

Science Teachers' Satisfaction on the Implementation of Content Standards Towards Enhancing Their Teaching Practices

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Abstract—This study explores the satisfaction of science teachers with the implementation of content standards and how this impacts their teaching practices in the District of Burdeos, Quezon Province. Using a quantitative correlational methodology, the research examines the extent to which science teachers perceive the alignment and integration of prescribed science standards in their classrooms. It also identifies challenges encountered and measures the effectiveness of these standards in practice. The findings highlight key factors influencing the successful implementation of science standards, offering insights for curriculum planners, school administrators, teachers, students, and parents. This study aims to enhance the quality of science education by proposing an action plan based on the results, ultimately contributing to the improvement of teaching practices and educational outcomes in the local context.

Keywords— Curriculum implementation, educational standards, quantitative correlational methodology, science education, and teacher satisfaction.

I. INTRODUCTION

Adams and Krockover (2019) argued that a scientific curriculum had the potential to substantially improve students' critical thinking, curiosity, and foundational knowledge. This approach to education placed a high value on the curriculum's objectives and the methods used to teach it. Concern and investigation into this alignment's effectiveness dated back to the area of primary scientific education. The dynamic nature of both science and teaching raised the question of how well the primary school science curriculum reflected real classroom practices. The educational system received guidance from various sources, such as institutions and governments (Smith & Brown, 2019). All aspects of the scientific curriculum, including its depth and breadth, learning objectives, and methods for evaluating competency, were laid forth in these standards. However, implementing these regulations in a school setting really put them to the test. Due to the diversity of beliefs, pedagogical methodologies, and available resources, educators faced the challenge of incorporating these expectations into their instructional practices (Johnson, 2020).

The purpose of this research was to dissect the intricate web of connections between the science curriculum mandated for students in grades K-5 and its actual classroom implementation. Examining this alignment and finding probable gaps, inequities, and success areas was the goal of the research, aiming to enhance the effectiveness of fundamental scientific education. To completely grasp this

matter, a multi-faceted strategy was necessary. It began by taking stock of where elementary school science instruction stood. Part of this process was ensuring the right knowledge, objectives, and abilities by reviewing the requirements. There needed to be a greater investigation of the many pedagogical approaches utilized by teachers, such as the materials, instruments, and assessment strategies they used, and the methods employed to convey scientific concepts in the classroom. Understanding the factors at work was also necessary for coordinating instructional strategies with course goals (Johnson, 2020). Several variables, including teacher preparation, school funding, administrative backing, and curricular discretion, determined the extent to which curricular standards were actually applied in the classroom. Finding these characteristics and learning how they impacted alignment was crucial for filling any gaps and improving educational outcomes.

The purpose of this research was to illuminate the complex interplay between the stated goals of the scientific curriculum and their actual application in elementary school science classes (Adams & Krockover, 2019). The project's overarching goal was to help primary school teachers reduce this performance gap through improved scientific teaching for students. In the heart of the Quezon Province lies the District of Burdeos, a vibrant educational landscape where the implementation of science standards in elementary education took center stage. As the district strove for academic excellence, it became imperative to scrutinize the intricate dynamics within classrooms to ensure that science education aligned with established standards. The study titled "Benchmarking Classroom Realities: A Quantitative Exploration of Science Standards Implementation in Elementary Education" aimed to delve into the practices of science teachers in the District of Burdeos, Quezon Province, employing a quantitative correlational methodology. The significance of this research emanated from the pressing need to understand the correlation between the prescribed science standards and their actual integration into daily classroom instruction. This study drew inspiration from the growing body of literature emphasizing the pivotal role of effective science education in shaping the future of individuals and communities (Smith, 2019; Rodriguez et al., 2022). Recognizing the local context, the research focused on the years 2022 to 2024, ensuring relevance to the most recent

developments in educational policies and practices within the district.

The District of Burdeos, Division of Quezon Province, nestled in the CALABARZON region, boasted a diverse educational landscape that reflected the broader tapestry of the Philippines. It encompassed urban and rural settings, each presenting unique challenges and opportunities for science educators. The local nuances of Quezon Province, from cultural influences to resource availability, formed an integral part of this study's background, as they contributed to the intricate tapestry shaping science education within the Division (Cruz, 2020; Department of Education, 2023).

Burdeos district, one of the rural districts in Quezon Province, lies on the east coast of the Pacific within the Polillo group of islands. It had 12 elementary and two integrated schools with a total of 14 schools offering elementary sciences. Based on 2022 End of School Year reports on school building inventory, there was no classroom or building allotted as a science laboratory. Science and Mathematics Equipment (SME) provided by the DepEd were displayed and stored in a science corner in the library, in the school heads' office, or any classrooms with available and secured spaces. These factors might have hindered the learning capability of every learner. The DepEd Computerization Project (DCP) could also have enhanced teachers' capabilities in teaching science through ICT aid and integration. But in the recent inventory, six schools declared their computer units as needing repair, and eight schools reported that their DCP packages were already non-functional and recommended for disposal. Four schools reported receiving their newly received package, consisting of two laptops for administrative use and a smart TV for audiovisual purposes. Additionally, seven out of ten schools had no regular access to grid electricity (Burdeos District DCP Inventory 2022).

As the research unfolded, it was poised to shed light on the complex interplay between prescribed science standards and their practical implementation within the elementary classrooms of Burdeos Quezon. By adopting a quantitative correlational methodology, the study sought to establish relationships between various factors influencing the efficacy of science education delivery. This approach enabled the identification of patterns, correlations, and potential areas for improvement, ultimately contributing valuable insights for policymakers, educators, and stakeholders invested in the advancement of science education within the local context.

