

Development and Evaluation of Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars for Grade 10 Science

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Abstract. The research aimed for the development and evaluation of culturally relevant Classroom-Based Sexuality Education Lesson Exemplars for Grade 10 science. It employed a sequential explanatory mixed methods approach and quasi-experimental design to test the effectiveness of the exemplary lessons. The participants were secondary science teachers of 10 national high schools, whereas selected teachers were surveyed through key informant interviews for qualitative insights. The results from the implementation indicated that teachers were able to use inclusive language, hands-on activities, and real-life examples to cultivate a respectful and proactive classroom atmosphere. Increased student comfort and understanding around sensitive issues were noted in the pre-test and post-test comparisons among students comprising the experimental group. The study finds that the integration of culturally relevant Comprehensive Sexuality Education materials into the science curriculum enhances student interest and promotes inclusive sexuality education. Ongoing professional development for teachers should focus on culturally relevant practices while engaging peer collaboration for greater strength of implementation.

Keywords: Culturally relevant teaching, Cultural considerations, Inclusive education, Differentiated instruction

1. Introduction

Comprehensive Sexuality Education (CSE) is an important element of education that equips the learners with essential knowledge and skills for independent decision-making regarding sexuality and health education. International organizations such as UNESCO give importance in establishing robust CSE programs across the globe, saying that CSE is more than just imparting values and rights, it also led to a better health outcome ("UNESCO Strategy on Education for Health and Well-being," 2022). However, challenges to effectively implement CSE persist globally, especially in the regions where evidence-based programs face resistance due to cultural sensitivities, societal norms and conservative ideologies [1].

In the Philippines, Republic Act 10533 also known as the Enhanced Basic Education Act of 2013 supports the implementation of CSE. This law emphasizes the role of schools in providing quality education integrating sexuality education that is culturally sensitive and age-appropriate. DepEd Order No. 21 s. 2023 embodies a step taken by the Department of Education (DepEd) to integrate CSE into the K to 12 curriculum. This DepEd Order underscores the importance of embedding sexuality education within the educational framework in fostering awareness and informed decision-making among Filipino learners. Although the law promotes culturally relevant CSE in schools, significant gaps remain in the actual implementation of CSE in classrooms [2].

One major challenge is the lack of culturally relevant and context specific teaching materials that address sensitive topics such as sexuality, reproductive health and gender issues. At the local level, science teachers play a crucial role in delivering sexuality education in the classrooms. Yet many struggle to address sensitive topics relevant to sexuality, reproductive health, and gender in culturally congruent and sensitive ways. Both at the national and local levels, teachers observed that cultural and societal factors significantly shape how Filipino adolescents perceive these subjects, which makes culturally relevant CSE resources particularly difficult to incorporate into science lessons [3].

The research clearly outlines the goals for addressing the identified challenges through the development of classroom-based Sexuality Education Lesson Exemplars for science in Grade 10. These exemplars focus on the core topic, "Living Things and Their Environment." The three systems under consideration include the coordinated functions of the reproductive, endocrine, and nervous systems. It integrates and tackles essential CSE messages, including the topics of sexuality and sexual behavior, personhood, gender, media, and human rights. The materials are developed to be culturally relevant and accessible to teachers and students, providing tools for science teachers to be able to implement CSE within the classroom.

The main purpose of the study is to bridge the gap created by the lack of complementary, culturally relevant CSE materials that are tailored to the Philippine educational context. Through the development and iterative refinement of these exemplars, informed by input from teachers and experts, the study seeks to enhance the capacity of science teachers to deliver effective, culturally sensitive sexuality education. Ultimately, the research aims to contribute to broader international efforts that promote sensitivity towards culture, classroom-based sexuality education which will equip Filipino learners with knowledge and skills on making decisions that are healthy for their life principles.

