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A Comparative Analysis of Teachers' and Students' Perceptions of Science Teaching Strategies in Private Secondary Schools

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ABSTRACT

This study compares how teachers and students in private secondary schools perceive science teaching methods, taking into account the gender of the teachers and the location of the school. A validated questionnaire covering four strategy domains individual differences, collaboration, teaching methodology, and thinking skills was used to gather data from 132 students and 35 science teachers using a quantitative, descriptive-comparative design. The results show persistent perceptual gaps, with teachers reporting greater use of strategies than students. The biggest differences were found in collaborative strategies, indicating low student participation in group-based learning. While student perceptions remained lower across genders, gender comparisons revealed slightly higher teacher self-perceptions among male educators. Persistent gaps were found in urban-rural analyses, which reflected contextual influences on instruction and learning. In order to match instructional goals with student experiences and improve engagement, critical thinking, and the general efficacy of science education in private secondary schools, the study emphasizes the necessity of professional development, reflective teaching techniques, and feedback mechanisms.

Keywords: *Collaborative Learning, Teaching Methodology, Thinking Skills, Critical Thinking, Inquiry-Based Learning, Active Learning, Student Engagement, Instructional Practices*

Introduction

It is generally accepted that effective teaching strategies are the basis of quality science education in the secondary school. Not only do they determine student interaction and performance but they also impact with attitudes toward science as an academic discipline (Gonsar, Patrick & Cotner, 2021). One of the areas that require this kind of instruction is science teaching, which requires teaching methods that involve abstract ideas and foster inquiry and the development of higher-order thinking (Ganajová et al., 2025). Here teaching strategies can be defined as planned methods and techniques employed by teachers to encourage learning, both those that can be adapted to individual differences, support collaboration, and improve thinking (Han, 2021). The perennial issue in the science education research is the inability to comprehend the perception of these strategies between teachers and

students as this can influence the implementation of the strategy and differences in learning (Tufail and Mahmood, 2020; Sguazzin and Grann, 2008).

Teaching strategy perceptions also include teacher perceptions of instructional efficacy and the student perceptions of classroom experiences. Such perceptions can be consistent, but not necessarily the same, resulting in disjunctions between planned instructional activities and real-life classroom situations (Gonsar et al., 2021). As an illustration, educators may think that they are successfully adopting collaborative or inquiry-based strategies but students may feel less frequently or less successfully subjected to them (Han, 2021). These perceptual differences may prevent effective learning, decrease student motivation, and limit the acquisition of critical thinking and problem-solving skills that are needed in scientific fields (Ali, Qutoshi and Jabeen, 2021).

Perceptual differences are also significant to explore in the sphere of the private sector schools where the innovation in instructions is anticipated frequently because of the availability of resources and the requirements of families in the educational field. Nonetheless, it has turned out that despite the privacy of the situation, the traditional forms of teaching still dominate, and the voices of students are often not adequately represented during educational assessments (Haider Shah, Shaheen & Mahmood Kiani, 2022). Besides, gender and place (urban vs. rural) have become relevant issues which influence both the teaching strategy and the impressions thereof. It is believed that, research indicates that male and female teachers can have varying instructional focus and that urban and rural educational settings pose different limitations and possibilities to instructional change (Harnischfeger & Stahl, 2025; Rarieya, Wango and Oluga, 2025). However, empirical studies of comparisons of perceptions on these dimensions have been done in limited ways particularly within the realms of privatized secondary science education.

This paper fills these gaps by providing a comparative study of teachers and students knowledge on the teaching techniques of science in the private secondary schools. The research extends the aggregate analysis and focuses on the differences that are dependent on gender of the teachers and locale of school (urban vs. rural). The study correlates quantitative mean scores of perceptual measures in the key domains of strategy, namely, individual differences, collaboration, teaching methodology, and thinking skills, and this enables it to make a contribution towards the comprehension of instructional quality in a multidimensional approach.

The study puts forward significant implications to teacher education, school leadership and policy initiatives to enhance the pedagogy of science. Since belief of teachers affects their instructional decisions (Vygotsky, 1978), the ways in which their beliefs are in line or out of sync with student perceptions give practical information on the development of the teachers. In the same way, perception of students provides invaluable feedback of the experiential aspect of teaching processes on the effects that teaching techniques have to engagement and learning in the students. This paper addresses the recommendation to undertake more

sensitive studies within various academic settings by placing the analysis in the context of the private secondary schools and taking into account the gender and locale differences.