1.1 Statement of the Problem

Specifically, this study sought to answer the following questions:

- 1. What is the demographic profile of science teachers in the District of Burdeos, Division of Quezon Province, based on the following factors:*
 - 1.1 Age;*
 - 1.2 Sex;*
 - 1.3 Years as Science Teacher*
 - 1.4 Educational Attainment*

- 2. To what extent do science teachers implement content standards in their classrooms, considering factors such as:*

- 2.1 Familiarity with science content standards;*
- 2.2 Perceived relevance of science content standards to classroom instruction;*

- 3. What are the challenges encountered by the respondents on the implementation of content standards as perceived by science teachers in terms of:*

- 3.1 Implementation of content standards*
- 3.2 Enhancing teaching practices*
- 3.3 Mastery of the subject*

- 4. Is there a significant difference between the implementation of content standards in their class when grouped according to their profile?*

- 5. Is there a significant correlation between the extent to which science teachers implement the content standards in their science class and the challenges encountered during the implementation?*

II. METHODOLOGY

The research design for this study employed a quantitative correlational methodology, blending elements of both quantitative and descriptive research approaches. The quantitative aspect involved the systematic collection and analysis of numerical data to discern patterns, relationships, and correlations among variables. This method allowed for the measurement of the strength and direction of relationships between different factors, providing statistical insights into the variables under investigation. In this study, the primary focus was on exploring the correlation between the alignment and integration of science standards and the classroom practices of elementary school science teachers in the District of Burdeos Division of Quezon Province.

III. RESULTS AND DISCUSSION

This chapter presents the results, analysis, and interpretation of data relative to the questions aimed at determining science teachers' satisfaction with the implementation of content standards towards enhancing their teaching practices. The study highlights the findings from the investigation. Figures and tables are used to depict the data in an engaging manner, followed by detailed analysis and interpretation.

Problem Number 1: What is the demographic profile of science teachers in the District of Burdeos, Division of Quezon Province, based on the following factors such as Age, Sex, Years as Science Teacher, and Educational Attainment?

Table 1 presents the profile of the teacher-respondents according to age, sex, years of teaching experience as science teachers, and educational attainment, respectively.

Table 1 shows the demographic profile of science teachers in the District of Burdeos, Division of Quezon Province. The age distribution shows that the majority of teachers are between 26-30 years old (22.6%) and 36-45 years old (49%). A smaller portion of teachers is younger (21-25 years old) or older (more than 51 years old), each comprising 9.4% of the

total. Teachers with 4–6 years of teaching experience make up 30.2%, while those with less than a year and more than 12 years each make up 13.2%. The sex distribution reveals a higher percentage of female teachers (71.7%) compared to male teachers (28.3%). Regarding educational attainment, 28.3% hold a Bachelor's degree, 15.1% have master's units, 17% hold a master's degree, 15.1% have doctoral units, and 24.5% hold a doctoral degree.

Table 1. The Demographic Profile of Science Teachers in the District of Burdeos, Division of Quezon Province

Age	Frequency	Percent
21-25 yrs. old	5	9.4
26-30 yrs. old	12	22.6
31-35 yrs. old	5	9.4
36-40 yrs. old	13	24.5
41-45 yrs. old	13	24.5
More than 51 yrs. old	5	9.4
Total	53	100
Sex	Frequency	Percent
Male	15	28.3
Female	38	71.7
Total	53	100
Years as Science Teacher	Frequency	Percent
Less than 1 year	7	13.2
1-3 yrs.	10	18.9
4-6 yrs.	16	30.2
6-9 yrs.	10	18.9
9-12 yrs.	3	5.7
More than 12 yrs.	7	13.2
Total	53	100
Educational Attainment	Frequency	Percent
Bachelor	15	28.3
With a master's unit	8	15.1
With a master's degree	9	17
With the Doctoral unit	8	15.1
With a Doctoral degree	13	24.5
Total	53	100

The data indicates that the science teaching workforce in the District of Burdeos is predominantly female and relatively young, with many teachers in the early stages of their careers. The presence of teachers with varying years of experience suggests a mix of novice and seasoned educators, which can facilitate a dynamic exchange of teaching practices and experiences. The substantial number of teachers with advanced degrees or units towards higher education demonstrates a commitment to professional development and suggests a well-qualified teaching staff dedicated to improving their instructional methods and content knowledge.

The demographic profile suggests that professional development programs tailored to different career stages could be highly effective in enhancing teaching practices. For instance, newer teachers could benefit from mentorship and induction programs, while more experienced teachers might engage in advanced professional development opportunities. The high percentage of female teachers and those pursuing further education could indicate a positive trend towards continued learning and professional growth. The varied educational attainment levels among teachers also imply the potential for collaborative learning environments where teachers can share best practices and support each other in the

implementation of content standards, ultimately leading to improved student outcomes in science education.

Problem Number 2: To what extent do science teachers implement content standards in their classrooms, considering factors such as Familiarity with science content standards, and perceived relevance of science content standards to classroom instruction?

Tables 2 and 4 show the extent of implementation of content standards in terms of familiarity with science content standards and perceived relevance to classroom instruction, respectively.

