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THE RELATIONSHIP OF TEACHER AND STUDENT EDUCATIVE INTERACTIONS ON CHEMISTRY LEARNING ACHIEVEMENT OF SMAN 4 MATARAM STUDENTS

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ABSTRACT

This study aims to determine how the educative interaction of teachers and students and their relationship to chemistry learning achievement of grade XI and XII IPA students of SMAN 4 Mataram. This research is an ex-post facto quantitative study with a total population of 275 students in class XI and XII IPA. The sample used was 163 students who were determined using a stratified random sampling technique. The data collection method uses a teacher-student educational interaction questionnaire and documentation of the results of the Mid Semester Examination scores for the chemistry subject for Odd Semester 2022/2023 Academic Year. Descriptive analysis technique to find out how the pattern of teacher-student educational interaction and chemistry learning achievement as well as hypothesis testing with Pearson Product Moment correlation. Based on the descriptive analysis, the percentage of each indicator of the form of educational interaction states that students in class XI and XII IPA in chemistry learning use two-way communication. The percentage of educational interaction based on strata (class) and overall the students of SMAN 4 Mataram are in the moderate category. The results of the study stated that there was a positive and significant relationship between the educative interaction of teachers and students on the chemistry learning achievements of class XI and XII IPA SMAN 4 Mataram in the 2022/2023 Academic Year. The strength of the relationship between the educational interaction variable and the chemistry learning achievement is included in the high category with each addition of 1.289 the value of the chemistry learning achievement, the value of the educational interaction increases by 34,75%.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui bagaimana interaksi edukatif guru dan siswa serta hubungannya terhadap prestasi belajar kimia siswa kelas XI dan XII IPA SMAN 4 Mataram. Penelitian ini merupakan penelitian kuantitatif *ex-post facto* dengan jumlah populasi seluruh siswa kelas XI dan XII IPA sebanyak 275 siswa. Sampel digunakan sebanyak 163 siswa yang ditentukan menggunakan teknik *stratified random sampling*. Pengumpulan data menggunakan angket interaksi edukatif guru-siswa dan dokumentasi hasil nilai Ujian Tengah Semester mata pelajaran kimia Semester Ganjil Tahun Ajaran 2022/2023. Teknik analisis deskriptif digunakan untuk mengetahui bagaimana pola interaksi edukatif guru-siswa dan prestasi belajar kimia serta uji hipotesis dengan korelasi *Pearson Product Moment*. Berdasarkan analisis deskriptif bahwa persentase setiap indikator interaksi edukatif menyatakan bahwa siswa kelas XI dan XII IPA pada pembelajaran kimia cenderung komunikasi yang bersifat dua arah. Persentase interaksi edukatif berdasarkan strata (kelas) dan secara keseluruhan siswa SMAN 4 Mataram termasuk kategori cukup. Hasil penelitian menyatakan bahwa terdapat hubungan positif dan signifikan antara interaksi edukatif guru dan siswa terhadap prestasi belajar kimia siswa kelas XI dan XII IPA SMAN 4 Mataram Tahun Ajaran 2022/2023. Kekuatan hubungan variabel interaksi edukatif dengan prestasi belajar kimia termasuk dalam kategori tinggi dengan setiap penambahan 1,289 nilai prestasi belajar kimia, maka nilai interaksi edukatif bertambah sebesar 34,75%.

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INTRODUCTION

Interactions that take place around human life can be transformed into "interactions with educational value", namely interactions that consciously set the goal of changing behavior through one's actions. This interaction with educational value in the world of education is called "educational interaction". In educational interaction, the teacher and student elements must be active, it is impossible for an educational interaction process to occur if only one element is active. Active in terms of attitude, mentality and actions. In a teaching system with a process skills approach, students must be more active than the teacher. The teacher only acts as a guide and facilitator (Djamarah, 2014).