2. Materials and Methods

2.1 Research Design

The study used Sequential Explanatory Mixed-Methods Design. This design entails a two-phase process, commencing with the collection and analysis of quantitative data, followed by qualitative exploration to offer an in-depth understanding of the integration process. In that quantitative phase, surveys were administered to a representative sample of secondary science teachers and students,

In the qualitative phase, interviews were the main tool to further explore and contextualize the findings from the quantitative phase. This integration of both qualitative and quantitative approach followed a process of convergence, whereby the comparison and contrast of results from the different phases served to reinforce or refine central conclusions. The Sequential Explanatory Design was chosen to better explain qualitative findings for the quantitative results, thus giving a more holistic and richer picture of how integration works.

2.2 Population and Participants of the Study

A careful process for selecting the participants was confined to the research design and its aims. In the quantitative stage, a survey was carried out to gather data on cultural responsiveness in classroom-based sexuality education approaches from science teachers from 10 national high schools of Esperanza, Agusan del Sur. A total of 21 teachers were identified using complete enumeration sampling (also known as universal sampling). These participants are all the teachers who have had actual experience and observation of teaching or drafting the incorporation of Comprehensive Sexuality Education (CSE) into the syllabi. Furthermore, the implementation of the lesson exemplar engaged 72 Grade 10 students from Esperanza National High School, from two Grade 10 sections with 36 students each. One section served as the control group which had not experienced the developed lesson exemplars and another section as experimental group, who participated in the implementation of the developed lesson exemplars and provides feedback and evaluation data. The study's distribution and participants are shown in Table 1.

Table 1. Distribution of the Participants of the Study

Schools	Actual Science Teachers	Percentage (%)	Sex		Age			
			Male	Female	20-30	31-40	41-50	51-60, up
Esperanza NHS	7	33.33	2	5	1	3	2	1
Catmonon NHS	1	4.76	-	1	-	1	-	-
Nato NHS	2	9.52	1	1	-	2	-	-
Duangan NHS	2	9.52	-	2	1	1	-	-
Guadalupe NHS	3	14.31	1	2	2	1	-	-
Salu NHS	1	4.76	-	1	-	1	-	-
Santa Fe NHS	1	4.76	1	-	1	-	-	-
Hawilian NHS	2	9.52	1	1	-	2	-	-
Oro NHS	1	4.76	-	1	1	-	-	-
San Toribio NHS	1	4.76	-	1	-	1	-	-
Groups	Actual Students	Percentage (%)	Sex		Age			
			Male	Female	13-14	15-16	17-18	19-20, up
Section A	36	50	9	27	2	31	3	-
Section B	36	50	15	21	5	26	4	1

2.3 Research Instrument

For this study, a survey developed by the researcher and key informant interviews (KII) were used to collect quantitative and qualitative information. Three questionnaires were used: the first assessed the practice of teachers vis-a-vis Comprehensive Sexuality Education (CSE) in science; the second explored issues around developing culturally-responsive CSE Lesson Exemplars (CSE-LEs); and the third explored the influence of CSE-LEs on student learning, and the teachers' interpretations of this learning. In addition to these questionnaires, semi-structured interviews with teachers and students provided additional perspectives. There was systematic validity and reliability testing for the instruments via expert validation, revisions, and pilot testing- the pilot data was also statistically analyzed.

2.4 Data Gathering Procedure

An expert validated the survey questionnaire developed by the researcher, reviewed the questionnaire, and made suggestions to improve it. After validation, the researcher administered the questionnaires face-to-face, collecting all questionnaires on the same day for accuracy. Data interpretation occurred upon collection of all data. The investigation used the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation—as the instructional design framework. Since the 1970s, the model has been used by many educators, including in instructional design. The ADDIE model supported the design and delivery of a Grade 10 Science lesson using CSE and in each phase of the model provided clear steps to use in instructional design.

2.5 Statistical Treatment

Quantitative and qualitative analyses were conducted on the data. In terms of the survey data, the responses were analyzed by using weighted means on a 5-point Likert scale to determine perceptions of the effectiveness of professional development and implementing scientific literacy. Additionally, Paired Sample T-test determined if there were significant differences between the pre-test and post-test scores to measure the impact of the culturally relevant CSE Lesson Exemplars. For the qualitative data, a thematic analysis utilized the identified themes and patterns

within the participants' stories to articulate their experiences and convey the challenges they faced. Thematic was coded (Braun & Clarke, 2006), manually.