Table 2. The Extent of Science Teachers Implementing Content Standards in Their Classrooms Considering Factors Such As Familiarity with Science Content Standards

Familiarity with Science standards	Mean	Verbal Interpretation
1. Science teachers perceive the alignment and integration of prescribed science standards into their classroom practices to a moderate extent.	3.38	To a Great Extent
2. Teachers generally perceive that there is a reasonable level of alignment and integration of prescribed science standards into their classroom practices.	3.30	To a Great Extent
3. I believe that the extent to which science teachers perceive the alignment and integration of prescribed science standards into classroom practices is moderately clear.	3.42	To a Great Extent
4. The alignment and integration of prescribed science standards into classroom practices are perceived to be reasonably balanced.	3.36	To a Great Extent
5. Teachers generally perceive that there is a moderate extent of alignment and integration of prescribed science standards into their classroom practices.	3.45	To a Great Extent
6. I believe that the alignment and integration of prescribed science standards into classroom practices are satisfactory.	3.21	To a Moderate Extent
7. Teachers generally perceive that there is a reasonable extent of alignment and integration of prescribed science standards, practically speaking, into their classroom practices.	3.09	To a Moderate Extent
8. The overall extent to which science teachers perceive the alignment and integration of prescribed science standards into classroom practices is perceived to be reasonably balanced.	3.53	To a Great Extent
9. My experience with the alignment and integration of prescribed science standards into classroom practices is perceived as satisfactory.	3.17	To a Moderate Extent
10. Teachers generally perceive that the alignment and integration of prescribed science standards contribute reasonably to their overall teaching practices.	2.94	To a Moderate Extent
Weighted Mean	3.28	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

Table 2 presents the extent to which science teachers implement content standards in their classrooms, considering their familiarity with these standards. The data shows that most teachers To a Great Extent with several indicators: they perceive the alignment and integration of prescribed science standards into their classroom practices to a moderate extent

(mean = 3.38), there is a reasonable level of alignment and integration (mean = 3.30), and the extent of alignment and integration is moderately clear (mean = 3.42). Additionally, teachers perceive this alignment and integration as reasonably balanced (mean = 3.36), and to a moderate extent in general (mean = 3.45). However, there are also indicators where teachers only to a Moderate Extent: the alignment and integration are satisfactory (mean = 3.21), there is a reasonable extent of alignment, practically speaking (mean = 3.09), and the overall extent of alignment is perceived as reasonably balanced (mean = 3.53). Furthermore, teachers find the alignment and integration satisfactory based on their experience (mean = 3.17) and perceive that these standards contribute reasonably to their overall teaching practices (mean = 2.94). The overall weighted mean is 3.28, which falls within the "To a Great Extent" range.

The findings indicate that science teachers in the District of Burdeos generally feel confident in their ability to align and integrate prescribed science standards into their classroom practices. The consistent "To a Great Extent" ratings across most items suggest that teachers perceive the standards as relevant and well-integrated into their instructional methods. Even the indicators where teachers only "To a Moderate Extent" (such as the contribution of standards to overall teaching practices, with a mean of 2.94) still reflect a positive overall perception. This consensus highlights that teachers are familiar with the standards and believe they are effectively applied in their teaching.

The positive perception of the alignment and integration of science content standards implies that teachers are likely to continue implementing these standards effectively. This leads to a Great familiarity and positive attitude towards the standards can lead to more consistent and effective science instruction, benefiting student learning outcomes. However, the areas where teachers only "To a Moderate Extent" rather than "To a Great Extent" suggest room for improvement. Professional development and support focused on these specific areas could further enhance teachers' confidence and effectiveness in implementing the standards, ensuring that all aspects of the standards are fully integrated into classroom practices.

The positive perception of science teachers in the District of Burdeos regarding the alignment and integration of content standards into their classroom practices reflects a Great recognition of the importance of curriculum alignment in effective instruction. This finding supports the idea that when teachers are familiar with and understand the relevance of content standards, they are more likely to integrate them meaningfully into their teaching. Such alignment ensures that instructional activities, assessments, and learning objectives are cohesive and targeted toward educational goals, ultimately leading to improved student outcomes.

This observation is consistent with the findings of Narayan Prasad Adhikari et al. (2021), who emphasized the necessity of equipping teachers with a solid understanding of content standards to promote successful teaching and efficient classroom management.

Table 3. *The Extent of Science Teachers Implementing Content Standards in Their Classrooms Considering Factors Such as Perceived relevance of science content standards to classroom instruction*

Perceived relevance of science content standards to classroom instruction	Mean	Verbal Interpretation
1. Science teachers perceive the alignment and integration of prescribed science content standards into their classroom practices to a moderate extent, considering the perceived relevance of science standards to classroom instruction.	3.38	To a Great Extent
2. Teachers generally perceive that there is a reasonable level of alignment and integration of prescribed science standards into their classroom practices, considering the perceived relevance of science standards to classroom instruction.	3.40	To a Great Extent
3. I believe that the extent to which science teachers perceive the alignment and integration of prescribed science standards into classroom practices, considering the perceived relevance of science standards, is moderately clear.	3.26	To a Great Extent
4. The alignment and integration of prescribed science standards into classroom practices, with consideration for the perceived relevance of science standards to classroom instruction, is perceived to be reasonably balanced.	3.43	To a Great Extent
5. Teachers generally perceive that there is a moderate extent of alignment and integration of prescribed science standards into their classroom practices, considering the perceived relevance of science standards to classroom instruction.	3.45	To a Great Extent
6. I believe that the alignment and integration of prescribed science standards into classroom practices, with consideration for the perceived relevance of science standards, is satisfactory.	3.21	To a Moderate Extent
7. Teachers generally perceive that there is a reasonable extent of alignment and integration of prescribed science standards, practically speaking, into their classroom practices, considering the perceived relevance of science standards to classroom instruction.	3.25	To a Great Extent
8. The overall extent to which science teachers perceive the alignment and integration of prescribed science standards into classroom practices, considering the perceived relevance of science standards, is perceived to be reasonably balanced.	3.45	To a Great Extent
9. My experience with the alignment and integration of prescribed science standards into classroom practices, considering the perceived relevance of science standards, is perceived as satisfactory.	3.21	To a Moderate Extent
10. Teachers generally perceive that the alignment and integration of prescribed science standards, considering the perceived relevance to classroom instruction, contribute reasonably to their overall teaching practices.	3.13	To a Great Extent
Weighted Mean	3.32	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

Table 3 presents the extent to which science teachers implement content standards in their classrooms, considering

the perceived relevance of these standards to classroom instruction. The data indicates that science teachers generally do so to a Great Extent with several indicators. They perceive the alignment and integration of prescribed science content standards to be moderate (mean = 3.38), reasonably level (mean = 3.40), and moderately clear (mean = 3.26). They also feel that the integration is reasonably balanced (mean = 3.43) and perceive a moderate extent of alignment (mean = 3.45). Furthermore, they believe that the integration is satisfactory (mean = 3.21) and reasonably practical (mean = 3.25). Teachers also believe to a Great Extent that the overall extent of alignment and integration is balanced (mean = 3.45) and contributes reasonably to their teaching practices (mean = 3.13). The overall weighted mean is 3.32, falling within the "To a Great Extent" range.

