Constraints in Teaching Science and Science Instructional Practices at Iloilo State University of Fisheries Science and Technology

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Abstract: This study determined the constraints and instructional practices of 21 science teachers at Iloilo State University of Fisheries Science and Technology. Respondents were classified according to civil status, educational attainment, teaching experience, and area of specialization. A researcher-made questionnaire and an adapted survey instrument were used to collect data. The study employed descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (t-test and Pearson's r) at a 0.05 level of significance. Findings revealed that science teachers demonstrated excellent instructional practices despite constraints, particularly limited instructional materials and resources. Teachers consistently applied effective strategies to support student learning and maintain instructional quality. Results further showed that selected demographic variables had varying associations with instructional practices, although most relationships were not statistically significant, indicating generally consistent instructional competence across teacher profiles. The findings suggest the need for targeted interventions, improved access to instructional materials, and strengthened faculty development programs to further enhance the quality of science education.

Keywords: constraints in teaching science, science instructional practices

Introduction

Science education is one of the foundations of national development because it helps students develop critical thinking, analytical abilities, creativity, and problem-solving skills that are essential in everyday life and future careers. Through science learning, students become more capable of understanding the world around them and making informed decisions based on evidence and reasoning. Because of this, science teachers play a significant role in shaping students' academic growth and scientific literacy. However, delivering quality science education is not always easy, as teachers often face several challenges that may affect the teaching and learning process. (Anastasiou, Manassero-Mas & Vázquez-Alonso, 2025; Putri, 2022).

Among the common difficulties experienced by science teachers are the lack of adequate instructional materials, limited laboratory equipment and facilities, insufficient training opportunities, heavy workloads, and other classroom-related concerns. These constraints can make it difficult for teachers to conduct experiments, demonstrate scientific concepts effectively, and provide engaging learning experiences for students. In many cases, teachers are forced to become resourceful and adaptive to continue delivering lessons despite limited resources. Even with these obstacles, effective instructional practices remain important in maintaining quality science education and ensuring that students continue to learn meaningfully (Sahoo, 2021; Umar, Wahyuni & Sidiq, 2026).

This study was conducted to examine the teaching constraints encountered by science teachers and to assess their instructional practices at Iloilo State University of Fisheries Science and Technology. Specifically, the research aimed to determine the extent of challenges faced by science teachers, particularly in terms of instructional materials and other teaching-related factors. It also sought to evaluate the instructional practices of science teachers when they were grouped according to civil status, educational attainment, teaching experience, and field of specialization. By examining these variables, the study aimed to provide a clearer understanding of how personal and professional factors may influence science teaching practices.

The findings of this study are valuable because they may help educational administrators, school leaders, and policymakers develop more effective strategies and support systems for science teachers. Understanding the challenges faced by educators can guide institutions in improving instructional resources, strengthening laboratory facilities, and providing professional development programs that enhance teaching effectiveness. Furthermore, the study highlights the dedication and resilience of science teachers in maintaining quality instruction despite existing limitations. Ultimately, the research contributes to the continuous improvement of science education and supports the goal of producing scientifically literate and competent learners in higher education institutions.

Methodology

The study employed a descriptive-correlational research design to examine the teaching constraints encountered by science teachers and to assess their science instructional practices. This research design was considered appropriate because it allowed the researchers to describe the existing conditions experienced by science teachers while also determining whether significant relationships existed among the variables included in the study. Through this approach, the researchers were able to gain a deeper understanding of how teaching challenges may influence instructional practices in science education.

The respondents of the study consisted of twenty-one (21) science teachers from Iloilo State University of Fisheries Science and Technology. These respondents were selected because they are directly involved in teaching science subjects and are knowledgeable about the actual challenges and classroom experiences encountered in science instruction. The respondents were further categorized according to their civil status, educational attainment, teaching experience, and field of specialization in order to determine whether these profile variables had an influence on their teaching constraints and instructional practices.

To gather the necessary data, the researchers utilized two research instruments. The first was a researcher-made questionnaire designed to identify and measure the different teaching constraints experienced by science teachers. This instrument focused on areas such as instructional materials, teaching resources, and other factors that may affect the delivery of science instruction. The second instrument was an adapted survey questionnaire used to assess the instructional practices of the respondents. The adapted questionnaire was selected to ensure reliability and relevance in evaluating the teaching methods and strategies employed by science educators.

