ORIGINAL ARTICLE

A Predictive Analysis of Teacher-Student Interactions and Learners' Perceptions of Biology in the Philippine Context

Jed Henry S. Lacorte

West Visayas State University, Iloilo City, Philippines 5000

***Abstract**:* This study examined the predictive power of Teacher Expectation-Student Achievement (TESA) interaction and its dimensions of Response Opportunities, Feedback, and Personal Regard on learners' perceptions of Biology in terms of Concept of Teacher, Interest in Class, and Perceived Ease. A validated survey was administered to 279 randomly selected high school learners from three schools in Iloilo, Philippines. Multiple regression analysis was used to determine predictive relationships. Descriptive results indicated moderately favorable levels of overall TESA interaction and Biology perceptions, with lower mean scores in Personal Regard and Perceived Ease. Overall TESA significantly predicted learners' perceptions of Biology. At the dimension level, Personal Regard emerged as the strongest predictor of both Interest in Class and Concept of Teacher, emphasizing the role of affective teacher–student interactions. Feedback significantly correlates with Perceived Ease, while Response Opportunities did not predict Perceived Ease but significantly predicted both Interest in Class and Concept of Teacher. The findings support affective and interactionist views of learning and suggest that teacher professional development should focus on strengthening personal regard and feedback practices to improve students' perceptions and engagement in Biology.

Science Insights Education Frontiers 2026; 34(2):5477-5501.
DOI: 10.15354/sief.26.or284

How to Cite: Lacorte, J.H.S. (2026). A predictive analysis of teacher-student interactions and learners' perceptions of biology in the Philippine context. Science Insights Education Frontiers, 34(2):5477-5501.

Keywords: *Teacher-Student Interaction, Teacher Expectation-Student Achievement (TESA), Personal Regard, Affective Interactions, Biology Education, Predictive Modeling*

About the Author *Jed Henry S. Lacorte, West Visayas State University, Iloilo City, Philippines 5002. E-mail: jedhenry.lacorte@wvsu.edu.ph. ORCID: https://orcid.org/0009-0002-2952-6412*

Correspondence to*: Jed Henry S. Lacorte at West Visayas State University in Philippines.*

Conflict of Interests*: None*

Funding*: No funding sources declared.*

Data Availability*: Data supporting the findings of this study are available from the corresponding author upon reasonable request.*

Ethics Statement*: The study adhered to the Philippine Health Research Ethics Board (PHREB, 2022) guidelines. Informed consent was obtained from all participants.*

Declaration of Artificial Intelligence Use*: The author utilized artificial intelligence (AI) tools to improve grammar, coherence, and cohesion. The content was evaluated and revised by the author, who takes full responsibility for the final published work.*

Introduction

SOCIAL interactions in educational settings are now recognized as a critical determinant of teaching and learning outcomes. Following initial investigations in the 1950s and 1960s, studies on classroom interactions have developed significantly, with particular attention given to opportunities for teachers to communicate content knowledge and its practical application to students in effective ways (Zheng et al., 2021). The dynamic of teacher–student interactions is closely linked to several core elements of the classroom that are essential for creating a positive classroom atmosphere (Zhao, 2024), cultivating an engaging learning environment (Sinaga, 2024), and providing an optimal setting for intellectual growth and development (Chen, 2023). Furthermore, attention to these interactions extends to the economic, social, environmental, and public policy dimensions that benefits global sustainability through inclusive quality education aligned with the United Nations Sustainable Development frameworks (Mohd et al., 2024). However, despite these advances, there remains no cohesive instructional model that clearly integrates what kinds of interactions should be enacted during instruction.

The extensive research confirming the importance of classroom interactions led Zheng et al. (2021) to explain that focusing only on participation frequency is insufficient. A more complete understanding requires attention to the quality of interactions, beginning with the identification of the specific interaction types teachers use and how these relate to different components of student learning. In this context, Busari et al. (2023) similarly emphasize that many teachers remain unaware of the strong influence they have on educational effectiveness, which results in missed opportunities to maximize student learning. Landorf and Wadley (2021) describe teachers as essential agents who transmit knowledge and uphold standards of conduct, highlighting their responsibility to use both the physical and social classroom environment in strategic ways that support meaningful learning experiences.

The benefits of constructive classroom interactions affect not only cognitive learning but also students' psychological and social development. Kahveci (2023) found that positive teacher behaviors enhance learners' confidence, motivation, satisfaction, and trust, whereas negative behaviors reduce motivation, undermine confidence, weaken respect toward teachers, and interfere with social development. Other research demonstrates connections between students' perceptions of teacher behavior and their views on subject difficulty (Zhao, 2024; Pervin

et al., 2021), their interest in class (Nandini et al., 2024; Gui, 2024), and their overall perception of teachers (Agrawal et al., 2024). Despite these insights, many studies rely on broad correlational evidence, limiting understanding of the specific and unique roles that different types of interactions play in shaping effective learning environments.

In a comparative study, Zhao (2024) noted that traditional teaching approaches often produce passive learners who rely heavily on the teacher and demonstrate limited critical thinking. In contrast, student-centered approaches that incorporate frequent positive teacher-student interactions increase motivation, responsibility, deeper thinking, and genuine interest in the subject. Although positive teacher-student relationships are beneficial, Yilmaz (2022) and Arcidiacono and Giglio (2024) explain that these relationships are complex to develop and require ongoing professional reflection and improvement.

This study is grounded in the Teacher Expectation-Student Achievement (TESA) training model of Kerman, Kimball, and Martin (1980, cited in Gottfredson et al., 1991; Gottfredson et al., 1995). TESA includes three interconnected dimensions representing different types of teacher-student interactions. Personal Regard, which covers Proximity, Courtesy, Personal Interest, Compliments, Touching, and Desist, indicates the socio-emotional quality of interactions. Feedback, which includes Affirm or Correct Responses, Praise, Reasons for Praise, Listening, and Accepting Feelings, represents instructional and evaluative quality. Response Opportunities, comprising Equitable Distribution, Individual Help, Latency, Delving, and Higher-Level Questioning, captures transactional and participatory quality. While these dimensions are related, TESA suggests that each serves a distinct primary purpose. Accordingly, this study aims to examine the separate effects of the affective, instructional, and transactional TESA dimensions on students' Concept of Teacher, Perceived Ease, and Interest in Class.

Although classroom interactions have been widely studied, few studies have looked at how the TESA dimensions of Personal Regard, Feedback, and Response Opportunities affect students' perceptions of Biology. This is important because biological concepts can be abstract and difficult, which may need different interaction patterns than other subjects. Meanwhile, most TESA research has been done in Western contexts, where individualistic values are common. It is not clear if these findings apply to collectivist cultures such as the Philippines, where group harmony and respect for authority may affect how often students take part in transactional interactions like Response Opportunities.

This study examines the relationship between teacher-student interactions and students' perceptions of Biology using the TESA categories. It looks at which types of interactions predict students' views on the ease of Biology, their interest in the subject, and their perception of their Biology teacher, with the goal of providing practical guidance for teaching, supporting curriculum development, and helping prepare globally competent graduates.