3. Results and Discussion

Level of agreement of the current practices of teachers in teaching science concepts integrating CSE in terms of the following: Concept formations, Scientific Skill Acquisition, Scientific Attitudes, and Classroom instructions

Table 2 shows that teachers generally align their science teaching practices with Comprehensive Sexuality Education (CSE) integration, as reflected in their very high alignment with all parameters.

The strongest agreement level obtained was in relation to scientific attitudes (4.56) and classroom instruction (4.50). Thus, these indicated that teachers actively promote critical thinking, ethical responsibility, and engaging learning environments. This goes in line with studies that stress a student-centered approach in a positive culture as a salient contributor to scientific literacy and responsible decision-making in sexuality education [4,5]. Meanwhile, concept formation (4.34) and scientific skill acquisition (4.37) also received high levels of agreement but indicate slight room for improvement in further solidifying conceptual understanding and hands-on scientific inquiry regarding CSE topics.

Table 2. The Level of Agreement of the Current Practices of Teachers in Teaching Science Integrating CSE

Parameters	Mean	Verbal Description	Verbal Interpretation
concept formations	4.34	Agree	generally reflects their current practices
scientific skill acquisition	4.37	Agree	generally reflects their current practices
scientific attitudes	4.56	Strongly Agree	Strongly reflects their current practices
classroom instructions	4.50	Strongly Agree	Strongly reflects their current practices

Mean: 1.00-1.49– Strongly Disagree, 1.50-2.49 – Disagree, 2.50-3.49 – Neutral, 3.50-4.49 – Agree, 4.50-5.00– Strongly Agree

The implications of these findings are that while the teachers are generally proficient in their integration of CSE into Science instruction, further improvement in concept formation and skill acquisition suggest ensuing more student engagement and comprehension. Various literature outlines those methods such as inquiry-based learning, existing real-world applications paired with interdisciplinary approaches strongly contribute to deep learning and critical thinking [6]. Other options can further leverage CSE while preserving the scientific outlook, including continuous professional development, which allows teachers to integrate various methodologies more flexibly [7,8].

The profile considerations for developing culturally responsive classroom-based sexuality education lesson exemplars for grade 10 science in terms of: Cultural beliefs and values, Language and Terminology, Religious and Ethical considerations, and Gender and Sexual Orientation

Table 3 spotlighted critical profile considerations for developing Grade 10 Science culturally responsive classroom-based sexuality education lesson exemplars.

Table 3. Summary of the Profile Considerations for Developing Culturally Responsive Classroom-Based Sexuality Education Lesson Exemplars for Grade 10 Science

Parameters	Mean	Verbal Description	Verbal Interpretation
Cultural beliefs and values	4.52	Extremely Important	Crucial consideration
Language and terminologies	4.69	Extremely Important	Crucial consideration
Religious and ethical considerations	4.70	Extremely Important	Crucial consideration
Gender and sexual orientation	4.60	Extremely Important	Crucial consideration

Mean: 1.00-1.49– Not Important, 1.50-2.49 – Slightly Important, 2.50-3.49 – Moderately Important, 3.50-4.49 – Very Important, 4.50-5.00– Extremely Important

The parameters which garnered the highest rating were concerned with ethical and religious concerns (4.70) and language and terminologies (4.69), thereby indicating that these dimensions are effective for lessons that were to be respectful, inclusive, and context appropriate. Sexuality education must adhere to strict culturally and linguistically sensitive guidelines to ensure that students feel comfortable participating in classes and that it is accepted within communities [9, 10, 11]. High scores for gender and sexual orientation (4.60) and cultural beliefs and values (4.52) further highlight the vital need for developing lesson exemplars that take into account the diversity of identities and perspectives as they relate to the learners' cultural context.