The findings suggest that science teachers in the District of Burdeos view the alignment and integration of science content standards as relevant and well-incorporated into their classroom practices. The consistent "To a Great Extent" ratings indicate that teachers find these standards to be meaningful and supportive of their instructional methods. Even the lower scores, which fall within the "To a Moderate Extent" range, suggest a generally positive perception. This alignment highlights that teachers recognize the importance of these standards in enhancing their teaching and contributing to effective classroom instruction.

The positive perception of the relevance and integration of science content standards implies that teachers are likely to continue implementing these standards effectively, enhancing the quality of science education. The high level of To a Moderate Extent indicates that teachers find these standards useful and pertinent to their instructional practices, which can lead to improved student engagement and learning outcomes. However, areas where teachers only "To a Moderate Extent" suggest that there is still room for further support and professional development to ensure that all aspects of the standards are fully understood and utilized to their fullest potential. This could include targeted training sessions and resources to help teachers maximize the relevance and impact of science content standards in their classrooms.

To a Great Moderate Extent among science teachers in the District of Burdeos regarding the relevance and integration of content standards into their classroom practices aligns with previous research that underscores the significance of teacher perception in the effective implementation of educational standards. As highlighted by Narayan Prasad Adhikari et al. (2021), teachers who perceive content standards as relevant and well-integrated are more likely to employ effective classroom management and instructional strategies. The consistent "To a Great Extent" ratings suggest a positive alignment with Liu et al. (2022), who found that the perceived practicality and clarity of educational standards are crucial for enhancing teaching practices. Furthermore, the overall weighted mean of 3.32, indicating a Great To a Moderate Extent, supports Herrera et al. (2021) and Al-Bahrani et al. (2022), who noted that positive teacher attitudes towards standards are essential for successful implementation and improved student outcomes. However, the presence of some

indicators falling within the "To a Moderate Extent" range points to the need for ongoing professional development, as emphasized by Tartavulea et al. (2020), to address specific areas where teachers may require additional support, ensuring that the relevance and impact of science content standards are fully maximized in classroom instruction.

Table 4. *The Summary of the Table of Extent of Science Teachers Implementing Content Standards In Their Classrooms Considering Factors*

The extent to which Science teachers perceive the alignment and integration of prescribed science standards into their classroom practices	Mean	Verbal Interpretation
Familiarity with Science standards	3.28	To a Great Extent
Perceived relevance of science content standards to classroom instruction	3.32	To a Great Extent
Weighted Mean	3.30	To a Great Extent

Legend: 3.25 – 4.00 To a Great Extent 2.50 - 3.24 To a Moderate Extent 1.75 - 2.49 To a Moderate Extent 1.00 – 1.74 To a Great Extent

Table 4 presents the extent to which science teachers implement content standards in their classrooms, considering two factors: familiarity with science standards and the perceived relevance of these standards to classroom instruction. The mean score for familiarity with science standards is 3.28, and for perceived relevance of science content standards, it is 3.32. Both scores fall within the "To a Great Extent" range, resulting in an overall weighted mean of 3.30, also in the "To a Great Extent" range.

The findings indicate that science teachers in the District of Burdeos that their familiarity with science standards and the perceived relevance of these standards to classroom instruction positively largely influence the alignment and integration of these standards into their teaching practices. This suggests that teachers feel confident in their understanding of the standards and recognize their importance in enhancing classroom instruction.

The findings, to a Great extent, on both familiarity and perceived relevance, imply that science teachers are well-equipped to implement content standards effectively in their classrooms. This positive perception can lead to more consistent and effective science instruction, ultimately benefiting student learning outcomes.

To maintain and further enhance this alignment and integration, continuous professional development and resources should be provided to support teachers' familiarity with the standards and underscore their relevance to classroom practices. This approach will help ensure that all teachers can fully utilize the content standards to improve their teaching and student engagement.

The findings that science teachers in the District of Burdeos, to a Great Extent, on the importance of their familiarity with and the perceived relevance of content standards to classroom instruction resonate with existing literature emphasizing the critical role of teacher understanding and perception in effective standards implementation.

Narayan Prasad Adhikari et al. (2021) noted that teacher familiarity with content standards is essential for effective classroom management and instructional practices. The To a

Great To a Moderate Extent observed aligns with Liu et al. (2022), who highlighted that teachers' recognition of the relevance of educational standards significantly enhances teaching efficacy. Moreover, the overall weighted mean of 3.30 supports Herrera et al. (2021) and Al-Bahrani et al. (2022), who found that positive teacher attitudes towards standards are crucial for successful implementation and improved student outcomes.

However, continuous professional development, as suggested by Tartavulea et al. (2020), remains vital to sustain and enhance teachers' familiarity with standards and their relevance, ensuring that the benefits of these standards are fully realized in classroom instruction and student engagement.

Problem Number 3: What are the challenges encountered by the respondents on the implementation of content standards as perceived by science teachers in terms of Implementation of content standards, enhancing teaching practices, and Mastery of the subject?

Tables 5 to 8 illustrate the challenges encountered by science teachers in implementing content standards in terms of implementation, enhancing teaching practices, and mastery of the subject, respectively.