Research Questions

This study is guided by the following research questions:

1. What are learners' perceived levels of teacher-student interactions, overall, and in terms of (a) Response Opportunities, (b) Feedback, and (c) Personal Regard?
2. What are learners' perceived levels of Biology, overall, and in terms of (a) Perceived Ease of Biology, (b) Interest in Biology class, and (c) View of their Biology teacher?
3. To what extent do learners' perceptions of teacher-student interaction, specifically Response Opportunities, Feedback, and Personal Regard, predict their overall perceptions of Biology in terms of Perceived Ease, Interest in Biology class, and View of their Biology teacher?

Null Hypothesis

Learners' perceptions of teacher-student interaction, along with its dimensions of Personal Regard, Feedback, and Response Opportunities, do not significantly predict their overall perceptions of Biology in terms of ease of the subject, their interest in Biology class, and their view of their Biology teacher.

Review of Related Literature

Roles and Influence of Teacher Expectations in Learning

Teacher expectations refer to educators' beliefs about their students' capacity for academic success (Rubie-Davies & Turner, 2022). These beliefs actively shape instructional methods, classroom activities, and teacher-student interactions. Positive expectations expressed through actions promote better academic performance and psychological

outcomes, such as confidence and intrinsic motivation (Rubie-Davies et al., 2020). Teacher expectations are thus a self-fulfilling prophecy influencing students' academic trajectories.

Observable classroom behaviors reveal these expectations. Teachers signal their beliefs through classroom climate, feedback quality, instructional input, and cognitive demands (Shan, 2022; Bouderbane, 2020). Consistently, high expectations create supportive environments, provide meaningful feedback, and encourage participation. Students interpret these signals as belief in their potential, enhancing motivation and self-confidence (Johnston et al., 2021).

Engagement quality varies by student performance. Denessen et al. (2020) found low- performing students received directive feedback, while high-performing students received facilitative feedback promoting autonomy and deeper understanding. Frequency alone does not capture interaction quality. The current study's variables, Response Opportunities, Feedback, and Personal Regard, are rooted in this literature and align with the TESA model to analyze teacher-student communication. Teacher expectations are shaped by student factors such as prior achievement and motivation, and teacher factors including experience and self-efficacy. High teacher self-efficacy supports higher expectations and consistently positive teaching behaviors (Aydın & Ok, 2022).

Teacher Expectations and Academic Achievement

The connection between teacher expectations and academic performance is empirically robust. Pervin et al. (2021) established a strong positive correlation between teacher-student interaction shaped by expectations and students' grade point average. Furthermore, a longitudinal study by Rubie-Davies et al. (2020) demonstrated that students taught by high-expectation teachers achieved significantly better academic outcomes by year-end compared to similar peers taught by low-expectation teachers, even when starting at comparable achievement levels. This powerful, compounding effect is particularly noticeable in early education where students are highly sensitive to teacher signals. These studies collectively confirm that teacher expectations dictate the distribution of attention and tasks, with high- expectation students receiving more challenging tasks and critical feedback geared toward intellectual growth (Aydın & Ok, 2022).

Teacher Expectations and Students' Interest

Beyond academic achievement, teacher expectations profoundly influence students' motivation and interest in learning. Shan (2022) and Siems-Muntoni et al. (2023) demonstrated that high teacher expectations significantly improve students' self-concept, their sense of control over the learning process, and their tendency to attribute success to their own effort. Sustained exposure to high expectations supports stronger beliefs in academic capability and, consequently, greater intrinsic interest in the subject matter (Siems-Muntoni et al., 2023). Moreover, a supportive, high-expectation environment reduces student anxiety, making students more willing to engage confidently with challenging tasks (Rubie-Davies et al., 2020). This sustained motivational effect is a key mechanism for long-term academic success.

Teachers' Expectations and Students' Perceptions of Teachers

Teacher expectations are instrumental in shaping how students perceive their instructors. Students commonly define a good teacher based on attributes like respect, patience, fairness, and competence (Ramadan & Ali, 2021). These qualities are strongly associated with teachers who clearly communicate high expectations. When teachers express high expectations, students report higher levels of perceived teacher support and academic competence (Rubie-Davies et al., 2020). This positive perception not only strengthens the student-teacher relationship but also encourages deeper student engagement, supporting a classroom environment of confidence and motivation.

The literature consistently confirms the direct influence of teacher expectations, realized through classroom interactions, on student achievement, motivation, and perceptions of their instructors. While the relationship between interaction quality and student perceptions is well-established across various educational settings, a significant limitation persists. Specifically, the majority of extant studies utilize broad measures of interaction or focus predominantly on primary/general education outcomes. Consequently, an empirical void remains regarding the predictive power of specific, qualitatively defined TESA-based interaction types namely Response Opportunities, Feedback, and Personal Regard on student perceptions within the context of a specialized secondary subject. Specifically, the relationship between these defined

TESA-based interactions and student perceptions of a conceptually challenging subject like Biology regarding its ease, their interest, and view of the teacher requires empirical investigation. This study is designed to bridge this gap by establishing those specific predictive relationships.

Research Design and Methodology

Design and Rationale

This study employed a quantitative, non-experimental predictive correlational design to examine how TESA-based teacher–student interactions, both overall and across the dimensions of Response Opportunities, Feedback, and Personal Regard, predict students' overall perceptions of Biology and its components, including Perceived Ease, Interest in Class, and View of the Teacher. This design allows the analysis of relationships among variables without manipulation, which is appropriate when interventions are impractical and unethical, as in pre-existing teacher–student interactions (Putri et al., 2025; Wubante, 2020). Using observed interaction patterns, the study developed predictive models to identify the influence of different types of teacher–student interactions on students' perceptions of Biology.

Research Participants and Sampling

The target population for this study consisted of all Grade 10 students in public high schools in Santa Barbara, Iloilo, Philippines. For practical accessibility and geographic representation, three schools from the municipality's northern, southern, and central clusters were selected as research locales, yielding a total accessible population of 933 students. Two schools were excluded from the main study. One northern school which declined participation, and one southern school which was used for pilot testing, to avoid contamination of the main sample and potential bias in the pooled results.

A three-stage sampling procedure was employed. In the first stage, schools were purposively selected to ensure representation across the municipality's geographic clusters. In the second stage, the total sample size (n = 279) was determined using Slovin's formula with a 5% margin of error applied to the accessible population (N = 933). This total sample was then allocated to each school proportionally according to its Grade 10

Table 1. Distribution of Grade 10 Population and Sample Size by School Location.

	Location	Population (N)	Sample Size (n)
School A	North	28	22
School B	South	80	35
School C	Central	825	222
Total		**933**	**279**

Note: Sample sizes were allocated proportionally according to each school's share of the total accessible population and were rounded for operational feasibility. Analyses were conducted on the pooled sample across all three schools (n_{total}), and proportional allocation was used solely to maintain geographic representativeness.

population relative to the total accessible population to ensure representativeness across geographic clusters. Sample sizes were rounded for operational feasibility while maintaining approximate proportional representation. In the third stage, students were randomly selected from each school's official Grade 10 roster according to these proportional allocations. All analyses were conducted on the pooled sample across three schools, and the proportional allocation was used solely to maintain representativeness, not for separate per-school analysis.

