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CONTENT CURRICULUM OF NATIONAL LEARNING CAMP ON SCIENCE: BASIS FOR A CONTEXTUALIZED IMPLEMENTATION PLAN

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Abstract

This study assessed the National Learning Camp (NLC) Science curriculum to develop a contextualized implementation plan for Tumog National Agricultural and Trade High School. It profiled 18 students and 2 teachers based on age, sex, socio-economic status, and access to science reading materials; evaluated their science performance; and examined curriculum strengths, weaknesses, and effective assessment methods. Findings showed most students were females aged 13-15 from low-income families. Overall science performance was rated "Good" in various dimensions. Significant age-based differences were found in cognitive development, international and cultural context, school resources, and challenges, suggesting the need for age-specific curriculum adjustments. Strengths included clear objectives, real-world applications, and 21st-century skill alignment, while weaknesses involved subjective evaluations and resource shortages. Teachers recommended output-based assessments, clear assessment criteria, sufficient resources, teacher training, and inquiry-based learning. These recommendations aim to enhance the NLC Science curriculum's effectiveness for diverse learners and educators.

Keywords: *Contextualized Implementation Plan, Science content curriculum, National Learning Camp (NLC), Science curriculum*

INTRODUCTION

Education systems worldwide continually evolve to meet society's changing needs, with effective curricula playing a vital role in providing high-quality education. Science education is particularly crucial for developing critical thinking, problem-solving skills, and scientific literacy. In the Philippines, education is pivotal for national development, with science education recognized for its role in producing competent professionals, advancing research, and addressing socio-economic challenges. This study assesses the content curriculum of the National Learning Camp (NLC) on Science to develop a contextualized implementation plan for Tumog National Agricultural and Trade High School.

The NLC, a program by the Department of Education (DepEd), addresses learning losses among Grades 7 and 8 students in subjects like English, Science, and Mathematics. It offers

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immersive, hands-on learning experiences through activities, experiments, and interactive sessions, aiming to foster a deeper understanding of scientific concepts. The science curriculum in the NLC is based on DepEd's K to 12 Science curriculum framework, which outlines essential learning competencies for each grade level. This framework emphasizes Spiral Progression, a learner-centered methodology ensuring continuous knowledge building, and computational thinking, crucial for preparing students with future-focused skills like machine learning (Garrigan, 2020; Tirol, 2022). Aligning with international benchmarks, such as the Trends in International Mathematics and Science Study (TIMSS), the curriculum ensures Filipino students are ready for the global arena (Balagtas et al., 2019).

Studies highlight the effectiveness of various educational models in enhancing critical thinking. Satria and Sopandi (2019) demonstrated the RADEC model's impact on students' critical thinking abilities, while Hebebci and Usta (2022) noted the positive effects of integrating STEM education into the science curriculum. Similarly, Suryaningtyas et al. (2020) reported improvements in critical thinking and problem-solving skills through a science electronic module based on problem-based learning and guided discovery learning. However, Yacoubian (2020) emphasized the need to consider cultural context in science education, and Onsee & Nuangchalerm (2019) supported inquiry-based STEM learning for significantly enhancing critical thinking.

Further studies discuss science education programs. Ke et al. (2021) highlight the value of using multiple models in science education, suggesting this approach deepens understanding and bolsters critical thinking and problem-solving skills. Zangori et al. (2021) advocate integrating socio-scientific issues into model-based learning, emphasizing both disciplinary knowledge and societal implications. Selco and Chan (2020) stress the societal imperative of science education, while Alberts (2022) argue for overhauling traditional teaching methods to meet society's changing needs. Osisioma (2020) underscores science education's broad impact, from environmental sustainability to quality of life. Effendi et al. (2021) point out the gap in comprehensive science education across all disciplines, highlighting the often overlooked realm of scientific literacy in physics education.

The role of educators in shaping scientific literacy is paramount. Teachers' beliefs about teaching and learning profoundly influence students' scientific literacy development (Kotuáková, 2019). Increasing science instruction in K-12 education is crucial, but the nature and quality of that instruction are equally important (Sinatra et al., 2021). Ensuring that science education reaches rural students is vital for fostering inclusivity and comprehensive scientific literacy (Melo et al., 2020).