Interaction means the activities of students who learn and educators who teach. Interactions in the teaching and learning process have normative value in that students have standards, norms and values that they believe in. In education, creating a reciprocal relationship between teachers and students is important in teaching and learning activities in order to provide active and directed learning. This interaction shows the activity of students learning and teachers teaching. Teaching and learning activities are interactions in which students adhere to the standards, norms and values they believe in. In teaching and learning interactions there must be a goal which will determine the way and form of interaction.

The achievement of the teaching and learning process can be seen from the results. Student learning achievement will be optimal if good educational interactions are created in the classroom. Educational interactions must depict an active two-way relationship with knowledge as the medium, so that the interaction is a meaningful and creative relationship. Thus, students are expected to be more active in teaching and learning activities and also make student learning achievements better. Where learning achievement becomes a measuring point for the success of a teaching and learning process (Rizawati, 2017).

The results of an interview with one of the chemistry subject teachers at SMAN 4 Mataram, class During online learning, students are still not optimal in understanding chemistry material so that when studying the next material students do not have a basic understanding of the material. Students tend to be passive and less responsive to the lessons explained by the teacher. Many students cannot communicate what they do not understand, so teaching and learning activities occur in only one direction. This results in a lack of interaction during the teaching and learning process, so that learning objectives are not achieved as they should be. This is also proven by the students' grades which are still relatively low.

According to Rusmiati (2017), learning achievement is the level of humanity students have in accepting, rejecting and assessing information obtained in the teaching and learning process. A person's learning achievement is in accordance with the level of success in learning the subject matter expressed in the form of grades or report cards for each field of study after experiencing the teaching and learning process. Student learning achievements can be known after an evaluation is held. The results of the evaluation can show whether student learning achievement is high or low.

The results of Pramiana and Winaryati's research (2014) show that many children assess chemistry teachers as good

at communicating with students, easy to understand, able to create pleasant learning conditions, and use media (assistants) in the learning process. According to Wardhani (2018) that learning media greatly influences educational interactions between teachers and students. If the learning process uses media, students quickly grasp the understanding or meaning taught by the educator. In educational interaction there are three patterns of communication between teachers and students, including, communication as action, communication as interaction and communication as transaction. So, this learning media is very important in the learning process.

Based on the problem description above, research was conducted regarding educational interactions regarding how communication patterns between teachers and students take place in teaching and learning activities to achieve learning objectives. If educational interactions are carried out well, it will be easy for students to learn and understand the subject matter, so that the competencies achieved are as expected. When learning objectives are achieved it will increase student learning achievement. Based on the background explanation above, researchers conducted research on "The Relationship between Teacher and Student Educational Interactions on Student Achievement in Chemistry at SMAN 4 Mataram".

METHODS

The research aims to determine the patterns of educational interaction between teachers and students and their relationship to chemistry learning achievement in class XI and XII science students at SMAN 4 Mataram. This type of research is ex post facto quantitative research where the independent variable has occurred when observing the dependent variable in a study (Ibrahim, 2018). The research design uses correlational research with the aim of finding out the relationship between two variables. So, a theory can be built that can function to explain relationships, predict data and control symptoms (Rukminingsih, 2020).

This research was carried out at SMAN 4 Mataram in the first semester of the 2022/2023 academic year. The stages in this research are the planning stage, namely preparation of proposals, administration of research permits, validation of questionnaire instruments, data collection and data processing stages and data analysis.

The variables of this research are teacher-student educational interactions and chemistry learning achievement. The population was 275 students and the sample was 163 students who were determined using a stratified random sampling technique with a sample size using the Slovin formula at an error level of 5%.

The data collection technique for educational interaction variables between teachers and students uses a questionnaire instrument (questionnaire), while chemistry learning achievement uses a documentation method, namely data on the results of the Mid-Semester Examination (UTS) for the odd semester of the 2022/2023 Academic Year which was obtained from the archives of one of the chemistry teachers at SMAN 4 Mataram. The questionnaire instrument was tested for validity using expert judgment and product moment Pearson (Sugiyono, 2019) so that 16 items were declared valid out of the 22 items tested. The reliability test using Cronbach Alpha was obtained at 0.672 with a high level of question reliability. Prerequisite tests use descriptive statistical tests, normality and linearity tests, while hypothesis tests use simple linear regression tests and Pearson

product moment correlation (Sugiyono, 2019).