The adequacy of this sample for multiple linear regression was further confirmed through a G*Power analysis (F test, R^2 deviation from zero), which indicated a minimum of 68 cases for three predictors (power = 0.80, α= 0.05, medium effect size $f^2 = 0.15$). By including 279 students, the study exceeded this minimum, ensuring sufficient statistical power for analyses conducted on the pooled sample. It should be noted, however, that the subsamples for individual schools, particularly the rural schools A and B, were insufficient for independent regression modeling. Consequently, the findings primarily reflect the central urban school context, and caution is warranted when generalizing to rural settings.

Table 1 shows the Grade 10 population and the corresponding sample sizes determined through proportional random sampling for each participating school.

Instrumentation

The primary quantitative instrument was a 30-item structured survey questionnaire developed by the researcher, using a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree) to assess students' perceptions. The questionnaire comprised three sections. Part I collected demographic information, including age, gender, and school location. Part II measured students' perceptions of teacher-student interaction and

included 15 items based on the Teacher Expectation-Student Achievement (TESA) framework, covering the dimensions of Response Opportunities, Feedback, and Personal Regard. Items were derived by translating key interaction indicators into observable classroom situations relevant to the Grade 10 Biology context. Representative items included "After he or she asks a question, my Biology teacher gives us time to think of the answer" for Response Opportunities, "My Biology teacher explains our scores in our performance" for Feedback, and "My Biology teacher speaks respectfully" for Personal Regard.

Part III consisted of 15 items designed to measure students' perceptions of Biology in terms of Perceived Ease, Interest in Class, and Concept of Teacher. Items were developed based on a review of science education literature, the Grade 10 Biology curriculum, and theoretical assumptions that classroom interactions influence students' cognitive and affective responses. Representative items included "Explaining the parts of the reproductive system in Biology is hard" for Perceived Ease, "I feel excited to attend my Biology class because my teacher helps me a lot" for Interest in Class, and "Our Biology teacher assists me to understand the parts of the reproductive system" for Concept of Teacher.

The instrument underwent content and face validation by a panel of three experts in Science Education, Educational Psychology, and Guidance and Counseling. Each item achieved an item-level content validity index (I-CVI) of 1.00, and the scale-level content validity index using universal agreement (S-CVI/UA) was also 1.00, indicating strong item-level and overall content validity with full consensus among the validators (Jia et al., 2023). Reliability testing using Cronbach's alpha on pilot data demonstrated high internal consistency, with an overall alpha of 0.815. The reliability coefficients for Part II and Part III were 0.775 and 0.747, respectively, exceeding the recommended threshold of 0.70, indicating acceptable reliability for research purposes (Yun et al., 2023). Negatively worded items in Parts II and III were reverse scored during analysis to ensure accurate representation of the intended constructs.

A 4-point Likert scale was used to enhance discriminant validity by removing the neutral midpoint, encouraging students to indicate a clear evaluative direction. This forced-choice format reduces central tendency bias and promotes more decisive responses (Koo & Yang, 2025). With a limited number of response options, students could clearly select their answers, minimize random or inconsistent responses and support data reliability. This format was considered appropriate for capturing evaluative judgments in the context of Biology classes in the Philippines, where students' perceptions of teacher-student interactions and learning

experiences are central to determining the predictive power of the TESA framework. The removal of a neutral midpoint aligns with Filipino communication tendencies to preserve harmony, avoid confrontation, and maintain face (Santos, 2022), encouraging students to provide clear but socially considerate evaluations. Acknowledging a limitation, some participants may perceive that the available options do not fully reflect their views.

Data Analysis

Data analysis, including descriptive and multiple regression statistics, was conducted on the quantitative data collected from $N = 279$ student respondents using Jamovi statistical software (Version 2.7.5). Preliminary data screening revealed no missing values across all study variables and, therefore, no data imputation or exclusion procedures were necessary.

Although the data were collected using a four-point Likert scale, the responses were treated as interval variables. This approach is methodologically acceptable because the items were aggregated into composite scale scores, allowing the resulting distributions to approximate the continuity required for parametric procedures (Lionello et al., 2021).

Normality was initially examined using the Kolmogorov–Smirnov test, which is commonly recommended for large sample sizes (Sayili and Gunver, 2025). The results indicated significant deviations from normality for most variables ($p < 0.05$). However, further inspection of skewness and kurtosis showed values ranging from −0.618 to 0.304 and −0.061 to 1.704, respectively. These values fall within the commonly accepted thresholds of ± 2 for skewness and ± 7 for kurtosis (Blanca et al., 2012; López et al., 2025), suggesting that the distributions were approximately normal and suitable for parametric analysis. Magsalay (2025) explained that although the Kolmogorov–Smirnov test indicated non-normality, this may reflect its sensitivity to minor deviations in large samples, and that a sample size of 200 is sufficient for parametric tests to produce reliable results.

Descriptive statistics were computed using means (*M*) and standard deviations (*SD*). Mean scores were interpreted based on the four-point descriptive scale presented in **Table 2**.

Multiple regression analysis was conducted to determine the predictive influence of Teacher–Student Interactions on students' Perceptions of Biology. Prior to model estimation, regression assumptions were evaluated. Multicollinearity was assessed using the Variance

Table 2. Scales and Descriptions for Learners' Degree of Perception.

Mean Score Range	Interpretation
1.00-1.75	Not Favorable
1.76-2.50	Less Favorable
2.51-3.25	Moderately Favorable
3.26-4.00	Highly Favorable

Inflation Factor (VIF), with all predictor values below 1.51, indicating no multicollinearity concerns (Upendra et al., 2023). The independence of residuals was examined using the Durbin–Watson statistic, which ranged from 1.45 to 1.75 across all models, suggesting acceptable independence (Turner et al., 2021). Homoscedasticity was tested using the Breusch–Pagan test, which produced p-values ranging from 0.484 to 0.929, all above the 0.05 threshold, indicating that the assumption of homoscedasticity was satisfied (Ilori & Tanimowo, 2022). The level of statistical significance for all inferential tests was set at 0.05.

Ethical Consideration

This study adhered to the ethical principles and guidelines of the Philippine Health Research Ethics Board (PHREB, 2022). Approval was obtained from school authorities before data collection. Informed consent and assent were secured from parents and minor participants, detailing the study's objectives, procedures, risks and benefits, and the right to voluntary participation and withdrawal without penalty. Students were reoriented on their rights and gave verbal consent before their actual participation. Confidentiality and anonymity were strictly maintained, and no student identifiers were recorded. All data were securely stored in locked containers accessible only to the researcher. Participants were debriefed, thanked, and provided with the researcher's contact information for any follow-up inquiries.

Results

Descriptive statistics were computed for all student participants (N=279) regarding their perceptions of Teacher-Student Interactions and its dimensions. Overall, learners reported a moderately favorable perception of Teacher-Student Interactions (M=3.03, SD=0.33). Response Opportunities received the highest mean score (M=3.12, SD=0.47),

Table 3. Learners' Perceived Level of Teacher-Student Interactions.