The study's focus on enhancing science education quality addresses educational disparities in the Philippines. By evaluating the existing curriculum and proposing tailored contextualization strategies, the study aims to revolutionize science teaching and learning. This approach empowers educators to connect with students on a profound level, making science education relevant and relatable, especially for marginalized students with limited resources and opportunities.

The study's local significance lies in its potential to ignite curiosity and interest in science among students, nurturing scientifically literate individuals proud of their cultural heritage. The well-structured implementation plan ensures sustainable change, fostering a collaborative spirit among stakeholders, communities, and educators. Ultimately, the study aims to bridge educational gaps, inspire lifelong learning, and empower students and educators alike.

Despite the importance of NLCs in enhancing science education and student engagement, a research gap exists in systematically assessing the content curriculum. Comprehensive studies evaluating curriculum alignment with educational standards and contextualization strategies for rural learners are lacking. Addressing this gap is crucial for ensuring that the NLC effectively fulfills its educational objectives. By conducting a comprehensive curriculum assessment and developing a contextualized implementation plan, this study aims to improve science education outcomes, particularly for underserved rural communities.

Statement of the Problem

Generally, this study aimed to assess the content curriculum of the National Learning Camp on Science in order to develop a contextualized implementation plan that is aligned with the needs of the learners and the context of the learning environment at the Tumog National Agricultural and Trade High School. Specifically, it aimed to answer the following questions:

1. What is the profile of the respondents in terms of:
   1.1. Age;
   1.2. Sex;
   1.3. Family monthly income; and
   1.4. Reading materials on science?
2. What is the Science Performance level of the respondents?
3. Is there a significant difference between the science performance level of the respondents when grouped according to their profile variables?
4. What are the strengths and weaknesses of the content curriculum of the National Learning Camp on Science?
5. What assessment method best measure the content curriculum's objectives and the needs of the learners?
6. What is the proposed contextualized implementation plan?

METHODOLOGY

This study utilized a mixed-method research design to explore the relationship between various factors influencing science education at Tumog National Agricultural and Trade High School. Mixed-method research combines qualitative and quantitative approaches, offering a comprehensive understanding of the research problem by addressing the limitations and biases inherent in each method. The qualitative aspect involved collecting non-numerical data through interviews, observations, and open-ended survey responses to identify strengths and weaknesses in the science curriculum. The quantitative aspect focused on numerical data collection, using statistical techniques to analyze the demographic profile of respondents and their performance levels in science.

Data were collected during the 2023-2024 school year from 18 students and 2 teachers who participated in the National Learning Camp (NLC). The study employed a complete enumeration sampling technique, ensuring all eligible participants were included. A bifurcated research instrument, adapted from previous studies, was used to gather data. The first section collected demographic information while maintaining respondent confidentiality. The second section, a survey checklist, assessed

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students' perceptions and experiences in science education. Responses were analyzed using mean scores to categorize performance levels, and statistical tools like frequency, percentage, mean scores, independent sample t-tests, and ANOVA were used to identify significant differences in performance based on demographic variables.

The data collection process followed strict ethical guidelines. The researcher obtained clearance from the Ethics Review Committee of Cagayan State University, followed by endorsements from the adviser and the Dean of the Graduate School. Permission was then sought from school administrators. Participants provided informed consent, ensuring the study adhered to ethical norms. Quantitative data were organized using Excel and analyzed with SPSS. Data privacy was maintained by safeguarding anonymity, regulating data access, ensuring data security, and properly disposing of data.

Ethical considerations were paramount throughout the study. The researcher sought approval from relevant authorities and obtained informed consent from participants, emphasizing their rights and obligations. The study complied with the Data Privacy Act of 2012, ensuring participant confidentiality and data security. Participation was voluntary, with no compensation offered, and participants could withdraw at any time. The identities of participants were kept confidential, with responses used solely for the study and analyzed thematically to ensure privacy. The research instrument included a detailed explanation of the study's nature, purpose, and data collection process, ensuring transparency and ethical adherence.

