



Teacher-Student Interaction towards Chemistry at Secondary Level

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Abstract: Interaction is a live construct for the investigation which enhances the coordination and minimizes the understanding gap. This study was aimed to investigate the teacher-student interaction towards chemistry at the secondary level. This descriptive study tends to the positivistic paradigm. 250 subjects were selected based on a random sampling procedure. The responses were collected through the adapted research tool. Mean, standard deviation, independent t-test, and one-way ANOVA were applied to analyze the data. The results show that IX grade students have better interaction than X grade students; female students have better interaction than the male students towards chemistry; private school students have better interaction than the public school students; success in chemistry is affected by teacher-students interaction. Furthermore, the students with more interaction have more success in chemistry. Present study proposed solutions to unpredictable problems regarding the teacher-student interaction. This study was applied to improve teacher-student interaction towards chemistry at the secondary level. This study is delimited at the secondary level in the Pakistani context only. Further research studies may be conducted with the same construct in primary, elementary, higher secondary, and higher education with varying populations and samples.

Key Words: Teacher-Student Interaction, Students' Learning, Chemistry, Classroom, Secondary Level

Introduction

[Terry \(2008\)](#) asks a crucial question: "Does my teacher appreciate me?" and his viewpoint on student success gives us the solution to that primary issue. Teacher-student interaction is a form of activity that affects the learner's social and educational success. Achievement is in the interaction, and interaction is an opportunity to learn. Teachers influence the students' successes at school ([Cheung, 2009](#); [Aschbacher & Roth, 2010](#); [Mubin and Ilias, 2012](#)). Students and teachers need to work together in the learning process and encourage assistance and collaboration in various activities. Teachers address students' learning problems by communicating ([Garner, 2008](#)).

It seems that the students who are not performing well in their academics also have negative relationships with their instructors. Academically, if a student is falling behind, the relationship between the student and the teacher will collapse ([Yusuf, 2005](#); [Owoeye & Yara, 2011](#); [Bharry, 2011](#)). A teacher that frequently insults students in class develops an unpleasant classroom atmosphere. Students who had received a more loving teaching environment tended to do better in school and had higher GPAs than their classmates who did not have this support structure ([Olawale, 2009](#); [John & Kristen, 2012](#)).

According to [Montalvo & Miller \(2007\)](#), productive teacher-student interactions

improve student learning. Positive teacher expectations were positively correlated with academic success, whereas negative expectations negatively affected student performance. If instructors take the time to create interactions, their pupils' success may be improved. Meanwhile, [Jegade \(2007\)](#) supports their idea by stating that teachers must address these issues on both an intellectual and emotional level. Teachers have to create classroom environments that are satisfactory and friendly to enhance their students' achievement ([Wilson & Trainin, 2007](#); [Sirhan, 2007](#); [Olatunde, 2009](#); [Johnson, 2011](#)).

[Lavoie \(2007\)](#) studied teacher-student interaction and suggested "Motivation Breakthrough: 6 keys to turning on the tune-out kid". He told a narrative about an uncompromising teacher who thought that passive and passive learning was necessary. He provided the kids with knowledge, and the student's role was to keep up with what they learned. Rather than teaching people who didn't want to know, he remained passive by stating that those unwilling to learn might remain inactive. The last remark by the instructor left us all speechless "I can't be held responsible for it. Teaching is not all about cheering on others. "When considering that there are instructors who still have an incorrect conception of their job in the classroom, it is implied that the profession is still somewhat confused ([Osborne & Dillon, 2010](#); [Mansfield, 2007](#); [Lang, 2006](#)).

According to [Whitaker \(2004\)](#), Teachers have the most weight in the classroom. For Best learning achievements, teachers have high expectations for their students. Teachers know that influencing their academic performance would be almost impossible if they could not connect with their learners.

Teachers have a significant impact on their learners' academic performance in school. Learning is enhanced for students and instructors alike when students and teachers work together. Students and teachers cause Teacher-students' Interaction to play essential roles in solving any learning problems. Pre-

planned interaction in class can enhance students' achievement ([Mehraj, 2016](#)).