Perceptions of Teacher-Student Interaction	N	M	SD	Interpretation
Overall	279	3.03	0.33	Moderately Favorable
Response Opportunities	279	3.12	0.47	Moderately Favorable
Feedback	279	3.08	0.40	Moderately Favorable
Personal Regard	279	2.88	0.35	Moderately Favorable

Note: Interpretation scale: 1.00−1.75 = Not Favorable; 1.76−2.50 = Less Favorable; 2.51−3.25 = Moderately Favorable; 3.26−4.00 = Highly Favorable.

Table 4. Learners' Perceived Level of Biology.

Perceptions of Biology	N	M	SD	Interpretation
Overall	279	2.94	0.33	Moderately Favorable
Ease of Biology	279	2.90	0.44	Moderately Favorable
Interest in Biology	279	2.94	0.41	Moderately Favorable
Concept of Biology Teacher	279	2.99	0.39	Moderately Favorable

Note: Interpretation scale: 1.00−1.75 = Not Favorable; 1.76−2.50 = Less Favorable; 2.51−3.25 = Moderately Favorable; 3.26−4.00 = Highly Favorable.

followed closely by Feedback (M=3.08, SD=0.40). Personal Regard was also perceived as moderately favorable but with the lowest mean score (M=2.88, SD=0.35). Based on the established interpretation scale, all measured aspects of teacher- student interaction were viewed favorably. The detailed descriptive results are provided in **Table 3**.

Descriptive statistics regarding the learners' perceptions of Biology, overall and across its specific components, were calculated. Overall perceptions of Biology were rated as moderately favorable (M=2.94, SD=0.33). The dimension with the highest mean score was the Concept of Biology Teacher (M=2.99, SD=0.39). This was followed by Interest in Biology Class (M=2.94, SD=0.41) and Perceived Ease of Biology (M=2.90, SD=0.44). The data consistently indicate a moderately favorable perception of Biology and its related factors among the learners. The detailed descriptive results are provided in **Table 4**.

A series of regression analyses were conducted to examine the predictive relationships between Teacher-Student Interaction (TESA) dimensions and various perceptions of Biology. The initial simple linear regression determined that the learners' overall perception of Teacher-Student Interactions was a highly significant positive predictor of their overall Perceptions of Biology, thus rejecting the null hypothesis. The overall model was highly statistically significant (F (1,277) =220.24, p<0.001), explaining 44.3% of the variance in the outcome variable

(R2=0.443). The unstandardized coefficient (B=0.676) suggests a 0.676 unit increase in overall Perception of Biology for every one-unit increase in perceived Teacher-Student Interactions.

Moving to the specific dimensions, a subsequent multiple linear regression examined the predictive power of the three TESA dimensions on the Perceived Ease of Biology. This overall model was statistically significant ($F(3,275) = 34.20$, $p<0.001$), explaining a moderate 27.1% of the variance ($R2=0.271$). Response Opportunities was not a significant predictor of Perceived Ease ($p = 0.114$). However, it significantly predicted both Interest in Biology ($\beta=0.200$, $p=0.001$) and the Concept of the Biology Teacher ($\beta=0.231$, $p<0.001$), suggesting that participation opportunities primarily correlate with engagement and teacher perception rather than perceived ease of learning.

Furthermore, the multiple linear regression predicting Interest in Biology Class was also highly statistically significant ($F(3,275) = 45.54$, $p<0.001$), explaining 33.2% of the variance ($R2 = 0.332$). In this model, all three TESA dimensions were statistically significant positive predictors. Personal Regard was the strongest predictor ($\beta=0.293$, $t=5.17$, $p<0.001$), followed by Feedback ($\beta=0.222$, $t=3.70$, $p<0.001$), and Response Opportunities ($\beta=0.200$, $t=3.32$, $p=0.001$). The positive unstandardized coefficients confirm that favorable teacher-student interactions significantly predict greater learner interest.

Finally, the regression examining the prediction of the Concept of Biology Teacher also yielded a highly statistically significant model ($F(3,275) = 37.38$, $p<0.001$), explaining 28.9% of the variance ($R2 = 0.289$). Consistent with the previous findings for interest, all three TESA dimensions were statistically significant positive predictors of a favorable concept of the teacher. Personal Regard was the strongest predictor ($\beta=0.244$, $t=4.05$, $p<0.001$), followed by Response Opportunities ($\beta=0.231$, $t=3.63$, $p<0.001$), and Feedback ($\beta=0.208$, $t=3.31$, $p=0.001$). The positive coefficients confirm that positive teacher-student interactions are significantly associated with a more favorable concept of the teacher. The comprehensive results for all regression analyses are summarized in **Table 5**.

Discussion

Learners in this study hold an overall moderately favorable perception of Teacher-Student Interactions (TESA), reflecting positive relational practices while indicating notable inconsistencies in student experience.

Table 5. Results of Inferential Analysis.

Outcome Variable	Predictor Variable	B	SE	β	t	P	R2	F	df
Overall	TESA Interactions								
Perceptions	(Overall)	0.676	0.046	0.666***	14.84	<.001	0.443	220.24	1, 277
	(Intercept)	0.896	0.139	—	6.46	<.001			
Perceived Ease	Response Opportunities	0.093	0.059	0.100	1.59	0.114	0.271	34.2	3, 275
	Feedback	0.353	0.069	0.322***	5.09	<.001			
	Personal Regard	0.269	0.075	0.213***	3.61	<.001			
	(Intercept)	0.742	0.218	—	3.41	<.001			
Interest in Class	Response Opportunities	0.174	0.053	0.200**	3.32	0.001	0.332	45.54	3, 275
	Feedback	0.230	0.062	0.222***	3.7	<.001			
	Personal Regard	0.345	0.067	0.293***	5.17	<.001			
	(Intercept)	0.693	0.195	—	3.56	<.001			
Concept of Teacher	Response Opportunities	0.188	0.052	0.231***	3.63	<.001	0.289	37.38	3, 275
	Feedback	0.202	0.061	0.208**	3.31	0.001			
	Personal Regard	0.267	0.066	0.244***	4.05	<.001			
	(Intercept)	1.015	0.192	—	5.29	<.001			

*Note. TESA = Teacher-Student Interactions; B=Unstandardized Regression Coefficient; SE=Standard Error; β=Standardized Regression Coefficient. **p<0.01; ***p<.001.*

This moderate classification suggests that the TESA climate falls short of a highly favorable status, which can be understood by examining the interaction between its three dimensions. Specifically, the moderate rating is primarily driven by the lower perception of Personal Regard compared to the higher perceptions of Response Opportunities and Feedback. This pattern indicates that while transactional and instructional interactions are generally effective, the affective and relational aspects of the teacher-student bond may be the main constraint preventing a universally positive TESA climate.