Table 5. *The Challenges Encountered by the Respondents on the Implementation of Content Standards as Perceived by Science Teachers in Terms of Implementation of Content Standards*

Implementation of content standards	Mean	Verbal Interpretation
1. The science content standards are well-defined and easily interpretable for classroom implementation.	3.28	To a Great Extent
2. I have access to adequate teaching resources and materials that align with the science content standards.	3.30	To a Great Extent
3. The professional development programs offered effectively prepare me to implement the science content standards.	3.21	To a Moderate Extent
4. The time allocated in the curriculum is sufficient to cover all required science content standards.	3.40	To a Great Extent
5. The science content standards integrate well with the existing curriculum and instructional plans.	3.38	To a Great Extent
6. Administrative support is sufficient to help overcome challenges in implementing the science content standards.	3.23	To a Moderate Extent
7. The flexibility in the science content standards allows me to use diverse teaching methodologies.	3.17	To a Moderate Extent
8. The assessments provided are well-aligned with the science content standards and help measure student progress accurately.	3.45	To a Great Extent
9. Collaboration with fellow teachers aids in addressing challenges related to the implementation of science content standards.	3.25	To a Great Extent
10. The technology and tools available in my school support the effective implementation of science content standards.	3.13	To a Moderate Extent
Weighted Mean	3.28	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

Table 5 presents the challenges encountered by science teachers in the implementation of content standards. The data reveals that teachers To a Great Extent on several aspects: the clarity and interpretability of science content standards (mean = 3.28), access to adequate teaching resources (mean = 3.30), the sufficiency of time allocated in the curriculum (mean = 3.40), integration with existing curriculum (mean = 3.38), alignment of assessments with standards (mean = 3.45), and the benefits of collaboration with fellow teachers (mean = 3.25). However, there are areas where teachers only to a Moderate Extent, such as the effectiveness of professional development programs (mean = 3.21), administrative support (mean = 3.23), flexibility in using diverse teaching methodologies (mean = 3.17), and the availability of supportive technology and tools (mean = 3.13). The overall weighted mean is 3.28, indicating a general To a Great To a Moderate Extent with the implementation of content standards.

The data suggests that science teachers generally find the science content standards to be clear and well-integrated into their teaching practices. They feel adequately supported by resources and time allocation, and they value the alignment of assessments and collaboration with colleagues. However, there are notable challenges in areas such as professional development, administrative support, flexibility in teaching methods, and the availability of technology. These areas of concern reflect where additional support and improvement might be needed.

To a Great Moderate Extent on many implementations of content standards indicate that science teachers are generally well-supported in their roles. However, the areas with lower To a Moderate Extent highlight specific challenges that need addressing. Enhanced professional development, better administrative support, increased flexibility in teaching methodologies, and improved access to technology and tools could help overcome these challenges. Addressing these issues could further strengthen the implementation of science content standards and enhance overall teaching effectiveness, leading to better educational outcomes for students.

The findings that science teachers in the District of Burdeos generally agree to a Moderate Extent on the clarity and integration of content standards but face challenges in areas such as professional development, administrative support, flexibility in teaching methods, and access to technology align with previous literature highlighting the multifaceted nature of effective standards implementation. Narayan Prasad Adhikari et al. (2021) emphasized that clarity and interpretability of standards are crucial for successful implementation, which is supported by the To a Great To a Moderate Extent among teachers regarding these aspects. However, Liu et al. (2022) and Tartavulea et al. (2020) pointed out that effective professional development and administrative support are essential for teachers to feel fully equipped to implement standards, reflecting the lower To a Moderate Extent scores in these areas. The need for flexibility in teaching methodologies and access to supportive technology, as indicated by the teachers' responses, is consistent with findings by Herrera et al. (2021) and Al-

Bahrani et al. (2022), who noted that diverse teaching strategies and technological resources significantly enhance teaching effectiveness. Addressing these identified challenges through targeted professional development, improved administrative support, and increased technological resources can further strengthen the implementation of content standards and improve educational outcomes for students.

Table 6. *The Challenges Encountered by the Respondents on the Implementation of Content Standards as Perceived by Science Teachers in Terms of Enhancing Teaching Practices*

Enhancing teaching practices	Mean	Verbal Interpretation
1. Implementing science content standards enhances my ability to use diverse teaching strategies.	3.28	To a Great Extent
2. The science content standards provide clear guidelines that improve my instructional practices.	3.36	To a Great Extent
3. I find it challenging to integrate the science content standards with innovative teaching methods.	3.42	To a Great Extent
4. Professional development related to science content standards has positively impacted my teaching effectiveness.	3.57	To a Great Extent
5. The science content standards encourage me to incorporate more hands-on and inquiry-based activities.	3.32	To a Great Extent
6. I struggle to balance the requirements of science content standards with creative and engaging teaching practices.	3.47	To a Great Extent
7. The implementation of science content standards has led to improved student engagement in my classroom.	3.55	To a Great Extent
8. Collaborating with colleagues helps me to enhance my teaching practices while adhering to science content standards.	3.47	To a Great Extent
9. I find it difficult to adapt my teaching practices to meet the diverse needs of students while implementing science content standards.	3.47	To a Great Extent
10. The science content standards support the integration of technology in my teaching practices.	3.43	To a Great Extent
Weighted Mean	3.43	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

Table 6 presents the challenges encountered by science teachers in enhancing their teaching practices through the implementation of content standards. The data shows a Great To a Moderate Extent across all indicators. Teachers, to a Great Extent that implementing science content standards enhances their ability to use diverse teaching strategies (mean = 3.28) and provides clear guidelines that improve instructional practices (mean = 3.36). They also to a Great Extent that integrating content standards with innovative methods is challenging (mean = 3.42), but that professional development positively impacts teaching effectiveness (mean = 3.57). Other areas of To a Great To a Moderate Extent include encouragement for hands-on and inquiry-based activities (mean = 3.32), improved student engagement (mean = 3.55), and effective collaboration with colleagues (mean =

3.47). Teachers also find balancing standards with creative practices and adapting to diverse student needs challenging (mean = 3.47), and believe standards support technology integration (mean = 3.43). The overall weighted mean is 3.43, indicating a Great To a Moderate Extent.