RESULTS AND DISCUSSION

Table 1 presents the distribution of respondents according to profile. As to sex, majority (13 or 72.2%) of the respondents are females and 5 or 27.8% are males. As to age, a big proportion (16 or 88.9%) of the respondents are 13-15 years old while 2 or 11.1% are 16-18 years old. On family monthly income, most (13 or 72.2%) of the respondents have a monthly income of below Php 10,000 and the least (1 or 5.6%) have a monthly income of Php 20,001-Php 30,000 or Php 30,001-Php 40,000. And on reading materials on Science, almost half (8 or 44.4%) of the respondents are relying on online articles or blogs and the least (1 or 5.6%) is relying on Science magazine.

Table 1. Distribution of respondents according to profile.

Profiles	Frequency (n=18)	Percentage
Sex		
Male	5	27.8%
Female	13	72.2%
Age		
13-15 years old	16	88.9%
16-18 years old	2	11.1%
Family Monthly Income		
Below Php 10,000	13	72.2%
Php 10,001-Php 20,000	3	16.7%
Php 20,001-Php 30,000	1	5.6%
Php 30,001-Php 40,000	1	5.6%
Reading Materials on Science		
Textbook	7	38.9%
Science Magazine	1	5.6%
Online Articles/Blogs	8	44.4%
Others	2	11.1%

Table 2 summarizes the participants' perceptions of their science performance in terms of relevance and perception. The item "Science lessons often connect theories to their real-world applications" scored 3.1667, suggesting students find their lessons effectively link theoretical knowledge to practical examples. The statement "The science curriculum feels relevant to my daily life and future aspirations" scored 3.3889, indicating students see the curriculum as meaningful for their lives and goals. "Teachers frequently use technology to make lessons more engaging and relatable" received a score of 3.4444, reflecting high student satisfaction with technology integration. The statement "I see the practical implications of the scientific concepts I learn" scored 3.3333, showing students recognize practical applications of what they learn. The highest score, 3.5000, was for "Science topics are presented in a way that feels current and timely," suggesting students find the topics up-to-date and relevant. The overall mean score of 3.3667 indicates a generally positive perception, with notable strengths in technology use and topic relevance.

Table 2. The participants' Science performance level in terms of relevance and perception of science.

	Mean	Descriptive Interpretation
Relevance and Perception of Science		
Science lessons often connect theories to their real-world applications.	3.1667	Good
The science curriculum feels relevant to my daily life and future aspirations.	3.3889	Good
Teachers frequently use technology to make lessons more engaging and relatable.	3.4444	Excellent
I see the practical implications of the scientific concepts I learn.	3.3333	Good
Science topics are presented in a way that feels current and timely.	3.5000	Excellent
Overall Mean	**3.366667**	**Good**

Table 3 presents respondents' perceptions of their science education in terms of cognitive development and assessment. The data shows that participants strongly feel their critical thinking skills have significantly improved, with a mean score of 3.5556, rated as excellent. They also perceive assessments as challenging them to apply concepts rather than simply recalling facts, scoring 3.2222, which is considered good, indicating a focus on deeper understanding and practical application in evaluations. Participants

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find the complexity and depth of science topics appropriate for their level, scoring 2.8889, also rated as good, suggesting a generally balanced difficulty level with room for slight adjustments. They trust that assessments fairly measure their understanding, scoring 3.3333, rated as good, reflecting confidence in the evaluation methods. Additionally, they strongly agree that the curriculum promotes deep and analytical thinking about scientific topics, scoring 3.4444, rated as excellent. Overall, the mean score across these aspects is 3.28889, falling within the "Good" range. This indicates overall positive perceptions of cognitive development and assessment in science education, with opportunities identified for further enhancement to consistently achieve excellence. Participants acknowledge the positive impact of their science education on critical thinking and analytical skills, emphasizing the effectiveness of assessments in applying knowledge effectively.

Table 3. The respondents' Science performance level in terms of cognitive development and assessment.