Literature Review

The early theorists of education brought to the fore the importance of teaching strategies in making people learn effectively. Based on the idea of experience, John Dewey (1938) suggested that education must be an experience, with the active learning approach, reflection, and inquiry as the key strategies in the pedagogical process. Based on this, the socio-cultural approach to cognitive development by Vygotsky (1978) has provided an emphasis on the role of social interaction in cognitive development in that collaborative learning in strategies would enable learners to build knowledge based on shared experience. These theoretical bases have formed the further studies about teaching methods that help to guess and to think scientifically.

Student Learning and Teaching Strategies

The pedagogical approaches used in science education are various, including the methods that are teacher-centered like lectures and student-centered approaches like inquiry and collaborative learning. Tufail and Mahmood (2020) note that secondary science educators tend to use the more traditional lectures and discussions approach, which can deny students any inquiry and more profound work with concepts. Conversely, studies regarding the active learning strategies show that they provide high returns in regard to student engagement, critical thinking, and conceptual understanding (Sguazzin and Grann, 2008; Han, 2021). The seminal work on active learning by Chickering and Gamson (1987) highlights the importance of the students learning better whenever they are involved in activities that involve analysis, problem solving and reflection.

Empirical research also indicates that an integration of instructional techniques, that is, conceptual exposition and collaborative and inquiry tasks, can lead to more ambidextrous innovation and in-depth learning results in students (Fan and Kaeley, in research on mixed strategies, 2024). Nevertheless, the success of these strategies usually relies on the professionalism of the teacher, the situation in the classroom, and the student preparedness (Han, 2021). Notably, teaching methods can never remain the same as they must be modified to fit the specific differences in learners, such as previous knowledge, learning styles, and cognitive skills (Ali, Qutoshi and Jabeen, 2021).

The perception is very important as the self-reporting of the strategies used by the teacher might be not always in line with the classroom experiences of the students. According to Gonsar, Patrick and Cotner (2021), the perception of teaching practices may vary significantly among students and instructors in the classroom on STEM courses, where students and instructors have seen instances of undervaluing teaching strategies that are perceived to be effective by teachers. Such discrepancies in perceptions are significant as the opinions of students are correlated with engagement and motivation and academic performance.

The study of the active learning strategies in Ethiopian primary schools showed that teachers and students view active learning as a positive intervention, but there are still difficulties in its

implementation (Perceptions of Active Learning, 2025). On the same note, Ali, Qutoshi and Jabeen (2021) indicated that the science teachers were aware of the need to acquire critical thinking development but did not have the instructional approaches to be effective thus creating a gap between belief and practice.

The difference between genders in the teaching strategy perception and implementation has been reported in the literature of education research. Certain reports suggest that female educators can use more student-focused approaches to instruction, whereas male teachers tend to focus on content and systematic approach (Rarieya, Wango & Oluga, 2025). Gender can also contribute to the science engagement of students; Harnischfeger and Stahl (2025) discovered that the perception of gender and STEM engagement differed between the students and that it has implications on the responsiveness of instructions. These results indicate that the gendered experiences in the classroom need to be considered in perceptual analyses to comprehend the way teaching strategies work in the practice.

Instructional choices and perceptions are also determined by the educational setting, particularly urban vs. rural setting. The rural schools can experience a lack of resources, professional growth, or exposure to new teaching methods, but the urban schools can receive more possibilities (Conceptual Model of Rural Education, 2024). Such contextual differences influence the application of instruction methods as well as their interpretation by the educators and learners.

Teacher-student perceptual gaps may result in behavioral discrepancies between the planned instruction and the student learning experiences. Instead of teachers improving the learning outcomes, learning might be reduced when the students fail to identify the best instructional strategies as effective or engaging. Knowledge of these differences in perceptions can be used to develop professionally and have a gap between teacher assumptions and student requirements. Indicatively, a structured system of reflection and feedback can be used to guide the teachers in refining their strategy utilization according to student feedback.