The collected data were analyzed using both descriptive and inferential statistical tools. Descriptive statistics such as frequency count, percentage, mean, and standard deviation were used to summarize and describe the respondents' demographic profiles, the level of teaching constraints they experienced, and the extent of their instructional practices. These statistical measures provided a clear presentation and interpretation of the gathered information.

Meanwhile, inferential statistical tools were employed to examine possible relationships and differences among variables. The t-test was used to determine significant differences between groups, while Analysis of Variance (ANOVA) was utilized when comparing more than two groups based on respondents' profiles. Pearson's r correlation coefficient was also applied to identify whether a significant relationship existed between teaching constraints and instructional practices. Through these statistical analyses, the researchers were able to draw meaningful conclusions regarding the challenges faced by science teachers and the effectiveness of their instructional practices.

Results and Discussion

The result in Table 1 shows that teachers face the least constraints in teaching science, indicating a favorable teaching environment. Notably, civil status doesn't seem to impact constraints, as both married and single teachers reported "least constraints". Additionally, educational background does not appear to be a barrier, as teachers with diverse backgrounds reported experiencing 'least constraints' or 'less constraints', suggesting that teaching effectiveness is not solely determined by educational credentials. Furthermore, the study found that experience and specialization may not be the primary determinants of teaching effectiveness, as both teachers with extensive and limited experience, as well as science and non-science majors, reported 'least constraints'. Overall, the findings

suggest that teachers are generally well-equipped to handle teaching demands and that factors like civil status, educational background, experience, and specialization may not be significant barriers to effective teaching.

Table 1 Level of Constraints in Teaching Science identified by the Instructors in the Area of Subject matter, when taken as a whole, and when grouped according to Civil Status, Educational Background, Teaching Experience, and Field of Specialization

Variables	*Mean*	*Description*	*SD*
As a whole	4.72	Least Constraints	0.238
Civil Status			
Married	4.64	Least Constraints	0.294
Single	4.77	Least Constraints	0.192
Educational Background			
Doctorate Degree	4.74	Least Constraints	0.228
Master's Degree holder	4.64	Least Constraints	0.279
With units in Doctorate			
Master's Degree holder	4.85	Least Constraints	0.191
Graduates of			
Other Courses with Ed			
Units	4.67	Less Constraints	0.231
Teaching Experience			
Long	4.80	Least Constraints	0.189
Short	4.72	Least Constraints	0.229
Field of Specialization			
Science majors	4.73	Least Constraints	0.267
Non-science Majors	4.71	Least Constraints	0.219

Score	Description
4.21 - 5.00	Least Constraints
3.41 - 4.20	Less Constraints
2.61 - 3.40	Moderate Constraints
1.81 – 2.60	Many Constraints
1.00 – 1.80	Most Constraints

Moreover, this implies that science majors have enough knowledge and skills to teach science. Science major teachers are equipped with sufficient information, updated on the current trends, and adequate preparation to teach science with mastery and confidence. On the other hand, non-science major teachers can adapt the core content of the subject through continuous attendance in seminars and training on science subjects, thus enriching their knowledge and skill in teaching the subject well.

The result in Table 2 shows that the level of constraints in teaching science in terms of instructional materials reveals a positive scenario, with an overall mean score of 4.74 indicating "Least Constraints." This suggests that teachers generally have access to sufficient instructional materials, which is essential for effective science teaching. The results also show that civil status and educational background do not significantly impact teachers' perceptions of constraints, implying that teachers are generally supported in terms of instructional materials regardless of these factors.

Table 2 Level of Constraints in Teaching Science in the area of Instructional Materials, when respondents are taken as a whole, and grouped according to Civil Status, Educational Background, Teaching Experience, and Field of Specialization

Variables	*Mean*	*Description*	*SD*
As a whole	4.74	Least Constraints	0 .288
Civil Status			

Married	4.56	Least Constraints	0.344
Single	4.84	Least Constraints	0.195
Educational Background			
Doctorate Degree	4.74	Least Constraints	0.327
Master's Degree holder	4.62	Least Constraints	0.273
With units in Doctorate			
Master's Degree holder	4.85	Least Constraints	0.191
Graduates of other			
Courses with Ed Units	4.93	Least Constraints	0.115
Teaching Experience			
Long (Above 10 years)	4.68	Least Constraints	0.368
Short (Below 10 years)	4.80	Less Constraints	0.217
Field of Specialization			
Science Majors	4.79	Least Constraints	0.214
Non-science majors	4.70	Less Constraints	0.343