The moderately favorable perception of Response Opportunities implies that students recognize the provision of participation chances, but the dimension's overall score is limited by issues of quality and fairness. Practices related to equitable distribution may remain inconsistent, as reliance on verbal answering often favors confident students (Whitney et al., 2023). Moreover, the moderate rating could reflect challenges in seeking individual help, since students often avoid asking questions publicly due to fear of embarrassment (Peeters et al., 2020; Cohen and Zusho, 2023). Conversely, the rating benefits from effective timing practices such as latency (Umali and Villaruz, 2024; Süt, 2020), yet inconsistent use of delving questions (Truong, 2024) and the challenging

nature of higher-level questioning (Akilli and Kingir, 2020) collectively prevent the dimension from achieving a higher mean perception.

Similarly, the moderately favorable perception of Feedback signals variability in consistency and impact, suggesting a mismatch between student expectations and delivery frequency. Students value affirmation, yet teachers may delay or avoid full corrections to promote critical thinking (Kholisoh and Bharati, 2021). A similar contradiction is evident in praise, where even infrequent, specific praise can boost confidence (Anh and Thuy, 2020) despite teachers sometimes failing to provide reasons for such praise (Van Der Kleij and Adie, 2020).

The lowest perception for Personal Regard confirms that affective relationships represent the most significant area for improvement in the TESA climate. High expectations for courtesy often contrast with teachers unintentionally violating politeness maxims (Yusri et al., 2023). The moderate rating may also reflect limitations in proximity, as teacher movement is often inconsistent (Kara, 2020; Mikulski, 2022), while near-avoidance of touch is influenced by institutional and moral concerns surrounding physical boundaries (Karvonen et al., 2023; Varea and Öhman, 2022). This low consistency in relational behaviors confirms Personal Regard as the weakest TESA dimension.

Learners hold an overall moderately favorable perception of Biology, consistently reflected across all three component dimensions of Concept of Teacher, Interest in Class, and Perceived Ease. The highest rating was assigned to the teacher concept, followed by interest, while perceived ease received the lowest rating. This ranking establishes that Perceived Ease, rather than Interest in Class or Concept of Teacher, is the primary constraint on overall positive perception of Biology. The moderately favorable perception of Perceived Ease suggests that although the subject is challenging, due to complex topics like Genetics (Fauzi et al., 2021), most students can manage the content. This moderate perception may be attributed to a supportive learning environment, where student cooperation and peer interaction mitigate challenges (Ling et al., 2020), and meaningful activities or technology-enhanced methods reduce perceived difficulty (Soltani et al., 2022). The moderately favorable perception of Interest suggests that instructional strategies establish foundational engagement but may fail to sustain intrinsic interest (Oliveira and Lathrop, 2022). Finally, the highest rating for Concept of Biology Teacher reflects the success of instructional practices that build emotional rapport and demonstrate subject mastery, while still limited by ineffective content delivery and inconsistent affective connection (Carvalho et al., 2025; Safra et al., 2025).

The inferential analysis strongly supports the central hypothesis, confirming that overall TESA is a highly significant positive predictor of learners' overall perceptions of Biology. This validates the theoretical model asserting that classroom relational climate profoundly influences student subject perception.

The regression models reveal nuanced relationships between TESA dimensions and Biology perceptions. Response Opportunities did not significantly predict Perceived Ease ($p=0.114$), suggesting that transactional participation alone may not reduce perceived difficulty. This may reflect cultural norms in the Philippines, where students defer to authority and are reluctant to use response opportunities to signal academic challenges. Such non-significance highlights a functional distinction: transactional Response Opportunities, emphasizing participation equity and question latency, do not directly address cognitive struggles associated with content complexity. Filipino norms of deference and teacher-student power distance inhibit students from openly signaling academic difficulties, as doing so carries a social cost related to saving face and fear of failure (Wonder, 2021).

However, Response Opportunities significantly predicted both Interest in Biology ($p=0.001$) and the Concept of the Biology Teacher ($p<0.001$), indicating that equitable participation promotes engagement and shapes teacher perception even without directly affecting perceived ease. Feedback and Personal Regard emerged as highly significant positive predictors. Feedback's strong predictive power indicates that well-timed, constructive input promotes learning motivation and perseverance (Liu, 2024; Peng, 2021). Personal Regard suggests that a supportive emotional climate, built through courteous communication (Sari and Daulay, 2023), lowers affective barriers and facilitates approach to challenging content (De Neve et al., 2022).

In predicting Interest in Biology, all three TESA dimensions were highly significant positive predictors, confirming that increasing interest in class requires a holistic approach. Personal Regard was the strongest predictor, revealing that a student's sense of being cared for is the most powerful determinant of intrinsic interest, reinforcing the role of strong interpersonal relationships in motivation and curiosity (Amerstorfer & Von Münster-Kistner, 2021; Nurishlah et al., 2023). Response Opportunities energize engagement through inclusive practices (Ghafar and Hazaymeh, 2024), while Feedback sustains interest via praise and recognition, promoting growth mindset (Zarrinabadi et al., 2021).

Finally, the Concept of the Biology Teacher was positively predicted by all three TESA dimensions. Personal Regard remained the

strongest predictor, confirming that emotional rapport and respectful behavior form the foundation of students' favorable view of their teacher (Schieghart, 2022). Response Opportunities and Feedback enhance perceptions of teacher competence, inclusivity, and respect (Ghafar and Hazaymeh, 2024; Troyer, 2022). Collectively, the three TESA dimensions indicate that the ideal teacher, as perceived by students, balances technical effectiveness (Response Opportunities and Feedback) with affective care, emphasizing the primacy of relational factors in shaping academic perceptions.

Overall, the findings reinforce interactionist and affective-motivational frameworks by demonstrating that relational dimensions, particularly Personal Regard, play a central role in shaping students' academic perceptions beyond instructional mechanics. Practically, these results suggest that Biology teachers and school leaders should prioritize professional development that strengthens affective competencies such as courteous communication, emotional support, and trust-building, alongside technical skills in questioning and feedback. Interventions intentionally cultivating Personal Regard, paired with consistent, meaningful Feedback, may effectively increase Perceived Ease and enhance Interest in Class, improving overall learning experiences in science classrooms.

Despite establishing a highly significant predictive relationship between TESA and students' perceptions of Biology, this study has important methodological and contextual limitations. Methodologically, reliance on a single-session survey introduces potential social desirability bias, which may inflate favorable self-reports and obscure the range of classroom experiences. Instruments were rigorously validated and showed strong reliability, but the study was confined to a single geographical town, limiting external validity and generalizability across diverse school systems, urban/rural contexts, or student demographics. The non-significant prediction of Perceived Ease by Response Opportunities suggests the need for granular qualitative analysis to understand cognitive barriers. Future research should adopt multi-site, longitudinal, or mixed-methods designs incorporating student interviews to triangulate affective variables and compare interaction patterns across core science subjects.

Conclusion

This study demonstrates that Teacher Expectation–Student Achievement (TESA) interactions are significant predictors of learners' overall perceptions of Biology. Three main findings emerged. First, Personal

Regard was the strongest positive predictor of both Interest in Class and the Concept of Teacher. All three TESA dimensions of Personal Regard, Feedback, and Response Opportunities, contributed significantly to these outcomes, indicating that positive attitudes toward Biology arise from a balanced integration of emotional support, instructional guidance, and active participation. Second, Feedback and Personal Regard predicted Perceived Ease, whereas Response Opportunities did not. Nonetheless, Response Opportunities significantly predicted both Interest in Class and the Concept of Teacher, suggesting that equitable participation promotes engagement and perceptions of the teacher, even if it does not directly reduce perceived difficulty. Third, the descriptive results revealed a generally positive classroom climate but identified lower scores in Personal Regard and Perceived Ease, revealing areas that should be prioritized for improvement.