RESULT AND DISCUSSION

The educational interaction of teachers and students in this research refers to students' perceptions of how communication patterns exist in interactions between teachers and students and students with other students in chemistry learning obtained from the results of filling out questionnaires by students. Student perception means based on students' views regarding information and experiences about certain objects or events. Educational interaction in this research refers to indicators of teacher and student interaction patterns in learning. There are three forms of communication patterns in interaction, namely communication as action (one direction), communication as interaction (two directions) and communication as transactions (many directions). Communication patterns between teachers and students can influence students' chemistry learning achievements. Chemistry learning achievement is the learning result achieved by each individual student in chemistry subjects taken from mid-semester exam score data from the chemistry teacher archives at SMAN 4 Mataram.

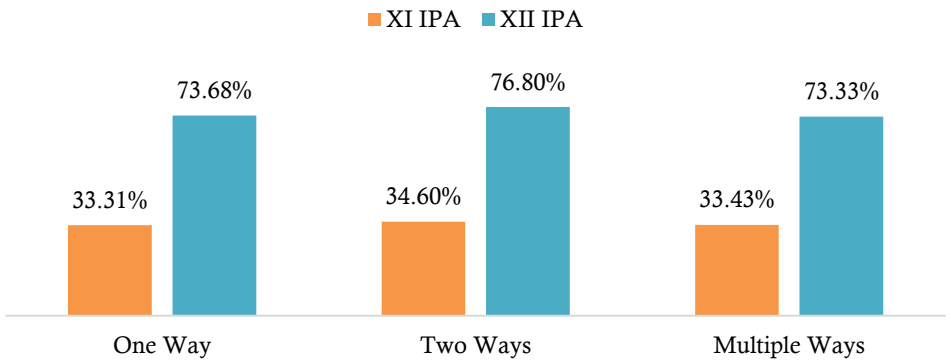

Figure 1. Percentage of Teacher and Student Educational Interactions Based on Indicators

The results of the analysis of the percentage of educational interactions and chemistry learning achievement were interpreted to determine whether the variables were in the low or high category. Based on Figure 5.1, the percentage of each indicator of educational interaction states that there is a very high percentage of the interaction pattern of class XI Science and According to Karuru (2018), the continuity of two-way interaction in learning occurs because of communication that comes from students to teachers or teachers to students. The teacher delivers the material and students respond to the material presented by the teacher. Learning activities in two-way interaction in the classroom atmosphere are more interactive, because there is reciprocity between the teacher and students. Two-way interaction is the most effective and appropriate form of learning to improve student learning outcomes.

The percentage of communication indicators as action or communication between teachers and students in only one direction is quite high. According to Zubaedi (2022), one-way communication pattern is the process of conveying messages from the communicator (teacher) to the communicant (student) using or without media, without any feedback from the communicant (student) in this case the communicant (student) acts as a listener. just. Furthermore, the communication indicator as a transaction or multi-directional communication between teachers and students and students with students is considered the lowest. According

to Karuru (2018), the principle of learning with three-way or more interactions (many directions) can enable a more interactive learning process carried out by teachers and students compared to two-way interactions. By having multi-directional interactions in learning, it will be possible to increase student collaboration and active learning as well as help certain students who experience learning difficulties.

The success of implementing educational interactions in teaching and learning activities in the classroom can be seen from the characteristics or indicators of educational interactions, namely the existence of learning objectives to be achieved, materials or messages that become communication materials, there are students who play an active role as recipients of the message, there are teachers who carrying out communication, there are methods to achieve goals, there are situations that support communication and there is an assessment or evaluation of the results of educational interactions (Nashiruddin, *et al*, 2021).