Score	Description
4.21 - 5.00	Least Constraints
3.41 - 4.20	Less Constraints
2.61 - 3.40	Moderate Constraints
1.81 – 2.60	Many Constraints
1.00 – 1.80	Most Constraints

However, the study highlights some differences in perceptions based on teaching experience and field of specialization. Long-experienced teachers tend to perceive least constraints in instructional materials compared to short-experienced teachers, possibly due to their familiarity with available resources and strategies for accessing them. Science majors also reported fewer constraints than non-science majors, likely due to their stronger background knowledge and familiarity with science resources. These findings have implications for professional development and resource allocation. Providing non-science majors with opportunities to enhance their knowledge and skills in teaching science could help alleviate the constraints they face. Additionally, schools and administrators can use these findings to inform resource allocation decisions, ensuring that instructional materials are adequately provided and accessible to all teachers.

Overall, the study's results are encouraging, suggesting that teachers perceive relatively few constraints in instructional materials. Nevertheless, the findings also highlight areas for improvement, particularly for non-science majors and short-experienced teachers. By addressing these areas, educators and policymakers can work towards creating a more supportive and effective science education environment.

Through FGD, valuable insights from instructors' experiences and perspectives shed light on the complexities of teaching science and the potential solutions that can help alleviate these constraints. By doing so, strategies that can support instructors in effectively teaching science can be determined, ultimately enhancing student learning outcomes.

Teaching Constraints

The findings indicate that science instructors at Iloilo State University of Fisheries Science and Technology (ISUFST) generally encounter very few constraints in their teaching. On average, instructors reported minimal limitations in subject matter (M = 4.72, SD = 0.238), instructional materials (M = 4.74, SD = 0.288), teaching methods and strategies (M = 4.83, SD = 0.247), and administrative aspects (M = 4.82, SD = 0.212).

When examined across demographic categories such as civil status, educational background, teaching experience, and field of specialization, the scores consistently indicated minimal constraints. For instance, single instructors reported slightly fewer challenges with subject matter (M = 4.77) than their married colleagues (M = 4.64), while instructors with Master's degrees and doctoral units expressed slightly greater ease with teaching methods and

strategies (M = 4.94). Overall, these variations were minor, suggesting that individual characteristics had little influence on instructors' perceptions of teaching constraints.

Science Instructional Practices

Instructors demonstrated strong and consistent instructional practices, with average ratings in all areas falling within the "excellent" range. Assessment practices scored M = 4.82 (SD = 0.212), use of instructional media and technology M = 4.83 (SD = 0.247), teaching strategies M = 4.83 (SD = 0.247), and basis for grading M = 4.62 (SD = 0.432). Differences based on demographics were small and statistically non-significant, indicating a high level of uniformity in teaching approaches across the faculty.

Relationship Between Constraints and Practices

Correlation analysis revealed a weak positive association between teaching constraints and instructional practices ($\varrho = 0.211$, $p = 0.264$). However, this relationship was not statistically significant, suggesting that while minor associations may exist, constraints do not meaningfully affect instructional effectiveness.

Differences Across Demographics

Further analysis using Kruskal-Wallis H and Mann-Whitney U tests confirmed that civil status, educational background, teaching experience, and field of specialization had no significant effect on either teaching constraints or instructional practices ($p > 0.05$). These findings highlight those institutional and systemic factors, rather than individual characteristics, are likely more influential in shaping instructors' experiences and practices.

Qualitative Insights

Focus group discussions supported the quantitative results. Instructors emphasized that factors such as administrative support, resource availability, collaboration, and professional development opportunities had a greater impact on teaching effectiveness than personal attributes like marital status or academic background. Participants noted that teamwork, access to instructional materials, and ongoing training helped them maintain high-quality and consistent instruction.

Overall, the results suggest that ISUFST science instructors maintain effective instructional practices while encountering minimal teaching constraints, with institutional support playing a central role in facilitating successful teaching outcomes.

In conclusion, the study shows that ISUFST provides a stable and enabling academic environment where science instructors perform effectively with minimal constraints. The institution itself emerges as the key factor supporting instructional success, highlighting the importance of sustaining and further enhancing organizational support systems to maintain high-quality education outcomes.

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