These findings carry important implications for science education. They reinforce learning theories that emphasize the role of teacher–student relationships and provide practical guidance for enhancing Biology instruction through intentional affective interaction. The results affirm the need for teaching approaches that balance consistent emotional regard with high-quality feedback practices. Consequently, teacher preparation should expand beyond purely technical instruction to include the deliberate development of affective and relational competencies that support students' perceptions of Biology and engagement with the subject.

While the study confirmed strong predictive relationships, it is limited by its single-session design and geographically restricted sample, which constrain the generalizability of the results. Future research should involve larger and more diverse samples, employ longitudinal or mixed-methods designs, and examine TESA interaction patterns across various science disciplines. Strengthening students' perceptions of Biology requires quality emotional and relational classroom experiences, which form the true foundation of meaningful and lasting scientific learning.

Acknowledgement

The researcher would like to thank Dr. Peter Ernie D. Paris for his valuable guidance in the completion of this study, as well as the participating schools and learners in the Municipality of Santa Barbara, Iloilo, for their cooperation.

References

Agrawa, S., Sagi, S., Srinivasaiah, B., & Ray, N. K. (2024). The impact of teacher-student relationships on students' perceptions of teachers' educational effectiveness. Journal of Research in Vocational Education, 6(11), 45–53. DOI: https://doi.org/10.53469/jrve.2024.6(11).10

Akilli, H. İ., & Kingir, S. (2020). The impact of high-level teacher questioning on elementary school students' achievement, retention and attitude in science. Journal of Education in Science Environment and Health. DOI: https://doi.org/10.21891/jeseh.811429

Amerstorfer, C. M., & Von Münster-Kistner, C. F. (2021). Student perceptions of academic engagement and student-teacher relationships in problem-based learning. Frontiers in Psychology, 12. DOI: https://doi.org/10.3389/fpsyg.2021.713057

Anh, V. T. L., & Thuy, L. D. T. (2020). Praise as classroom communicative reinforcing device: Perceptions of Vietnamese university students. Vysshee Obrazovanie V Rossii = Higher Education in Russia, 29(12), 57–71. DOI: https://doi.org/10.31992/0869-3617-2020-29-12-57-71

Arcidiacono, F., & Giglio, M. (2024). Social interactions in the classroom: Thoughts and perspectives. In Peter Lang Verlag eBooks. DOI: https://doi.org/10.3726/b21942

Aydın, O., & Ok, A. (2022). A systematic review on teacher's expectations and classroom behaviors. Uluslararası Eğitim Programları Ve Öğretim Çalışmaları Dergisi, 12(1), 247–274. DOI: https://doi.org/10.31704/ijocis.2022.011

Blanca, M. J., Arnau, J., López-Montiel, D., Bono, R., & Bendayan, R. (2012). Skewness and kurtosis in real data samples. Methodology, 9(2), 78–84. DOI: https://doi.org/10.1027/1614-2241/a000057

Bujang, M. A., Sa'at, N., & Sidik, T. M. M. (2017). Determination of minimum sample size requirement for multiple linear regression and analysis of covariance based on experimental and non-experimental studies. Epidemiology Biostatistics and Public Health, 14(3), e12117-3. DOI: https://doi.org/10.2427/12117

Busari, I., Funmilayo, A., & Sulaimon, T. (2023). Examining the impact of teachers' attitudes on college students' attitudes in a Mathematics classroom. Journal of Education and Practice. DOI: https://doi.org/10.7176/jep/14-9-03

Carvalho, J. C. R., Carvalho, M. D. S. S., & Batista, M. G. S. (2025). Affective relationships in the classroom as motivational factors for learning Biology content. Aurum Editora, 64–77. DOI: https://doi.org/10.63330/aurumpub.010-006

Chen, L. (2023). Research on the importance of teacher-student interaction in university art courses. Region - Educational Research and Reviews, 5(4), 70. DOI: https://doi.org/10.32629/rerr.v5i4.1400

Cohen, R. L., & Zusho, A. (2023). Prior achievement in math impacts adolescents' help‐seeking behavior in interactive learning environments. New Directions for Teaching and Learning, 2023(174), 65‐71. DOI: https://doi.org/10.1002/tl.20550

De Neve, D., Bronstein, M. V., Leroy, A., Truyts, A., & Everaert, J. (2022). Emotion regulation in the classroom: A network approach to model relations among emotion regulation difficulties, engagement to learn, and relationships with peers and teachers. Journal of Youth and Adolescence, 52(2), 273–286. DOI: https://doi.org/10.1007/s10964-022-01678-2

Denessen, E., Keller, A., Van Den Bergh, L., & Van Den Broek, P. (2020). Do teachers treat their students differently? An observational study on teacher-student interactions as a function of teacher expectations and student achievement. Education Research International, 2020, 1–8. DOI: https://doi.org/10.1155/2020/2471956

Fauzi, A., Rosyida, A. M., Rohma, M., & Khoiroh, D. (2021). The difficulty index

of biology topics in Indonesian senior high school: Biology undergraduate students' perspectives. JPBI (Jurnal Pendidikan Biologi Indonesia), 7(2), 149–158. DOI: https://doi.org/10.22219/jpbi.v7i2.16538

Ghafar, Z. N., & Hazaymeh, O. (2024). Effective questioning in the classroom: An overview of the techniques used by instructors. International Journal of Childhood Education, 5(2), 1–14. DOI: https://doi.org/10.33422/ijce.v5i2.676

Gottfredson, D. C., Marciniak, E. M., Birdseye, A. T., & Gottfredson, G. D. (1995). Increasing teacher expectations for student achievement. The Journal of Educational Research, 88(3), 155–163. DOI: https://doi.org/10.1080/00220671.1995.9941294

Gottfredson, D. C., Marciniak, E., Birdseye, A., & Gottfredson, G. (1991). Increasing teacher expectations for student achievement: An evaluation. report no. 25. In Education Resources Information Center (No. 25). Office of Educational Research and Improvement (ED), Washington, DC. Retrieved February 15, 2026, from https://eric.ed.gov/?id=ED339788

Gui, Y. (2024). Research on influencing factors and promoting strategies of teacher-student interaction in physical education classroom. Journal of Medicine and Physical Education., 1(2), 18–20. DOI: https://doi.org/10.62517/jmpe.202418203

Holzer, J., Sessig, E., & Lüftenegger, M. (2022). When educator-learner perceptions of instruction diverge: Teachers' perspectives. Educational Research, 65(1), 99–120. DOI: https://doi.org/10.1080/00131881.2022.2116348

Ilori, O. O., & Tanimowo, F. O. (2022). Heteroscedasticity Detection in Cross-Sectional Diabetes Pedigree Function: A comparison of Breusch-Pagan-Godfrey, Harvey and Glejser tests. International Journal of Scientific and Management Research, 05(12), 150–163. DOI: https://doi.org/10.37502/ijsmr.2022.51211