The findings suggest that science teachers perceive the implementation of content standards as highly beneficial for enhancing their teaching practices. They believe that these standards support the use of diverse teaching strategies, improve instructional practices, and foster student engagement. However, integrating these standards with innovative methods, balancing them with creative practices, and adapting to diverse student needs are perceived as significant challenges. The positive impact of professional development on teaching effectiveness further underscores the importance of continued support in these areas.

To a Great Moderate Extent on the positive impact of science content standards on teaching practices indicates that these standards are seen as a valuable tool for improving educational quality. To address the challenges identified, targeted support and professional development should be provided to help teachers integrate standards with innovative methods, balance requirements with creative practices, and adapt to the diverse needs of students. Additionally, enhancing resources and support for technology integration and fostering collaboration among colleagues can further strengthen teaching practices and maximize the benefits of content standards. This comprehensive approach can lead to more effective teaching and better student outcomes.

To a Great Moderate Extent, among science teachers in the District of Burdeos regarding the benefits of implementing content standards for enhancing teaching practices align with previous research highlighting the positive impact of well-defined standards on instructional quality. The perception that content standards support diverse teaching strategies, improve instructional practices, and foster student engagement reflects the findings of Narayan Prasad Adhikari et al. (2021), who emphasized the role of clear guidelines in effective classroom management and instruction. The challenges related to integrating standards with innovative methods and balancing them with creative practices are consistent with Liu et al. (2022), who identified the need for flexibility and innovation in teaching.

Table 7 presents the challenges science teachers encounter regarding mastery of the subject when implementing content standards. The data indicates a Great To a Moderate Extent on all indicators. Teachers, to a Great Extent, believe that the science content standards enhance their understanding and mastery of the subject matter (mean = 3.34) and boost their confidence in teaching all topics covered by the standards (mean = 3.34). They also believe the standards require a deeper level of subject knowledge than they currently possess (mean = 3.30) and that they have sufficient background knowledge to implement the standards effectively (mean = 3.42). Implementing these standards is seen to improve overall subject mastery (mean = 3.30), though staying updated with the latest scientific knowledge and dealing with complex topics present challenges (mean = 3.42). Teachers feel that the

standards provide clear benchmarks for gauging mastery (mean = 3.38), but additional training is needed (mean = 3.40), and a comprehensive understanding of interdisciplinary topics is required (mean = 3.40). The overall weighted mean is 3.37, reflecting a Great To a Moderate Extent.

Table 7. The Challenges Encountered by the Respondents on the Implementation of Content Standards as Perceived by Science Teachers in Terms of Mastery of the Subject

Mastery of the subject	Mean	Verbal Interpretation
1. The science content standards enhance my understanding and mastery of the subject matter.	3.34	To a Great Extent
2. I feel confident in my ability to teach all topics covered by the science content standards.	3.34	To a Great Extent
3. The science content standards require a deeper level of subject knowledge than I currently possess.	3.30	To a Great Extent
4. I have sufficient background knowledge to implement the science content standards effectively.	3.42	To a Great Extent
5. Implementing the science content standards has improved my overall mastery of the subject.	3.30	To a Great Extent
6. I find it challenging to stay updated with the latest scientific knowledge required by the content standards.	3.42	To a Great Extent
7. The content standards provide clear benchmarks that help me gauge my mastery of the subject.	3.38	To a Great Extent
8. I need additional training to meet the subject mastery required by the science content standards.	3.40	To a Great Extent
9. The science content standards demand a comprehensive understanding of interdisciplinary topics.	3.40	To a Great Extent
10. I struggle with certain topics within the science content standards due to their complexity.	3.42	To a Great Extent
Weighted Mean	3.37	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

The data suggests that science teachers view the implementation of content standards as a significant factor in enhancing their subject mastery and teaching confidence. Despite this positive outlook, teachers recognize challenges in keeping up with the latest scientific developments, understanding complex topics, and meeting the comprehensive knowledge requirements outlined by the standards. The need for additional training and the recognition of the standards as benchmarks for assessing subject mastery indicate areas where teachers feel they could benefit from further support.

The Great To Moderate Extent on the benefits of science content standards for subject mastery underscores their role in improving teachers' understanding and confidence in their teaching. However, the challenges related to staying updated with current knowledge, understanding complex topics, and the need for additional training highlight the necessity for ongoing professional development. Providing targeted training and resources to help teachers manage these challenges and stay abreast of new scientific information will be crucial in

ensuring that they can effectively implement the content standards and continue to enhance their subject mastery. This support will help teachers maintain high standards of science education and address the complexities of the subject matter.

The findings that science teachers in the District of Burdeos, to a Great Extent, on the benefits of content standards for enhancing subject mastery and teaching confidence align with existing literature emphasizing the crucial role of well-defined standards in improving educational quality. According to Narayan Prasad Adhikari et al. (2021), clear benchmarks provided by content standards are essential for gauging and enhancing subject mastery. The recognition of the need for deeper subject knowledge and additional training mirrors the conclusions of Liu et al. (2022), who highlighted the importance of continuous professional development in addressing gaps in teachers' knowledge. The challenges related to staying updated with the latest scientific developments and understanding complex topics are consistent with the findings of Tartavulea et al. (2020), who noted that ongoing professional development is necessary to keep teachers current with advancements in their field. Moreover, the positive impact of content standards on teaching confidence and mastery supports the observations of Herrera et al. (2021) and Al-Bahrani et al. (2022), who found that well-implemented standards can significantly boost teacher efficacy. To address the challenges identified, targeted professional development and resources should be provided, ensuring teachers can stay abreast of new scientific information and effectively implement content standards, ultimately maintaining high standards of science education.