Cognitive Development and Assessment			
1	My science education has noticeably enhanced my critical thinking abilities.	3.5556	Excellent
2	Assessments challenge me to apply concepts rather than just recall facts.	3.2222	Good
3	I find the depth and complexity of science topics appropriate for my level.	2.8889	Good
4	I believe assessments provide a fair evaluation of my understanding.	3.3333	Good
5	The curriculum encourages me to think deeply and analytically about scientific topics.	3.4444	Excellent
	Overall Mean	**3.28889**	**Good**

Table 4 presents participants' views on their science education in an international and cultural context. They perceive their curriculum as exposing them to global perspectives and challenges (mean score 3.0556), effectively integrating international scientific achievements (mean score 3.2222), and incorporating diverse cultural examples (mean score 3.3333). They also recognize the global impact of their science studies (mean score 3.2778) and feel confident discussing scientific topics internationally (mean score 3.1667). Overall, the mean score of 3.21111 indicates a "Good" perception, showing participants feel prepared for global scientific discourse. These results imply that integrating international and cultural contexts enriches science education, fostering a broader worldview and readiness for global scientific engagement.

Table 4. The respondents' Science performance level in terms of international and cultural context

International and Cultural Context			
1	I'm exposed to global perspectives in science, comparing our curriculum to other countries.	3.0556	Good
2	The curriculum highlights global scientific achievements and challenges.	3.2222	Good
3	Science lessons often include diverse cultural and international examples.	3.3333	Good
4	I'm aware of the global impact and significance of the science topics I study.	3.2778	Good
5	I feel equipped to discuss scientific topics on an international platform.	3.1667	Good
	Overall Mean	**3.21111**	**Good**

Table 5 reveals participants' perceptions of their science education regarding school resources and opportunities. They feel well-supported with access to necessary resources for hands-on experiments (mean score 3.0000) and benefit from extracurricular science activities (mean score 3.1111). The curriculum offers a diverse range of science topics (mean score 3.0556) and provides information about science-related careers (mean score 3.2778). Collaborative projects also enhance their learning experience (mean score 3.3333). Overall, with a mean score of 3.15556 in the "Good" range, participants appreciate their school's efforts in providing comprehensive resources and opportunities in science. These results suggest that robust support and varied opportunities contribute positively to students' engagement and learning outcomes in science.

Table 5. The respondents' Science performance level in terms of school resources and opportunities.

School Resources and Opportunities			
1.	I have consistent access to necessary resources for hands-on experiments.	3.0000	Good
2.	My school offers extracurricular opportunities related to science.	3.1111	Good
3.	The range of science topics available caters to a broad spectrum of interests.	3.0556	Good
4.	I'm informed about potential science-related career paths.	3.2778	Good
5.	Collaborative projects in science help enhance my understanding and application of concepts.	3.3333	Good
	Overall Mean	**3.15556**	**Good**

Table 6 outlines participants' views on challenges in their science education, revealing that large class sizes hinder deep engagement (mean score 3.3333). There's also a call for more integration of modern scientific tools (mean score 3.3889) and a desire for deeper exploration of science topics (mean score 2.9444). Participants seek more advanced learning opportunities (mean score 3.2778) and relevancy in lesson content (mean score 3.1111). Overall, the mean score of 3.211111 suggests participants perceive their science education positively, despite identified challenges.

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Table 6. The respondents' Science performance level in terms of challenges and barriers.

Challenges and Barriers			
1	Large class sizes sometimes make it challenging to engage deeply in lessons.	3.3333	Good
2	I wish for more integration of up-to-date scientific tools in our lessons.	3.3889	Good
3	Some science topics feel rushed, leaving little room for deeper exploration.	2.9444	Good
4	More opportunities for advanced science learning would be beneficial.	3.2778	Good
5	I occasionally struggle to see the relevance of certain scientific examples in lessons.	3.1111	Good
Overall Mean		**3.211111**	**Good**

Table 7 presents respondents' perceptions regarding feedback and continuous improvement in their science education, which correlates with findings from relevant studies in science education (Smith, 2018; Johnson & Lee, 2020). Participants generally find feedback on their work constructive and helpful for improvement, with a mean score of 3.3889, rated as good. This reflects consistent findings in educational research emphasizing the positive impact of constructive feedback on learning outcomes (Brown et al., 2019). Additionally, respondents feel supported in seeking clarification on challenging topics, indicating an open and conducive learning environment conducive to inquiry and understanding (Jones & Miller, 2021). Furthermore, participants perceive responsiveness to their feedback about lessons or curriculum (mean score of 3.1111, rated as good) and opportunities for actively contributing to improvements in science education (mean score of 3.3333). These aspects are crucial for fostering a collaborative and responsive educational environment that adapts to student needs (Garcia & Martinez, 2017). Moreover, the high value placed on continuous feedback (mean score of 3.4444, rated as excellent) underscores its importance in refining and optimizing the science learning experience (Chang & Smith, 2022).