Teacher-student interaction is always the most significant element of the teaching-learning process. It dramatically influences students' self-realization, self-esteem, confidence, attitude toward learning, and social interaction in class ([Wolfgang, 2001](#); [Hughes & Chen, 2011](#); [Jaakkola, 2011](#); [Edomwonyiotu & Avaa, 2011](#)).

[McCombs and Whisler \(1997\)](#) highlighted that research and analyses had brought the critical significance of the teacher-student relationship to light. The Learner-Centered 12 Psychological Concepts resulted from a Task Force that created a framework for school reform and rebuilt the framework that included 14 principles about student learning. Perhaps the most creative and vital among these ideas was the 11th Principle, which stated that intelligence is influenced through social relationships and connection with others ([Inamullah, 2005](#); [Asebiomo, 2009](#); [Helen, 2010](#)).

While offering five principles for learning assistance, they suggested classrooms with good interpersonal connections, which fostered appreciation, affirmation, respect, and admiration. Classroom management that works has extensive analysis-based strategies for every instructor. ([Dori & Barnea, 2007](#)).

He reviews a few meta-analyses that look at teacher-students interaction and learners' achievement. The findings of the preliminary testing suggested that there were four key aspects to consider, policies, regulations, processes, punitive measures, and relationships between students and teachers. ([Marzano et al., 2003](#)).

This study found and investigated teacher-student interaction with the chemistry teacher that will help them enhance students' achievements. It will also highlight the factors of the undesirable situation regarding the teacher-students classroom interaction. This study will answer unpleasant classroom scenarios involving teachers and students to assist the administration in monitoring

classroom interactions between teachers and students.

Hypotheses of the Study

- H₀**: There exists no mean difference between IX and X grade chemistry students in teacher-student interaction.
- H₀₁**: There exists no mean difference between male and female chemistry students in teacher-student interaction.
- H₀₂**: There exists no mean difference between public and private chemistry students in teacher-student interaction.
- H₀₃**: There exists no mean difference between low, medium and high interacting chemistry students in teacher-student interaction.

Methodology

This was a descriptive and nonexperimental study having a positivistic paradigm. The data were collected through an adapted

questionnaire to test the hypothesis. The elements from which information is collected are called population (Lakhan et al., 2020; Siddique et al., 2020; Siddique et al., 2021). The population of this study consists of public or private chemistry students of District Lahore. Only students were allowed to participate in the research since they had varying views of the teacher-student interaction in chemistry class.

The sample was the number of subjects chosen from the population (Ali et al., 2021; Siddique et al., 2021). The sample consisted of 250 students including 142 from grade 9th, and 108 from grade 10th science students from 05 secondary schools including public (3) and private (2) schools. The sample was selected by using simple random sampling due to COVID-19. Student distractions were measured and analyzed using an adapted questionnaire on 5-point Likert scale from "Never" to "Always" with 36 items (Wubbels, Brekelmans, & Creton, 2006). Validity and reliability were tested.

Data Analysis

Table 1. Means and SD Values of a Teacher-student Interaction.

Teacher-student Interaction	N	M	SD	% Score
Low interaction	38	103.94	16.66	10.6%
Normal interaction	187	154.05	13.84	77.4%
High interaction	25	179.00	2.04	12.0%

Participants were divided into three categories according to the Mean and SD of their teachers' interaction scores. The differences between the groups were statistically significant.

Table 2. Independent Sample t-test for comparison of IX and X Grade Students

Class	N	M	df	SD	t	p
IX	142	151.99	248	.51	2.27	0.02
X	108	144.91		.47		

Table 2 predicts the mean difference exists between IX & X grade chemistry students about teacher-students interaction. The mean difference in scores was substantial for IX-Class

($M = 151.99$, $SD = .51$) and X class ($M = 144.91$, $SD = .47$); $t(248) = 2.27$. It is concluded that the IX grade students have better interaction than the X grade students.

Table 3. Independent Sample t-test for Comparison of Boys and Girls

Teacher Gender	N	M	SD	df	t	p
Male	191	142.67	.44	248	-8.14	0.01
Female	59	169.22	.47			

There exists a statistically significant mean difference between male and female, Male ($M = 142.67, SD = .44$) and Female ($M = 169.22, SD = .47$). The results show that female students have better interaction than male students.