Jia, R., Yan, X., Liu, X., & Wang, J. (2023). Validity and reliability of the evaluation tool of TCM confidence in students with TCM learning experience. Frontiers of Nursing, 10(4), 465–469. DOI: https://doi.org/10.2478/fon-2023-0049

Johnston, O., Wildy, H., & Shand, J. (2021). 'Believe in me, and I will too': A study of how teachers' expectations instilled confidence in Grade 10 students. Social Psychology of Education, 24(6), 1535–1556. DOI: https://doi.org/10.1007/s11218-021-09668-1

Kahveci, H. (2023). The positive and negative effects of teacher attitudes and behaviors on student progress. Journal of Pedagogical Research. DOI: https://doi.org/10.33902/jpr.202319128

Kara, M. (2020). Transactional distance and learner outcomes in an online EFL context. Open Learning the Journal of Open Distance and e-Learning, 36(1), 45–60. DOI: https://doi.org/10.1080/02680513.2020.1717454

Karvonen, U., Routarinne, S., & Tainio, L. (2023). "Don't touch": Negotiating the boundaries of acceptable touching in classrooms. Learning Culture and Social Interaction, 41, 100730. DOI: https://doi.org/10.1016/j.lcsi.2023.100730

Kholisoh, M. N., & Bharati, D. a. L. (2021). Teachers' questioning strategies and students' perceptions toward critical questions in EFL classroom interaction. ELT Forum Journal of English Language Teaching, 10(2), 136–145. DOI: https://doi.org/10.15294/elt.v10i2.43302

Koo, M., & Yang, S. (2025). Likert-type scale. Encyclopedia, 5(1), 18. DOI: https://doi.org/10.3390/encyclopedia5010018

Landorf, H., & Wadley, C. (2021). The importance of John Dewey's philosophy for global learning theory and practice. Social Studies Research and Practice, 17(1), 6–18. DOI: https://doi.org/10.1108/ssrp-09-2021-0027

Ling, L. S., Vincent, P., & Lajium, D. (2020). Evaluation of students' perception of Biology classroom learning environment.

International Journal of Education Psychology and Counseling, 5(36), 94–113. DOI: https://doi.org/10.35631/ijepc.536007

Lionello, M., Aletta, F., Mitchell, A., & Kang, J. (2021). Introducing a method for intervals correction on multiple likert scales: A case study on an urban soundscape data collection instrument. Front. Psychol. 11:602831. DOI: https://doi.org/10.3389/fpsyg.2020.602831

Liu, X. (2024). Effect of teacher–student relationship on academic engagement: The mediating roles of perceived social support and academic pressure. Frontiers in Psychology, 15, 1331667. DOI: https://doi.org/10.3389/fpsyg.2024.1331667

López, M. T., Vargas, C. L., Banda, I. V. O., & Rodríguez, I. a. C. (2025). Adaptation and validation of the Lexington Attachment to Pets Scale (LAPS) in the Peruvian context. Human-Animal Interactions. DOI: https://doi.org/10.1079/hai.2025.0057

Magsalay, R. J. M. (2025). Quantifying Central limit Theorem convergence: A Monte Carlo simulation approach to minimum sample size. International Journal of Research and Innovation in Social Science, IX(VIII), 639–644. DOI: https://doi.org/10.47772/ijriss.2025.908000050

Mikulski, K. (2022). Distance between teacher and students during class, group and individual classes. Teacher Education and Curriculum Studies, 7(2), 46. DOI: https://doi.org/10.11648/j.tecs.20220702.11

Mohd, S., Latiff, A. R. A., & Azhar, S. N. F. S. (2024). Research impact assessment on sustainable development goals in higher education institutions: A Qualitative study. SAGE Open, 14(3). DOI: https://doi.org/10.1177/21582440241281095

Nandini, N., Lubis, N. S. Z., Hadori, N. V. N., & Dalimunthe, N. M. A. (2024). The influence of teacher interpersonal communication on students' interest in learning (Case study of students at the private madrasah Aliyah Plus Al-Ullum School). Maklumat Journal of Da Wah and Islamic Studies, 2(1), 9–17. DOI: https://doi.org/10.61166/maklumat.v2i1.8

Nurishlah, L., Mariam, S., & Samadi, M. R. (2023). Literature review study: Understanding students' curiosity in learning. Ta'dib, 1(1), 91–101. DOI: https://doi.org/10.69768/jt.v1i1.26

Oliveira, A. W., & Lathrop, R. (2022). Toward a curiosity mindset: Reframing the problem of student disengagement from classroom instruction. The European Educational Researcher, 313–317. DOI: https://doi.org/10.31757/euer.535

Peeters, A., Robinson, V., & Rubie-Davies, C. (2020). Theories in use that explain adolescent help seeking and avoidance in mathematics. Journal of Educational Psychology, 112(3), 533–550. DOI: https://doi.org/10.1037/edu0000423

Peng, C. (2021). The academic motivation and engagement of students in English as a foreign language class: Does teacher praise matter? Frontiers in Psychology, 12. DOI: https://doi.org/10.3389/fpsyg.2021.778174

Pervin, M. M., Ferdowsh, N., & Munni, I. J. (2021). Teacher-student interactions and academic performance of students. Dhaka University Journal of Biological Sciences, 30(1), 87–93. DOI: https://doi.org/10.3329/dujbs.v30i1.51812

Philippine Health Research Ethics Board. 2022. National Ethical Guidelines for Research Involving Human Participants 2022. Taguig City, Philippines: Philippine Council for Health Research and Development. https://www.pchrd.dost.gov.ph/publications/2022-national-ethical-guidelines/

Putri, L., Rezani, M. R., & Hermina, D. (2025). correlational research design. Jurnal Riset Multidisiplin Edukasi, 2(6), 306–317. DOI: https://doi.org/10.71282/jurmie.v2i6.456

Ramadan, M. O., & Ali, F. M. (2021). Libyan Students' perception of the good teacher: A study in the English department at Sirte University. Journal of Human Sciences, 20(2), 1–7. DOI: https://doi.org/10.51984/johs.v20i2.1563

Rubie-Davies, C. M., & Turner, H. (2022).