Such findings imply that for effective lessons, sexuality education is to emerge from careful integration between cultural and ethical dimensions for special purposes of inclusion and sensitivity. Teaching that is culturally responsive improves the receptivity of learners to sexuality education because it makes the content more relatable to their communities and consequently offers less resistance [12]. In framing discussions, teachers should include working with clear and non-stigmatizing terminology while respecting the students' belief systems but giving them the facts. Continued professional development focused on culturally responsive pedagogy may assist staff to bridge the gap for quality education delivery in diverse classroom settings [13, 14].

Level of Effectiveness of the Developed Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars for Grade 10 Science as Perceived by the Differences between the Controlled Group and the Experimental Group

The results in Table 4 indicate the significant impact when there is an integration of exemplary culturally relevant sexuality education lessons in the Grade 10 Science curriculum.

Table 4. Level of Effectiveness of the Developed Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars for Grade 10 Science

	Performance	Mean	Std. Deviation	Variance	Lowest Score Obtained	Highest Score Obtained
Control	Pretest	9.47	2.97	8.81	4	14
	Posttest	15.27	2.69	7.24	10	20
Experimental	Pretest	10.37	2.97	8.79	3	16
	Posttest	24.13	3.72	13.84	15	29

*total score = 30

The experimental group was able to perform remarkably well, rising from a pretest mean of 10.37 (SD = 2.97) to a posttest mean of 24.13 (SD = 3.72), while in stark contrast, the control group

showed only moderate improvement, going up from 9.47 (SD = 2.97) to just under 15.27 (SD = 2.69). These findings therefore indicate that culturally responsive lessons support greater appreciation and engagement of students than conventional instruction given the community research showing that teaching through culturally relevant pedagogy allows for deeper understanding and retention [15, 16].

Also, this difference between groups indicated an increase in variance and standard deviation among the experimental group, implying that the students had responded differently to the culturally relevant materials, understood most probably due to individual backgrounds and prior knowledge [17]. While incorporating culturally responsive lessons does not mean one-size-fits-all in teaching, their target is to enhance the learning process of varied learners by making the content accessible and significant [16]. Additional strengthening supporting these findings is evidence in support of employing culturally sustaining pedagogy in order to maintain inclusion, equity, and motivation in science teaching [18, 19].

Significant Difference Between Pre-Test and Post-Test of the Experimental Group in the Effectiveness of the Developed Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars

Table 5 displays the significant difference between pre-test and post-test of the experimental group in the effectiveness of the developed culturally relevant Classroom-based Sexuality Education Lesson Exemplars.

Table 5. Significant Difference Between Pre-Test and Post-Test of the Experimental Group in the Effectiveness of the Developed Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars

Performance	Mean	SD	SE	<i>p</i> -value	Remark
Pretest	10.37	2.97	0.54	0.000	Significant
Posttest	24.13	3.72	0.68		

Legend: tested at $\alpha = 0.05$ level of significance using Paired sample t-test. SD – Standard deviation, SE – Standard Error

It is very evident the vast difference between the mean scores of the pretest and posttest of the experimental group, enabling the conclusion that the development of culturally responsive classroom-based sexual education lesson exemplars was an effective one. The mean score of the experimental group examined showed a climb from 10.37 (SD = 2.97) to 24.13 (SD = 3.72) respectively. The increase is significantly accepted by the *p*-value 0.000 ($0.000 < 0.05$), otherwise, it suggests that students indeed had their learning change significantly with lesson materials that were culturally responsive. Such low values of standard errors both for the pretest value (SE = 0.54) and the posttest value (SE = 0.68) lend additional support to the results, concluding that the development of the lesson materials indeed did go a long way in helping the students learn what they needed.

These improvements in posttest scores provide convincing proof that culturally responsive materials indeed help students learn sexuality education. The finding is aligned with other previous studies that claimed that culturally relevant pedagogy fosters the student's involvement, performance, and worthiness of the content [20]. Findings are yet another basis for educational reform; culturally responsive factors should be integrated into instructional study in an effort to meet the diverse needs of the learning students; for example, sexuality education appears particularly sensitive to this issue [14].

Another reason improvement might have occurred is that other similar culturally responsive approaches can be applicable across varying subjects for different educational environments, especially those which host a diverse, multicultural student population within them. Such strategies may promote the inclusiveness and supportiveness of a learning atmosphere by giving thought to the different cultural backgrounds and lived experiences of students [21].