Based on the results of data analysis, the percentage of educational interactions based on strata and overall is in the sufficient category. The educational interactions between teachers and students that occur during the chemistry learning process are quite active, both from the role of the chemistry teacher and the students. This research is in line with research conducted by Pramiana (2014) which explains that there is good teacher and student interaction which was obtained based on student questionnaires and observations which showed that teachers were very good at interacting with students. Based on the results of descriptive analysis, the percentage of students' chemistry learning achievement based on their respective strata (classes) is in the sufficient category. If we look at the overall trend, the learning achievement obtained by students is in the sufficient category. The percentage of educational interactions and chemistry learning achievement based on strata (class) can be seen in Figure 2.

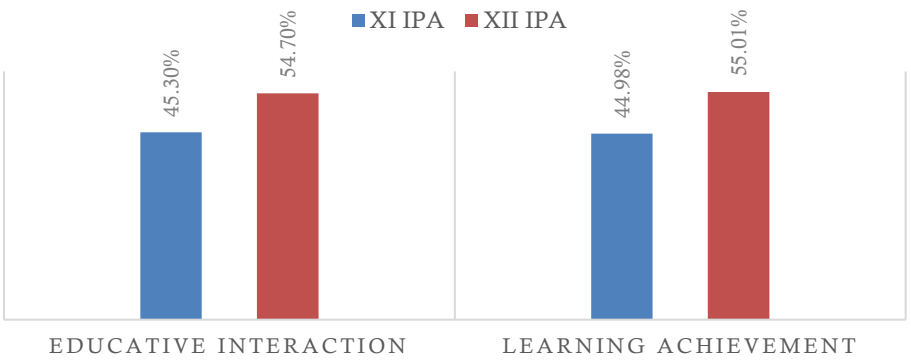

Figure 2. Average Educational Interaction and Chemistry Learning Achievement

Based on Figure 2, it shows that the relationship between the percentage of educational interactions and chemistry learning achievement for each class is a positive or unidirectional relationship. The results of this research also show that the higher the strata or class level, the ability for educational interaction will also increase. According to Sehabuddin (2015), the strong influence of educational interaction between teachers and students on student learning achievement shows that the more optimal the educational interaction between teachers and students is, the greater the

impact on student learning achievement. So, it can be said that the educational interactions that occur in chemistry lessons at SMAN 4 Mataram are quite good.

Normality test results for teacher-student educational interactions (X) using calculated chi square = 9.065 and chi square table = 11.070 with a significance level (α) of 5% and degrees of freedom (d_f) of 5, then the value of X^2 calculated < X^2 table means the data is normally distributed. Meanwhile, for chemistry learning achievement (Y), the calculated chi square = 8.870 and chi square table = 11.070 with a significance level (α) of 5% and degrees of freedom (d_f) of 5, so the value of X^2count <X^2 table means the data is normally distributed.

The results of the linearity test data for the teacher-student educational interaction variable (X) with chemistry learning achievement (Y) stated that the significance value was smaller than 0.05, namely 0.000 < 0.05, so it was concluded that teacher-student educational interaction had a relationship with learning achievement chemistry. The relationship between educational interactions and chemistry learning achievement is a positive relationship with a high level of relationship. Based on the results of the coefficient of determination test, it is known that the contribution of teacher-student educational interaction to chemistry learning achievement is 34.75%.

The t test analysis obtained a result of t_{count} of 9.278 while t_{table} of 1.654 with degrees of freedom (d_f) = 163 and significance level (α) = 0.05, so that $t_{count} > t_{table}$ then H_0 is rejected, which means there is a positive and significant relationship between teacher educational interaction and students on chemistry learning achievement of class XI Science and XII Science students at SMAN 4 Mataram.

The results of the hypothesis test stated that there was a positive relationship between educational interactions between teachers and students on the chemistry learning achievement of class XI and XII IPA students at SMAN 4 Mataram. The relationship between teacher-student educational interaction and chemistry learning achievement is a positive relationship with a very strong level of relationship. This means that if students' educational interactions increase, student learning achievements will also increase. From the regression test, it is known that there is a relationship between educational interaction and chemistry learning achievement with a correlation coefficient value of 0.590 at a significance level of 5%, so this shows that there is a positive relationship between educational interaction and chemistry learning achievement with a high level of relationship. This means that if educational interactions increase, learning achievement will also increase. Next, a determination coefficient test was carried out and a value of 34.75% was obtained. This means that the educational interaction variable contributes to student chemistry learning achievement by 34.75%.

