et al., 2022; Jupp et al., 2016).

**Table 3.** Observed Interaction Focus

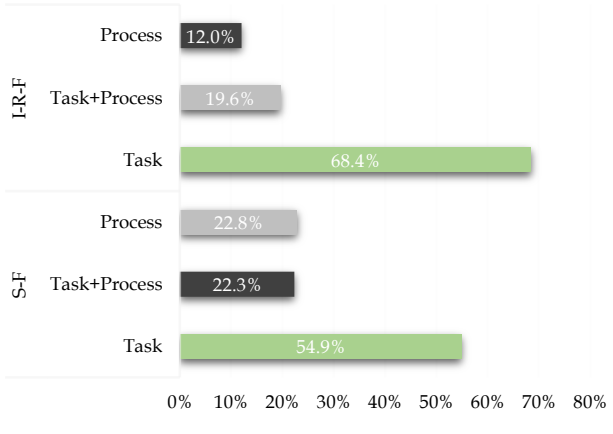
| Interaction Factors | Interaction (n=237) | |
|---|---|---|
| | f | % |
| Less interaction | 18 | 8 |
| Focus on yourself | 29 | 12 |
| Doing assignments with groups | 87 | 36 |
| Alone doing independent work | 37 | 16 |
| Doing hands-on tasks and activities | 14 | 6 |
| Doing activities | 33 | 14 |
| Do your activities | 19 | 8 |
| | 237 | 100 |




(a)




(b)




(c)

**Figure 2.** Graphical representation of the relationship between Lesson objectives and Type of interaction

Finally, there is a significant relationship between the type of interaction and the interaction's focus, which helps explain the observed distribution as in Figure 2. In Figure 2, it is stated that there are more interactions at the task level in the IRF interactions and more at the process level in the SF interactions. Teachers apply task-level interactions more when they initiate the interaction and less when the interaction is initiated by students (An et al., 2022; Baran et al., 2019; Barker et al., 2022; Bilici et al., 2013; Özüdoğru, 2022). In contrast, the likelihood of teachers using process-level feedback was lower in IRF interactions and higher in SF interactions. No significant effect of interaction type was observed during the use of task and process interactions. As we have pointed out, in most teacher-student interactions, the teacher interacts in an evaluative way. This may be related to the role of the teacher during the learning process (Chase et al., 2013; Fujii, 2019; Kandasamy et al., 2022; Ledger & Fischetti, 2020). If the teacher intends to transfer knowledge, they control the learning process. Previous research identified that these teachers mostly used summative assessment practices, reinforcing a more transmissive approach to knowledge (Compen et al., 2021; Gröschner, 2018; Heikonen et al., 2020; Hou et al., 2023; Marlina & Hamdani, 2023).

To minimize bystander bias, investigators received adequate training in appropriate recording findings; methods, tools, and timeframes for data collection are clearly defined. Although the collection of information is extensive, we also recognize that the data collected may not accurately represent teacher effectiveness in the classroom. Because we included a small number of teachers (five) in our study, these findings should not be generalized to all secondary school teachers in remote areas. Indeed, we recommend more research using qualitative and quantitative research methods to observe student-teacher interactions in the classroom. Greater evidence would allow for a greater understanding of the value and usefulness of interactions as agents of meaningful learning.

## Conclusion

Effective interaction focused on the level of process and self-regulation requires the teacher to interact as a tutor who promotes dialogic interaction. Therefore, we view teachers need more preparation for this role as facilitators of learning construction. One major finding emerged from our study regarding gender. Boys and girls in science lessons have different life experiences. Sometimes undetected or even ignored, gender bias still exists in secondary schools in remote areas, and it is important to support teachers with various strategies to increase the level of equity in their classrooms. Several limitations of this study should be noted. We recognize the subjective role of researchers in qualitative observations in the classroom, especially when they have to decide what interactions the teacher provides with his students.

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**Author Contributions**

Conceptualization, R.M., H.S., and I.I.: methodology, R.M., H.H.: validation, S.M., I.I., and H.H.: formal analysis, R.M., H.S., and I.I.: investigation S.M., I.I., and H.H.: resources, R.M., H.S., and I.I.: data curation, R.M., H.S., C.Y., and I.I.: writing—original draft preparation, R.M., H.S., C.Y., and I.I.: writing—review and editing, R.M., H.S., C.Y., and I.I.: visualization, S.M., I.I., and H.H. All authors have read and agreed to the published version of the manuscript.

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**Conflicts of Interest**

The authors declare no conflict of interest regarding the publication of this paper.

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