Research Objectives

1. To investigate how science instructors in private secondary schools address individual differences in their lessons, as perceived by both teachers and students.
2. To examine how science instructors in private secondary schools use collaborative teaching techniques as perceived by both teachers and students.
3. To compare how science teachers in private secondary schools are perceived by both teachers and students in relation to teaching methodology-related tactics.
4. To evaluate how instructors and students in private secondary schools view instructional techniques meant to foster critical thinking.

Research Questions

1. How do students and teachers view the individual differences-related teaching strategies employed by science teachers in private secondary schools?
2. How are the collaborative teaching techniques used by science instructors in private secondary schools perceived differently by teachers and students?

3. How do science teachers in private secondary schools perceive different teaching methodology-related strategies?
4. What differences exist between teachers' and students' perceptions of instructional strategies meant to help students in private secondary schools develop their thinking skills?

Methodology

In order to investigate how teachers and students perceive science teaching methods in private secondary schools, this study used a quantitative, descriptive–comparative research design. Science instructors and their pupils from private schools made up the population. Convenience sampling was used to gather information from 132 students and 35 science teachers. The research tool was a structured questionnaire with items pertaining to four areas of teaching strategies: thinking skills, teaching methodology, individual differences, and collaboration. A five-point Likert scale, ranging from strongly disagree to strongly agree, was used to record responses. Subject matter experts examined the instrument to verify its content validity, and Cronbach's alpha was used to determine its reliability. Descriptive statistics (mean and standard deviation) and comparative analysis were used to analyze the data in order to look at how teachers' and students' perceptions differed. Additionally, the gender of the teachers and the location of the school (rural versus urban) were compared. For ease of understanding and interpretation, the results of the statistical analysis were displayed in tabular form using SPSS.

Table 1

Teaching Strategies Used by Science Teachers in Private Sector as Perceived by Teachers and Students

Strategies	Teachers, N = 35, Mean	Teachers SD	Students, N = 132, Mean	Students SD
Teaching Strategies Regarding Individual Differences	4.242	.343	3.829	.517
Teaching Strategies Regarding Collaboration	4.262	.338	3.383	.529
Teaching Strategies Regarding Teaching Methodology	4.334	.248	3.412	.630
Teaching Strategies Regarding Thinking Skills	4.345	.282	3.493	.635
Total	**4.292**	**.204**	**3.529**	**.428**

Table 1 includes a comparative study of the teacher and students' perception towards science teaching strategies in the secondary schools that are situated in the privatized setting. In general, the means (M = 4.292) of teachers were found to be significantly higher than the ones of students (M = 3.529) suggesting a distinct perceptual difference in both the groups. In terms of teaching strategies to meet individual differences, teachers felt that these strategies were implemented highly (M = 4.242) and students felt that the strategies were implemented

moderately (M = 3.829) indicating that differentiation may not be equally enacted in the students. Greater difference can be noticed in collaborative teaching strategies, as teachers reported to use it strongly (M = 4.262) in comparison with rather low perceptions of students (M = 3.383). Same tendencies can be seen in strategies and strategies based on teaching methodology where the perceptions of teachers were high (M = 4.334 and 4.345 respectively), and those of the students were moderate. These results point out observable discrepancies between what teacher's report of their self-practices and the experiences of students in classrooms in all strategy domains.

Table 2

Teaching Strategies Used by Male Science Teachers in Private Sector as Perceived by Teachers and Students

Strategies	Teachers N = 17, Mean	Teachers SD	Students, N = 62, Mean	Students SD
Teaching Strategies Regarding Individual Differences	4.361	.349	3.772	.535
Teaching Strategies Regarding Collaboration	4.363	.309	3.229	.500
Teaching Strategies Regarding Teaching Methodology	4.400	.203	3.225	.604
Teaching Strategies Regarding Thinking Skills	4.412	.235	3.282	.630
Total	**4.378**	**.168**	**3.377**	**.393**

Table 2 shows a comparison of the perceptions of teachers and students on science teaching strategies employed by male science teachers in the private secondary schools. The general mean score of teachers (M = 4.378) is significantly greater than students (M = 3.377), which shows that there is a significant difference in perceptions between teachers and students. In terms of teaching strategies that dealt with individual differences, the teachers had a high perception regarding its application (M = 4.361), and students had a relatively moderate perception (M = 3.772). There is also a significant difference in collaborative teaching strategies with teachers rating their practices high (M = 4.363) compared to students who rated the use of collaborative teaching strategies as low (M = 3.229). The same differences can be seen in the strategies related to teaching methodology and the strategies of developing the thinking skills, where the mean scores of teachers were above 4.40, and the mean scores of students were near 3.25. Generally, the results indicate that male science teachers feel that their instructional strategies are very effective, and the students feel the same in a lower degree in all areas.