Table 8. The Summary of Table on the Challenges Encountered by the Respondents on the Implementation of Content Standards as Perceived by Science Teachers

Challenges of teachers in the implementation of content standards in Science classrooms	Mean	Verbal Interpretation
Implementation of content standards	3.28	To a Great Extent
Enhancing teaching practices	3.43	To a Great Extent
Mastery of the subject	3.37	To a Great Extent
Weighted Mean	3.36	To a Great Extent

Legend: 3.25–4.00 To a Great Extent, 2.50–3.24 To a Moderate Extent, 1.75–2.49 To a Limited Extent, 1.00–1.74 To a Very Limited Extent

Table 8 summarizes the challenges faced by science teachers in implementing content standards across different aspects of their teaching. The data reveals that teachers To a Great Extent on the challenges related to implementation (mean = 3.28), enhancing teaching practices (mean = 3.43), and mastery of the subject (mean = 3.37). The overall weighted mean of 3.36 indicates a To a Great To a Moderate Extent with the challenges faced in all these areas.

The findings suggest that science teachers acknowledge significant challenges in various aspects of content standards implementation. While they view these challenges as greatly present, they also recognize the complexities involved in applying the standards effectively, enhancing their teaching practices, and achieving mastery over the subject. The consistent "To a Great Extent" ratings across these categories reflect a comprehensive understanding of the difficulties

encountered in integrating content standards into their teaching.

To a Great To a Moderate Extent on the challenges related to implementation, teaching practices, and subject mastery indicate that science teachers face substantial hurdles in these areas. To address these challenges, targeted support and interventions are needed. This could include enhanced professional development programs, improved resources, and additional training to support teachers in effectively implementing content standards and overcoming difficulties in teaching practices and subject mastery. By addressing these areas, educational institutions can better support teachers in achieving successful integration of content standards and improving overall teaching effectiveness.

A study to a Moderate Extent among science teachers in the District of Burdeos regarding the challenges in implementing content standards, enhancing teaching practices, and mastering the subject matter is consistent with previous literature that underscores the multifaceted difficulties educators face in these areas.

According to Narayan Prasad Adhikari et al. (2021), effective content standards implementation is often hindered by the complexities of translating standards into practice, which is echoed in the high mean scores indicating To a Great

To a Moderate Extent on these challenges. Liu et al. (2022) highlight that enhancing teaching practices requires not only clear standards but also sufficient support and resources, a sentiment reflected in the need for targeted professional development and additional training identified by the teachers.

The challenges related to subject mastery align with Tartavulea et al. (2020), who emphasize the necessity for continuous professional development to keep educators updated with current knowledge and pedagogical strategies. The comprehensive recognition of these challenges supports the findings of Herrera et al. (2021) and Al-Bahrani et al. (2022), who advocate for systemic support through enhanced resources and professional development to address the multifaceted hurdles faced by teachers.

By implementing targeted support interventions, educational institutions can help teachers overcome these challenges, leading to more effective integration of content standards and improved educational outcomes.

Problem Number 4: Is there a significant difference between the implementation of content standards in their class when grouped according to their profile?

Table 9 presents the significant difference in the implementation of content standards when grouped according to the teachers' profile variables.

Table 9. *The Result of Significant Difference Between the Implementation of Content Standards in Their Class When Grouped According to Their Profile*

Teachers	Coefficients of F or t				
	Critical (2-tailed)	Computed	P-value	Decision	Interpretation
	Familiarity with Science standards				
Age	2.413	1.027	0.413	Accept Ho	Not Significant
Sex	2.008	0.101	0.920	Accept Ho	Not Significant
Years as Science Teacher	2.413	1.634	0.170	Accept Ho	Not Significant
Educational Attainment	2.565	0.109	0.979	Accept Ho	Not Significant
	Perceived relevance of science content standards to classroom instruction				
Age	2.413	0.954	0.456	Accept Ho	Not Significant
Sex	2.008	0.096	0.924	Accept Ho	Not Significant
Years as Science Teacher	2.413	1.754	0.141	Accept Ho	Not Significant
Educational Attainment	2.565	0.106	0.980	Accept Ho	Not Significant

Table 9 examines the significant differences in the implementation of content standards based on various teacher profiles, including age, sex, years as a science teacher, and educational attainment. For both familiarity with science standards and perceived relevance of these standards to classroom instruction, the coefficients of F or t are lower than the critical values, and the p-values are all greater than the significance level of 0.05. Specifically, familiarity with science standards shows no significant difference by age, sex, years as a science teacher, or educational attainment. Similarly, the perceived relevance of science standards also shows no significant differences based on these demographic factors.

The results indicate that there are no statistically significant differences in the implementation of science content standards when grouped according to teachers' age, sex, years of experience, or educational attainment. This suggests that the implementation of content standards is consistent across these demographic variables, and individual differences in these profiles do not significantly impact how teachers perceive or implement the standards.

The lack of significant differences across demographic variables implies that factors such as age, sex, years of teaching experience, and educational attainment do not influence the effectiveness of content standards implementation. This suggests that support and resources for implementing science content standards should be uniformly applied across all teachers, regardless of their demographic profiles. Ensuring equitable support for all teachers can help maintain consistent implementation of content standards and promote effective teaching practices across the board.

The finding that there are no statistically significant differences in the implementation of science content standards based on teachers' age, sex, years of experience, or educational attainment aligns with existing literature emphasizing the universal applicability of well-designed educational standards. Liu et al. (2022) support the notion that when content standards are clearly articulated and sufficiently supported, they can be implemented effectively by teachers regardless of their demographic background. This reinforces the idea that successful implementation is less about who the teacher is and

more about how the standards are communicated and supported within the system.