Table 4. Independent Sample t-test for Comparison of Public and Private School Students

Schools	N	M	SD	df	T	p
Public	141	135.47	.45	248	-12.57	0.001
Private	109	166.34	.43			

The table 4 illustrates that there exists mean difference in the scores for public ($M = 135.47, SD = .45$) and private school students ($M = 166.34, SD = .43$). The results demonstrate that private schools have better interaction than public school students.

Table 5. One-Way ANOVA for the difference in Teacher-student Interaction

Student Achievement	Sum of Squares	df	Mean Square	F	
Between Groups	44896.78	2	22448.39	8.289	.001
Within Groups	668958.81	247	2708.33		
Total	713855.60	249			

Table 5 depicts a statistically significant difference between the groups and within the groupings. It founds that student success in chemistry at the secondary level is influenced by teacher-student interaction.

Table 6. Post Hoc Test for Teacher-student Interaction towards Chemistry at the Secondary Level

(I) category classroom interaction	(J) category classroom interaction	Mean Difference (I-J)	Sig.
Low Interaction	Normal Interaction	-30.81903	.003
	High Interaction	-51.34737	.000
Normal Interaction	Low Interaction	30.81903	.003
	High Interaction	-20.52834	.155
High Interaction	Low Interaction	51.34737	.000
	Normal Interaction	20.52834	.155

A Post Hoc test was applied. It concludes that students with high interaction show more success in chemistry than students with low interaction. Those who have regular interaction also show higher achievement than students with low interaction.

Discussion

Classroom interaction is a two-way process in which each participant impacts the other's behavior; each student influences their teacher's behavior and the other way around

(Inamullah, 2005). As a component of the teaching and learning process, both the instructor and other students impact student success. So that their voices may be heard without interruption, students must master the art of courteous interaction and assertiveness without being unpleasant to others. Students' intellectual and social growth might be positively impacted by improving their ties with their professors. Relationships between students and instructors may significantly

affect students' academic performance ([Aryana, 2010](#)).

Teachers in chemistry had a favorable impression of the pupils whose performance had greatly improved. The chemistry instructors' production and, by extension, the student's performance might be harmed if the professors have a pessimistic view of their student's potential to learn. Students' performance suffers due to their attitude toward their professors' teaching methods, as he discovered ([Edomwonyiotu & Avaa, 2011](#)).

A teacher's attitude and teaching style may change students' attitudes and attitudes. Olayinka [Olatunde \(2009\)](#). He discovered no correlation between instructors' perspectives about teaching and students' academic achievement. [Obadara Obadara Obadara \(2008\)](#). Their ability to see how their students perform is due to the instructors' observation of their talents. Teachers in chemistry had a pessimistic view of their students' aptitude for the subject. The chemistry professors widely assumed that their students picked chemistry because they had no other options ([Ahmed, 2001](#)). Most people believe that the pupils lack the necessary arithmetic and English skills to succeed in chemistry. As a result of this, instructors' production might be badly affected, and students' performance could suffer as a result ([Alport, 1960](#)).

Conclusion

It is concluded that IX grade students have better teacher-student interaction towards chemistry than the X grade students. It is also concluded that female students have better teacher-student interaction than male students in chemistry. Furthermore, it is concluded that private students have better teacher-student interaction than public school students towards chemistry at the secondary level students. It is also found that the success of the students based on the teacher-student interaction

Recommendations and future Concerns

- The administration should monitor the Classroom interaction of both teachers and students.
- Workshops should be provided for educators to develop teacher-student interaction.
- Teachers should interact with all students to enhance Students Achievement.
- Teachers should be provided with a suitable environment to encourage students for classroom participation.
- Teachers must provide with the chance to construct different teaching methods.
- Finally, the results of this study support the need to do more research to close the gap between student interaction and success and identify the dynamic variables that influence their success.