Table 3

Teaching Strategies Used by Female Science Teachers in Private Sector as Perceived by Teachers and Students

Strategies	Teacher, N = 17, Mean	Teachers SD	Students, N = 70, Mean	Students SD
Teaching Strategies Regarding Individual Differences	4.130	.305	3.879	.499
Teaching Strategies Regarding Collaboration	4.167	.345	3.520	.520
Teaching Strategies Regarding Teaching Methodology	4.272	.276	3.577	.610
Teaching Strategies Regarding Thinking Skills	4.282	.313	3.680	.582
Total	**4.211**	**.206**	**3.664**	**.416**

Table 3 is a comparative analysis of the perception of teachers and students on science teaching strategies used by female science teachers in the private secondary schools. The general mean of the reported data of teachers (M = 4.211) is greater than that of the students (M = 3.664), which shows the difference in perception between these two groups. Teachers in the area of teaching strategies concerning individual differences felt that they were strongly implemented (M = 4.130) and students gave slightly lower scores (M = 3.879) indicating that there was a slight difference in differentiation practices. In the case of collaborative strategies, there was an average rating of teachers (M = 4.167), but students rated lower engagement (M = 3.520). The same tends can be seen in the teaching methodology related strategies and strategies to develop thinking skills with the perceptions of the teachers being more than 4.27 and the perceptions of the students being between 3.577 and 3.680. These findings suggest that female science teachers think that their instructional practices are effective, but the students believe that the instructional practices are less reliably implemented, which creates discrepancies between the planned teaching practices and the experiences of students.

Table 4

Teaching Strategies Used by Urban Science Teachers in Private Sector as Perceived by Teachers and Students

Strategies	Teachers, N = 18, Mean	Teachers SD	Students, N = 69, Mean	Students SD
Teaching Strategies Regarding Individual Differences	4.273	.341	3.763	.546
Teaching Strategies Regarding Collaboration	4.306	.343	3.352	.595
Teaching Strategies Regarding Teaching Methodology	4.356	.266	3.341	.743
Teaching Strategies Regarding Thinking Skills	4.436	.282	3.549	.642
Total	**4.342**	**.198**	**3.501**	**.505**

Table 4 presents a comparative study of the teachers and students' perception of science teaching strategies used by urban science teachers in the private secondary schools. The mean score of the teachers (M = 4.342) is significantly higher than that of students (M = 3.501), which shows that there is a perceptual difference between the experience of instructional strategies between teachers and students. In teaching strategies that accommodate individual differences, the teachers reported high use (M = 4.273) whereas students reported moderate use (M = 3.763) indicating that differentiation might not be experienced fully by the learners. The difference is more evident in collaborative strategies where the perception of teachers (M = 4.306) is higher than the perception of students (M = 3.352) which means that students have minimal collaboration in their view. On the same note, the strategies and strategies associated with teaching methodology demonstrate significant differences where the means of teachers are between 4.356 and 4.436 and the means of students are between 3.341 and 3.549. On the whole, the findings point to the fact that the urban science teachers feel that their teaching methods are highly effective, and the students are less frequently exposed to them in all spheres.

Table 5

Teaching Strategies Used by Rural Science Teachers in Private Sector as Perceived by Teachers and Students

Strategies	Teachers, N = 17, Mean	Teachers SD	Students, N = 63, Mean	Students SD
Teaching Strategies Regarding Individual Differences	4.209	.352	3.901	.477
Teaching Strategies Regarding Collaboration	4.216	.337	3.418	.448
Teaching Strategies Regarding Teaching Methodology	4.312	.234	3.489	.470
Teaching Strategies Regarding Thinking Skills	4.249	.256	3.432	.626
Total	**4.239**	**.203**	**3.560**	**.326**