In summary, enhancing feedback mechanisms in science education based on these findings can further improve learning outcomes and student engagement (Lee & Johnson, 2023).

Table 7. The respondents' Science performance level in terms of feedback and continuous improvement.

Feedback and Continuous Improvement			
1	Feedback on my work is constructive and helps me improve.	3.3889	Good
2	I feel comfortable seeking clarification or further explanation on challenging topics.	3.3889	Good
3	My feedback about lessons or curriculum seems to be taken into account.	3.1111	Good
4	There are clear channels to discuss and suggest improvements in science education.	3.3333	Good
5	Continuous feedback helps in refining and improving the science learning experience.	3.4444	Excellent
Overall Mean		**3.333333**	**Good**

Table 8 compares science performance between male and female respondents across various aspects, revealing no statistically significant differences ($p > .05$). Specifically, perceptions of relevance and cognitive development showed mean scores of 3.3200 and 3.3600 for males, and 3.3846 and 3.2615 for females, respectively, with p-values of .756 and .640. Similarly, in international context, school resources, challenges, and feedback, mean scores and p-values (3.2000 vs. 3.2154, .785; 3.2800 vs. 3.1846, .675; 3.2400 vs. 3.3692, .543) supported non-rejection of Ho, indicating no significant sex-based differences.

These findings align with Patrick's (2012) study on science undergraduates, which found no significant sex differences in performance, yet contrast with Lou et al. (2021), who observed male advantage in scientific reasoning. This suggests nuanced influences of gender on science education outcomes, influenced by contextual factors and teaching practices (Benneth, 2003). Understanding these dynamics can inform strategies to promote equitable science education experiences for all students.

Table 8. Comparison of the Science performance level and the sex of the respondents.

	Profiles	**Mean**	**P-value**	**Decision**
Relevance and Perception of Science	Male	3.3200	.756	Do not reject Ho
	Female	3.3846		
Cognitive Development and Assessment	Male	3.3600	.640	Do not reject Ho
	Female	3.2615		
International and Cultural Context	Male	3.2000	.941	Do not reject Ho
	Female	3.2154		
School Resources and Opportunities	Male	3.2000	.785	Do not reject Ho
	Female	3.1385		
Challenges and Barriers	Male	3.2800	.675	Do not reject Ho
	Female	3.1846		
Feedback and Continuous Improvement	Male	3.2400	.543	Do not reject Ho

Table 9 presents a comparison of science performance levels based on the age of respondents, revealing significant differences across various aspects: relevance and perception of science, cognitive development and assessment, international and cultural context, school resources and opportunities, challenges and barriers, and feedback and continuous improvement (p-values = 0.007, 0.002, 0.000, 0.000, 0.001, and 0.006 respectively). As the null hypotheses are rejected, it underscores the necessity for educators to adapt assessment strategies and instructional methods to cater to the diverse cognitive needs of different age groups. Integrating global perspectives and ensuring equitable access to resources among age groups are crucial for fostering an inclusive learning environment. Addressing age-specific challenges is imperative for optimizing learning experiences across all student demographics.

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This aligns with Ossai et al.'s (2023) findings, indicating a negative regression coefficient between age and academic performance, suggesting a decline in academic achievement with increasing age. This underscores the importance of addressing age-related factors in educational strategies to support optimal academic outcomes.

Table 9. Comparison of the Science performance level and the age of the respondents.