The level of strength of the relationship between educational interaction variables and chemistry learning achievement is a strong level. The higher the educational interaction between teachers and students, the higher the chemistry learning achievement at SMAN 4 Mataram. Previous research that is relevant to this research was also conducted by Zubaedi, *et al* (2022), namely that the higher the interaction used by teachers with students in the process of teaching and learning activities, the better the learning achievements that students will get. Research by Hakim, *et al* (2021) also

concluded that active student participation in class conversations can be linked to better student achievement. This is due to changes in each student's achievement which are related to the quality of class dialogue. Then students who do not have communication in learning tend to show low learning achievement, whereas students who have communication in learning tend to show high learning achievement. So the level of learning achievement is influenced by the communication skills that students have in the learning process.

Educational interaction is an activity that takes place between teachers and students. Students have an important place in educational interaction patterns, because in educational interactions students are the ones who will achieve learning goals. In an optimal learning process, students become the determining factor in educational interactions so that they influence everything needed to achieve learning outcomes. The educational interaction that is needed first is the student, then the other components, such as the materials needed, what is the right way to act, what media and facilities are appropriate and supportive, of course all of this must be adjusted to the characteristics of the student, because the student is the object as well as a learning subject (Handayani, 2015).

Educational interactions have several factors, both influencing and inhibiting factors. According to Zubaedi, *et al* (2022), there are many things that are supporting and inhibiting factors in interactions between teachers and students in improving student learning achievement. The triggers for supporting and inhibiting factors come from both parties. Both from the perspective of a teacher and from a student. According to Nashiruddin, *et al* (2021), also from the teacher factor, obstacles that often occur include teachers not being clear enough in conveying lesson material, the methods used are still considered monotonous by students, for example the lecture method, teachers seeming stern when teaching, and a lack of laughter in learning activities. . Apart from that, teachers are also required to refer to the syllabus and curriculum which causes students to feel that learning is too fast, even though the learning objectives have not been achieved. This will cause students to feel pressured, learning will become stiff, tense and boring for students, thus affecting students' level of understanding of the material presented.

One of the factors underlying the occurrence of educational interactions in learning is the teacher and students. Teachers and students are two subjects who play a role in interacting in teaching and learning activities. The teacher is the party who takes the initial initiative in organizing teaching activities, while the students are the parties who directly experience and benefit from the teaching and learning activities that occur. According to Zaifullah, *et al* (2021), communication between the two subjects can be influenced by several factors, namely (1) Objective factors, to determine the content of the interaction and also the direction of the learning objectives, (2) Material/subject matter factors, must be in accordance with the level conditions students who will receive learning materials, (3) Teacher and student factors, are two important subjects in the learning interaction system, (4) Method factors, namely an orderly way of working to achieve a learning goal, (5) Situation factors, namely learning conditions that related to students' conditions such as spirit in learning. Meanwhile, according to Djamarah (2014), the factors that influence the occurrence of educational interactions are (1) Goal factors, (2) Material factors, (3) Teaching and learning activity factors, (4)

Method factors, (5) Learning tool factors, (6) Learning resource factors, and also (7) Evaluation factors.

CONCLUSION

Based on the research data and discussion of the educational interaction variables and chemistry learning achievement that have been explained, it can be concluded that: (1) The pattern of educational interaction between teachers and students in class XI Science and XII Science at SMAN 4 Mataram for the 2022/2023 academic year in chemistry subjects is communication as interaction or two-way communication. (2) There is a positive and significant relationship between educational interactions between teachers and students on the chemistry learning achievement of students in class XI IPA and XII IPA at SMAN 4 Mataram for the 2022/2023 academic year.

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