Moreover, the conclusion of this study is that materials designed culturally responsively do come with the benefits of enhanced academic achievement, besides making a learner participate more and more motivated: He/she relates easily to the material that speaks to his/her cultural identity and is able to internalize the same satisfactorily [22]. This causes a huge gap in the pre-test and post-test scores, affirming the possibility that culturally responsive lesson exemplars can contribute to improving both the quality and effectiveness of sexuality education delivery to grade 10 students.

Teachers' Recommendations to Improve the Learning Experience of the Implementation of Culturally Relevant Classroom-Based Sexuality Education Lesson Exemplars

Table 6 summarizes teachers' recommendations to improve the learning experience of culturally relevant classroom-based sexuality education lessons.

Theme	Significant Responses	Frequency	Construct
Instructional Strategies for Conceptual Understanding	Inquiry and problem-based learning encourages active exploration and critical thinking	4	Instructional Strategies & Conceptual Understanding
	Laboratory experiments and hands-on activities enhance conceptual understanding		
Skill Development & Assessment	Hands-on activities promote skill acquisition, while peer learning enhances communication. Varied assessments ensure clarity and fairness.	6	Skills Development & Assessment Practices
Fostering Inquiry Attitude	Open, supportive learning environments foster curiosity. Inquiry-based learning and open-ended questions promote critical thinking.	3	Cultivating Curiosity, Critical Thinking, & Perseverance
Inclusivity in Instruction	Differentiated instruction ensures all students progress at their own pace. Collaborative learning supports inclusivity. Diverse instructional approaches ensure engagement.	4	Differentiation & Inclusivity in Instruction
Culturally Relevant Teaching	Culturally sensitive teaching integrates students' cultural backgrounds. Indigenous knowledge makes lessons relatable. Classroom inclusivity fosters respect.	4	Culturally Relevant Teaching Practices
Language and Terminology Sensitivity	Respectful, age-appropriate language fosters understanding. Clarity in scientific terminology ensures accessibility.	4	Culturally Appropriate Language & Sensitivity
Ethical Considerations in Sexuality Education	Neutral language and open dialogue respect diverse beliefs. Scientific accuracy is maintained with sensitivity to ethics.	4	Balancing Scientific Accuracy & Ethical Sensitivity
Inclusivity for Diverse Gender Identities	Inclusive language and recognition of identities foster respect. A safe environment promotes open dialogue. Teaching materials reflect diverse perspectives.	4	Promoting Inclusivity & Respect for Diversity

The most commonly cited theme, Skill Development & Assessment Practices, reinforce the degree to which applying practical components can support skill development while peer learning supports communication[23]. Teachers also noted the importance of diverse forms of assessments such as rubrics or performance tasks when facilitating fair assessment practices and supporting

different styles of learning. The processes identified were key in student commitment, independent thinking, and cognitive development through practical learning experiences[24]. Conversely, the least number of responses from teachers was in the theme of Fostering Inquiry Attitude. Although it is also prevalent, fewer teachers referred to cultivating open and supportive environments that support curiosity and critical thinking--there exists an opportunity to enhance strategies in this area including the use of open-ended questions and feedback based on the strategies of supporting deeper thinking and student confidence [25].

4. Conclusion

The study concluded that the integration of culturally relevant sexuality education lesson exemplars for Grade 10 Science has significantly enhanced academic performance, engagement, and motivation among students. There is a commitment among teachers to facilitate inclusive, culturally responsive learning environments, recognizing the need to address students' diverse cultural backgrounds. The study strongly supports the idea that there should be in-depth teacher professional training, more practical examples infused in dealing with critical thinking and ensuing respect among students' discussions. This also includes differentiated instruction, culturally relevant language with constant collaboration with the community for a more responsive and loving learning experience. These findings tell us of the cultural relevance application to help to realize academic achievement and a more inclusive and available experience for the students being so different; hence they suggest a glimpse into yet another possibility, one of culturally responsive teaching not only enhancing the quality of sexuality education.

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