Teacher expectations and teacher expectation effects. Routledge Resources Online. DOI: https://doi.org/10.4324/9781138609877-ree5-1

Rubie-Davies, C., Meissel, K., Alansari, M., Watson, P., Flint, A., & McDonald, L. (2020). Achievement and beliefs outcomes of students with high and low expectation teachers. Social Psychology of Education, 23(5), 1173–1201. DOI: https://doi.org/10.1007/s11218-020-09574-y

Safra, M., Ahesibwe, I., & Emmanuel, A. (2025). Teacher effectiveness and learners' academic achievements in Biology o-level secondary schools of Rwampara District. East African Journal of Arts and Social Sciences, 8(3), 158–169. DOI: https://doi.org/10.37284/eajass.8.3.3480

Santos, R. I. (2022). (Re)examining politeness concepts and contentions: Implications on Filipino brand of politeness. International Journal of Humanity Studies (IJHS), 6(1), 51–67. DOI: https://doi.org/10.24071/ijhs.v6i1.4723

Sari, W., & Daulay, S. H. (2023). Analysis of teacher's politeness interaction with students in English teaching. Getsempena English Education Journal, 10(2), 158–167. DOI: https://doi.org/10.46244/geej.v10i2.1875

Sayili, U., & Gunver, M. G. (2025). A novel modification approach for the one sample Kolmogorov-Smirnov test in large sample size. Scandinavian Journal of Clinical and Laboratory Investigation, 85(4), 287–298. DOI: https://doi.org/10.1080/00365513.2025.2512384

Schieghart, P. (2022). Learning environment perception and achievement goals. Science Insights Education Frontiers, 12(1), 1605–1606. DOI: https://doi.org/10.15354/sief.22.co016

Sgreccia, N. F., Cirelli, M. B., & Vital, M. B. (2023). Characteristics of "good teachers" according to incoming students in the Mathematics teacher education program at UNR: A study over two decades. CPU-e Revista De Investigación Educativa, 37. DOI: https://doi.org/10.25009/cpue.v0i37.2850

Shan, C. (2022). The effect of teacher expectation to students' intrinsic motivation. Advances in Social Science, Education and Humanities Research/Advances in Social Science, Education and Humanities Research. DOI: https://doi.org/10.2991/assehr.k.220131.027

Siems-Muntoni, F., Dunekacke, S., Heinze, A., & Retelsdorf, J. (2023). Teacher expectation effects on the development of elementary school students' Mathematics-related competence beliefs and intrinsic task values. Contemporary Educational Psychology, 76, 102255. DOI: https://doi.org/10.1016/j.cedpsych.2023.102255

Sinaga, D. (2024). Teacher-student interaction models: Effective strategies for increasing student participation and motivation. JTP - Jurnal Teknologi Pendidikan, 26(3), 1052–1066. DOI: https://doi.org/10.21009/jtp.v26i3.50372

Soltani, A., Boka, R., & Jafarzadeh, A. (2022). Students' perceptions of learning environment: Associations with personal mastery goal orientations, regulations, and academic performance in biology. International Journal of Science Education, 44(9), 1462–1480. DOI: https://doi.org/10.1080/09500693.2022.2082578

Süt, A. M. (2020). Wait time in the context of English for academic purposes: A perspective from conversation analysis. Language Teaching and Educational Research, 3(1), 149–162. DOI: https://doi.org/10.35207/later.698861

Troyer, M. (2022). Teacher knowledge and questioning in classroom talk about text. Literacy Research and Instruction, 62(2), 101–126. DOI: https://doi.org/10.1080/19388071.2022.2074328

Truong, H. N. (2024). Students' perspectives on the use of teacher questions to promote critical thinking in EFL classrooms. SSRN Electronic Journal. DOI: https://doi.org/10.2139/ssrn.4818211

Turner, S. L., Forbes, A. B., Karahalios, A.,

Taljaard, M., & McKenzie, J. E. (2021). Evaluation of statistical methods used in the analysis of interrupted time series studies: a simulation study. BMC Medical Research Methodology, 21(1), 181. DOI: https://doi.org/10.1186/s12874-021-01364-0

Umali, E., & Villaruz, K. (2024). Optimizing quality classroom engagement and thinking and rethinking processes in social studies courses through a Wait-Time Model (WTM). Pedagogy Review, 2(1), 150–158.

Upendra, S., Abbaiah, R., & Balasiddamuni, P. (2023). Multicollinearity in multiple linear regression: detection, consequences, and remedies. International Journal for Research in Applied Science and Engineering Technology, 11(9), 1047–1061. DOI: https://doi.org/10.22214/ijraset.2023.55786

Van Der Kleij, F., & Adie, L. (2020). Towards effective feedback: An investigation of teachers' and students' perceptions of oral feedback in classroom practice. Assessment in Education Principles Policy and Practice, 27(3), 252–270. DOI: https://doi.org/10.1080/0969594x.2020.1748871

Varea, V., & Öhman, M. (2022). 'Break the rules or quit the job': Physical education teachers' experiences of physical contact in their teaching practice. Sport Education and Society, 28(4), 395–406. DOI: https://doi.org/10.1080/13573322.2022.2036119

Whitney, T., Scott, T. M., & Cooper, J. T. (2023). An examination of response requirements associated with teachers' use of different opportunities for student response during instruction. Kentucky Teacher Education Journal the Journal of the Teacher Education Division of the Kentucky Council for Exceptional Children, 9(2). DOI: https://doi.org/10.61611/2995-5904.1043

Wonder, K. (2021). Understanding student perceptions of class participation. Journal of Effective Teaching in Higher Education, 4(1), 43–57. DOI: https://doi.org/10.36021/jethe.v4i1.58

Wubante, K. (2020). Review on correlation research. International Journal of English Literature and Culture, 8(3), 101-105. DOI: https://doi.org/10.32890/ijelc2020.8.3.14.

Yılmaz, A. B. (2022). Teacher-student interaction within the context of online teaching and learning. In Advances in educational technologies and instructional design book series (pp. 1–20). DOI: https://doi.org/10.4018/978-1-6684-8407-4.ch001

Yun, N. V. W. S., Ulang, N. N. M., & Husain, N. S. H. (2023). Measuring the internal consistency and reliability of the hierarchy of controls in preventing infectious diseases on construction sites: the Kuder-Richardson (KR-20) and Cronbach's Alpha. Journal of Advanced Research in Applied Sciences and Engineering Technology, 33(1), 392–405. DOI: https://doi.org/10.37934/araset.33.1.392405

Yusri, Y., Mantasiah, R., & Anwar, M. (2023). Assessing language impoliteness of primary school teachers in Indonesia. Asian Education and Development Studies, 13(1), 1–13. DOI: https://doi.org/10.1108/aeds-08-2023-0098

Zarrinabadi, N., Lou, N. M., & Darvishnezhad, Z. (2021). To praise or not to praise? Examining the effects of ability vs. effort praise on speaking anxiety and willingness to communicate in EFL classrooms. Innovation in Language Learning and Teaching, 17(1), 88–101. DOI: https://doi.org/10.1080/17501229.2021.1938079

Zhao, R. (2024). An analysis of the role and impact of teacher-student interaction on establishing a student-centered classroom teaching model. Lecture Notes in Education Psychology and Public Media, 40(1), 104–109. DOI: https://doi.org/10.54254/2753-7048/40/20240717

Zheng, X., Wang, R., Hoekstra, A. Y., Krol, M. S., Zhang, Y., Guo, K., Sanwal, M., Sun, Z., Zhu, J., Zhang, J., Lounsbury, A.,

Pan, X., Guan, D., Hertwich, E. G., & Wang, C. (2021). Consideration of culture is vital if we are to achieve the sustainable development goals. One Earth, 4(2), 307–319. DOI: https://doi.org/10.1016/j.oneear.2021.01.012

Received: February 04, 2026
Revised: February 21, 2026
Accepted: March 30, 2026