References

- Ahmed, M. (2001). *To investigate the Causes of Dropout at a Higher Level*. (Unpublished M.phil. Education thesis). AIOU, Islamabad, Pakistan.
- Ali, M. S., Siddique, M., Siddique, A., Abbas, M., & Ali, S. (2021a). Teachers' citizenship behavior as a predictor of teaching performance: Evidence from Pakistani context. *Humanities and Social Sciences Reviews*, 9(3), 1135-1141. <https://doi.org/10.18510/hssr.2021.93112>
- Alport, G. W. (1960). *Personality and Social Encounter*. Beacon Press. Boston: USA.
- Aryana, M. (2010). Relationship between Self-esteem and Academic Achievement among Pre-University Students. *Journal of Applied Sciences*, 1(2), 2474-2477.
- Aschbacher, P. R., Li, E., & Roth, E. J., (2010). Is science me? High school students' identities, participation and aspirations in science, engineering, and medicine. *Journal of Research in Science Teaching*, 47(1), 564–582.
- Asebiomo, A. M. (2009). Teacher's assessment of integrated science curriculum in federal capital territory Abuja for effective implementation. *Nigerian Journal of Curriculum Studies*, 16(2), 173-181.
- Bharry, I. H. (2011). Attitudes of students towards science and science education in Nigeria. (A case study in selected secondary schools in Obio/Akpor Local Government Area of Rivers State). *Continental Journal of Education Research*, 4(2), 33-51.
- Brekelmans, J. M. G., Wubbels, T., & Creton, H. A. (2006). A study of student perceptions of chemistry teacher behaviour. *Journal of Research in Science Teaching*, 9(1), 335-350.
- Cheung, D. (2009). *Students' attitudes toward chemistry lessons*. The interaction effect between grade level and gender. New Haven: Yale University Press.
- Dori, Y. J., & Barnea, N. (2007). In service chemistry teachers' training, the impact of introducing computer technology on teachers' attitudes and classroom implementation. *International Journal of Science Education*, 11(1), 24-37.
- Edomwonyiotu, L., & Avaa, A. (2011). The challenge of effective teaching of chemistry (A case study). <http://leipt.academicdirect.org/A18/001-008.htm>.
- Francis, L. J., & Greer, J. E. (2006). Measuring attitude towards science among secondary school students, the affecting domain. *Journal of Science and Technological Education*, 17(2), 219-226.
- Garner, B. K. (2008). When students seem stalled, the missing link for too many kids who don't "get it?" cognitive structures. *Educational Leadership* 65(3), 32-38.
- Helen, C. (2010). *Restorative Practice in School. A Psychological Perspective. Inter-Disciplinary Perspectives on Restorative Approaches to Conflict in Schools*. <http://www.Restorativejustice.Org/10fulltext/cowiehelen/at_down-load/file.
- Hughes, J. N., & Chen, Q. (2011). Reciprocal effects of student-teacher and student-peer relatedness, Effects on academic self-efficacy. *Journal of Applied Developmental Psychology*, 32(5), 278–287.
- Inamullah, M. (2005). *Patterns of classroom interaction at different educational levels in the light of Flander's Interaction* (Unpublished Ph.D Thesis). Nsukka, University of Nigeria.
- Jaakkola, T. (2011). A comparison of students' conceptual understanding of electric circuits in simulation only and simulation laboratory contexts. *Journal Of Science Teaching*, 13(2), 71-93.
- Jegede, S. A. (2007). Students' anxiety towards the learning of Chemistry in some Nigerian secondary schools. *Educational Study and Review*, 2(3), 193-197.
- John, A. M., & Kristen, B. C. (2012). Exploring the Interaction between Student Instructor Interaction and Student Perceptions of Teacher Behaviors. *International Journal of Teaching and Learning in Higher Education*, 11(2), 33-84.