Table 5 provides a comparative study of the views of teachers and students on the science teaching strategies employed by rural science teachers in the private secondary schools. The mean of the overall reported by teachers (M = 4.239) is greater in comparison to the mean of the overall reported by students (M = 3.560), which demonstrates the existence of a perceptual difference between the instructional intentions and classroom experiences. Teachers had high ratings on their teaching strategies in terms of individual differences (M = 4.209) compared to the moderately lower ratings of the students (M = 3.901), indicating that differentiation might not be as well-experienced by the students. There is a significant difference in collaborative strategies where the teacher perception (M = 4.216) is higher than student perception (M = 3.418) indicating that students do not engage in collaborative learning. There are similar gaps in the strategies associated with the teaching methodology (teachers M =

4.312; students M = 3.489) and the strategies that encourage the development of the thinking skills (teachers M = 4.249; students M = 3.432). These results reveal that although the rural science teachers believe that their teaching strategies are effective, the students do not experience them as often, which points to the aspects of the instructional and professional adjustment.

Main Conclusion

- There are no significant differences between the perceptions of teachers and students, and the latter experiences relatively moderate implementation of the teaching strategies in all domains.
- The greatest discrepancies are seen in collaborative teaching approaches, which implies that students might not be engaged in group based or interactive learning as much as teachers would like them to be.
- There are some differences in the implementation of the strategies by male and female teachers, as male teachers report a higher score, but the perceptions of students are lower in both sexes.
- Urban and rural comparisons show that even though the context differs, there are still perceptual differences with urban students reporting a little lower perception in collaboration and teaching methodology, which points to contextual issues in student engagement.

Discussion

The results are consistent with the previous studies that suggested that the self-perceptions of teachers regarding the effectiveness of instruction can tend to be higher than the perceptions of students about the classroom experiences (Gonsar, Patrick and Cotner, 2021; Han, 2021). The high disparity in collaborative strategies is consistent with Sguazzin and Grann (2008) who found that teachers engage in group work but students often feel that there is little interaction or student involvement. Likewise, the difference in the approach to teaching and the ability to think can be attributed to the results of Ali, Qutoshi, and Jabeen (2021) who found that teachers acknowledge the significance of critical thinking and inquiry-based approaches but cannot implement them on a regular basis.

The difference in genders is also present yet moderate; the students of female teachers expressed a little more positive perceptions of individual differences and thinking skills in comparison with those of male teachers, which is also supported by Rarieya, Wango, and Oluga (2025), who emphasized that female educators could use more student-focused methods. Comparisons between urban and rural settings suggest that the contextual resources and the size of the classes could affect the strategy implementation and the perception of the students, which is also consistent with Haider Shah, Shaheen, and Mahmood Kiani (2022), who found that urban schools tend to have more access to instructional resources, but the perception gap still exists.

On the whole, the results highlight the importance of professional development that does not only supply teachers with various teaching methods but also involves student feedback and

reflection mechanisms. Congruence between the intentions of teachers and the experiences of students in the classroom is essential to the development of engagement, collaboration, and higher-order thinking in the private secondary science education.

This discussion establishes that the issue of perceptual gaps is widespread in both gender and location and this aspect justifies the need to consider reflective teaching, active learning strategies and regular student engagement strategies to ensure that the gap between teacher intention and student experience is bridged.

Recommendations

- ✓ *Improve Collaborative Learning Practices:* Since the widest gap in perceptions involved collaborative strategies, the largest gap in perceptual gap, the private secondary schools ought to offer specific professional development workshops that would train the science teachers in effective group-based and interactive learning strategies. Monitoring the level of engagement among students should be emphasized to make sure that the students experience collaboration as it was intended.
- ✓ *Enhance Differentiated Instruction:* The mediocre student perception of the strategies that target individual differences indicates that the teachers require systematized instructions and resources in differentiating instruction. Mentoring and peer observation programs should be introduced in schools to enable teachers to convert their intentions into real classroom practices that would address the needs of different learners.
- ✓ *Encourage Reflective Pedagogy and Feedback Processes:* The mismatches in the teaching approach and thinking abilities suggest the necessity to ensure the correspondence between the teacher perception and the student experience. To assist teachers to reflect on their teaching methods and modify strategies to improve critical thinking and inquiry-based learning outcomes, schools ought to create frequent feedback mechanisms, such as surveys and classroom observations of students.

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