Problem Number 5: Is there a significant correlation between the extent to which science teachers implement the content standards in their science classes

Table 10 shows the correlation between the extent of implementation of content standards and the challenges encountered by the science teachers, and the challenges encountered during the implementation?

Table 10. *The Result of Significant Correlation Between the Extent to Which Science Teachers Implement the Content Standards in Their Science Class and the Challenges Encountered During the Implementation*

		r- value	p-value	Decision	Interpretation
Familiarity with Science standards	Implementation of content standards	0.749	0.000	<i>Reject Ho</i>	<i>Significant</i>
	Enhancing teaching practices	0.559	0.000	<i>Reject Ho</i>	<i>Significant</i>
	Mastery of the subject	0.45	0.000	<i>Reject Ho</i>	<i>Significant</i>
Perceived relevance of science content standards to classroom instruction	Implementation of content standards	0.862	0.000	<i>Reject Ho</i>	<i>Significant</i>
	Enhancing teaching practices	0.617	0.000	<i>Reject Ho</i>	<i>Significant</i>
	Mastery of the subject	0.502	0.000	<i>Reject Ho</i>	<i>Significant</i>

Legend: r = Pearson r Correlation

Table 10 illustrates the significant correlations between the extent to which science teachers implement content standards and the challenges they encounter during implementation. The correlation coefficients (r-values) indicate a Great positive relationship. For familiarity with science standards, the correlation with implementation of content standards is 0.749, with enhancing teaching practices is 0.559, and with mastery of the subject is 0.450. For perceived relevance of science content standards, the correlations are even Greater: 0.862 with implementation, 0.617 with teaching practices, and 0.502 with subject mastery. All the associated p-values are 0.000, which are below the 0.05 level of significance, leading to the rejection of the null hypothesis (Ho). These results confirm statistically significant correlations between the teachers' familiarity and perceived relevance of content standards and the various challenges they face in implementation.

The significance of these variables lies in their direct impact on the effectiveness of science instruction. A higher level of familiarity with science content standards enables teachers to confidently and competently align their lessons with prescribed goals, improving their ability to deliver content clearly and manage classroom instruction effectively. Familiarity also enhances teachers' ability to modify and adapt instructional strategies, thereby strengthening their teaching practices and reinforcing mastery of scientific content. On the other hand, when teachers perceive the standards as relevant to their teaching contexts and student needs, they are more likely to be motivated, committed, and proactive in implementing them. This sense of relevance fosters a deeper engagement with the curriculum and reduces resistance to change, resulting in more meaningful and consistent integration of the standards into classroom instruction.

These significant findings highlight the importance of improving both the familiarity and perceived relevance of content standards among science teachers. Targeted professional development programs that address these aspects can play a crucial role in helping teachers overcome implementation-related challenges. By equipping teachers with a thorough understanding of the standards and helping

them see their practical applications in the classroom, educational institutions can foster a more effective teaching environment. This, in turn, leads to enhanced instructional quality, greater teacher confidence, and improved learning outcomes for students in science education.

The findings align with existing literature that emphasizes the importance of the standards themselves and the support systems around them, over the demographic characteristics of teachers. For instance, Liu et al. (2022) contend that when content standards are clearly articulated and well-supported, they can be implemented effectively by teachers regardless of age, sex, years of experience, or educational attainment. This idea is echoed by Tartavulea et al. (2020), who argue that the success of standards depends not on the teacher's profile but on the quality of the standards and the professional development that accompanies them. Narayan Prasad Adhikari et al. (2021) similarly underscore the importance of equitable support mechanisms that ensure all teachers, regardless of background, receive adequate training and resources. The significant correlations in this study reinforce these perspectives, suggesting that improving familiarity with and perceived relevance of content standards, rather than focusing on demographic factors, may be a more impactful strategy in enhancing implementation.

IV. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions are drawn:

1. The demographic profile of science teachers in the District of Burdeos reveals diversity in age, teaching experience, and educational attainment, with a higher proportion of female teachers. This diversity is important because it provides insight into the varied needs and strengths of the teaching workforce, which can guide the design of inclusive and effective support programs.
2. Teachers generally implement science content standards effectively, as reflected in their strong familiarity with and perceived relevance of these standards to classroom instruction. This finding suggests that teachers are

confident and capable of aligning their teaching practices with prescribed standards, contributing to consistent and quality instruction.

3. Despite their positive perceptions, science teachers still encounter significant challenges related to the implementation process, enhancement of teaching strategies, and mastery of subject content. These challenges must be addressed because they can hinder effective instruction and limit the full integration of standards into classroom practice.
4. The study found no significant differences in the implementation of content standards when grouped by age, sex, years of experience, or educational attainment. This indicates that demographic characteristics do not significantly affect implementation, emphasizing the need for uniform and equitable support systems for all teachers.
5. There are strong correlations between the extent of content standards implementation and the challenges encountered, particularly regarding teachers' familiarity with and perceived relevance of the standards. This implies that enhancing teachers' understanding and appreciation of the standards can reduce implementation challenges and improve instructional outcomes.
6. In response to these findings, a comprehensive action plan is essential to address the identified challenges by improving teacher training, providing adequate resources, strengthening administrative support, fostering collaboration, and establishing a feedback mechanism. Implementing this plan can significantly enhance the quality of science instruction and ensure the successful application of content standards across classrooms.

Based on the conclusions drawn, the following are recommended:

1. School administrators may regularly provide professional development, allocate sufficient funds, and strengthen support systems to ensure effective implementation of science content standards.
2. Science teachers may actively participate in training and collaborate with peers to enhance their familiarity and instructional alignment with content standards.
3. All teachers may consistently apply and reflect on content standards in their lesson planning and teaching to promote cohesive and effective instruction.

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