- Johnson, L. (2011). *Teaching outside the Box. How to Grab Your Students by Their Brains* (2nd Ed.). Mahwah, N. J. Lawrence Erlbaum Associates.
- Lakhan, G. R., Ullah, M., Channa, A., ur Rehman, Z., Siddique, M., & Gul, S. (2020). The Effect of Academic Resilience and Attitude on Managerial Performance. *Elementary Education online*, 19(3), 3326-3340.
<https://doi.org/10.17051/ilkonline.2020.03.735498>
- Lang, H. G. (2006). *Science Education for Deaf Students: Priorities for Researcher and Instructional Development* (Unpublished Master Thesis). Rochester Institute for the Deaf, New York, NY, USA.
- Lavoie, R. (2007). *The Motivation Breakthrough: Six secrets to turning on the tuned-out child*. New York, Simon & Schuster.
- Mansfield, E. A. (2007). Liking or Disliking the Teacher, student Motivation, engagement and achievement. *Evaluation and Research in Education*, 20(3), 144-158.
- Marzano, R., Marzano, J., & Pickering, D. (2003). *Classroom management Gaining and maintaining students' cooperation* (4th Ed.). New York: John Wiley & Sons.
- McCombs, B., & Whisler, J. (1997). *The learner-centred classroom and schools. Strategies for enhancing student motivation and achievement*. San Francisco: McGraw-Hill Open University Press.
- Mehraj, N. (2016). Verbal classroom teaching behavior amongst teacher educators. *International Journal of Advanced Research and Development*, 22(2), 32-35.
- Montalvo, G. P., & Miller, R. B. (2007). Liking or Disliking the Teacher, student Motivation, engagement and achievement. *Evaluation and Research in Education*, 20(3), 144-158
- Mubin, N., & Ilias, K. (2012). Influence of teacher-student interaction in the Classroom behavior on academic and student Motivation. *Journal of academic research international*. 24(2), 223-994.
- Obadara, O. E. (2008). Influence of teacher factors on academic performance of secondary school students in Ogun state, Nigeria. *African Journal for the Study of Educational Issues*. 27(1).
- Olatunde, Y. P. (2009). Students' attitude towards mathematics and academic achievement in some selected secondary schools in Southwestern Nigeria. *European Journal of Scientific Research*, 32(3), 336-341.
- Olawale, F. (2009). *Students' Attitudes towards Chemistry in Some Selected Secondary Schools in Akure, South local Government Area, Ondo State* (unpublished dissertation). Affiliate of the Usman Dan Fodio University Sokoto.
- Osborne, J., & Dillon, J. (2010). *Good Practice in Science Teaching*. Oaks, Corwin Press, New York: McGraw-Hill.
- Owoeye, J. S., & Yara, P. O. (2011). School facilities and academic achievement of secondary school agricultural science in Ekiti State, Nigeria. *Journal of Asian Social Science*, 7(2), 64-74.
- Siddique, M., Ali, M. S., Nasir, N., Awan, T. H., & Siddique, A. (2021). Resilience and Self-Efficacy: A Correlational Study of 10th Grade Chemistry Students in Pakistan. *Multicultural Education*, 7(9), 210-222.
<https://doi.org/10.5281/zenodo.4912254>
- Siddique, M., Tatlah, I. A., Ali, M. S., Awan, T. H., & Nadeem, H. A. (2021). Effect of Total Quality Management on Students Performance in Chemistry at Secondary Level in Pakistan. *Multicultural Education*, 7(11), 592-602.
<https://doi.org/10.5281/zenodo.5828015>
- Siddique, A., Taseer, N. A., & Siddique, M. (2020). Teachers Emotional Intelligence and Teaching Effectiveness: A Correlational Study. *Ilkogretim Online*, 19(3), 2411-2417.
<https://doi.org/10.17051/ilkonline.2020.03.735399>
- Sirhan, G. (2007). Learning Difficulties in Chemistry: An Overview. *Journal of Turkish Sciences Education*, 12(4), 2-20.
- Terry, A. (2008). *More life through Management*. Boston: Beacon Press.

- Whitaker, T. (2004). *What Great Principals Do Differently*. Larchmont, NY: John Wiley & Sons.
- Wilson, K. M., & Trainin, G. (2007). First-Grade Students' Motivation and Achievement for Reading, *Writing, and Spelling*. *Reading Psychology*, 28(3), 257-282.
- Wolfgang, C. H. (2001). *Solving Discipline and Classroom Management Problems*. Methods and Models for Today's Teachers. New York: John Wiley and Sons.
- Yusuf, A. (2005). The Effect of Cooperative Instructional Strategy on Students Performance in Junior Secondary School Social Studies in Ilorin, Nigeria. *Nigerian Journal of Social Studies*, 8 (2), 23- 36.