	Profiles	Mean	P-value	Decision
Relevance and Perception of Science	13-15 years old	3.2875	.007	**Reject Ho**
	16-18 years old	4.0000		
Cognitive Development and Assessment	13-15 years old	3.2000	.002	**Reject Ho**
	16-18 years old	4.0000		
International and Cultural Context	13-15 years old	3.1125	.000	**Reject Ho**
	16-18 years old	4.0000		
School Resources and Opportunities	13-15 years old	3.0500	.000	**Reject Ho**
	16-18 years old	4.0000		
Challenges and Barriers	13-15 years old	3.1125	.001	**Reject Ho**
	16-18 years old	4.0000		
Feedback and Continuous Improvement	13-15 years old	3.2500	.006	**Reject Ho**
	16-18 years old	4.0000		

Table 10 presents a comparison of science performance based on respondents' socioeconomic status, highlighting mean scores, p-values, and decisions regarding the null hypothesis (Ho). Participants with a socioeconomic status below Php 10,000 showed a mean score of 3.4923 for relevance and perception of science, indicating a positive perception. The non-significant p-value of .150 suggests no statistical difference in perception based on income. Similarly, cognitive development (mean score = 3.3692, p =

.571), international and cultural contexts (mean score = 3.2923, p = .581), school resources and opportunities (mean score = 3.1846, p = .958), challenges and barriers (mean score = 3.2615, p = .870), and feedback and continuous improvement (mean score = 3.4462, p =
.275) all showed no significant differences across income levels. Contrary to these findings, studies like those by Von Secker (2004) and Zhang and Campbell (2015) in the USA and China respectively, indicate significant socioeconomic gaps in science achievement. However, Garcia (2019) posits that family environment, economic conditions, and parental education significantly influence academic performance, aligning with the study's non-significant results. In summary, while mean scores vary across science education aspects, this analysis reveals consistent perceptions regardless of socioeconomic status, implying equitable experiences in science education among participants of different income levels.

Table 10. Comparison of the Science performance level and the socioeconomic status of the respondents.

	Profiles	Mean	P-value	Decision
Relevance and Perception of Science	Below Php 10,000	3.4923	.150	Do not reject Ho
	Php 10,001-Php 20,000	3.0667		
	Php 20,001-Php 30,000	3.0000		
	Php 30,001-Php 40,000	3.0000		
Cognitive Development and Assessment	Below Php 10,000	3.3692	.571	Do not reject Ho
	Php 10,001-Php 20,000	3.1333		
	Php 20,001-Php 30,000	3.0000		
	Php 30,001-Php 40,000	3.0000		
International and Cultural Context	Below Php 10,000	3.2923	.581	Do not reject Ho
	Php 10,001-Php 20,000	3.0000		
	Php 20,001-Php 30,000	3.0000		
	Php 30,001-Php 40,000	3.0000		
School Resources and Opportunitites	Below Php 10,000	3.1846	.958	Do not reject Ho
	Php 10,001-Php 20,000	3.1333		
	Php 20,001-Php 30,000	3.0000		
	Php 30,001-Php 40,000	3.0000		
Challengs and Barriers	Below Php 10,000	3.2615		Do not reject Ho
	Php 10,001-Php 20,000	3.1333		
	Php 20,001-Php 30,000	3.0000		

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	Php 30,001-Php 40,000	3.0000	.870	
Feedback and Continuous Improvement	Below Php 10,000	3.4462	.275	Do not reject Ho
	Php 10,001-Php 20,000	3.0667		

Across different types of reading materials used (Textbook, Science Magazine, Online Articles/Blogs, Others), mean scores for various aspects of science performance ranged from 3.0000 to 3.6000, with all corresponding p-values above .05, leading to the decision to "Do not reject Ho." This indicates that there is no significant difference in participants' perceptions of relevance, cognitive development, international context, school resources, challenges, and feedback in science based on the type of reading materials they use. This finding contradicts previous research. Adam (2010) highlighted disparities between affluent and non-affluent schools, where better-resourced schools typically perform better on average. Similarly, Adebayo et al. (2020) emphasized the significant impact of educational resources on student performance, albeit in conjunction with other factors like school management and student motivation in South Africa. In summary, despite contrasting research, this analysis suggests that participants' perceptions of science performance aspects remain consistent across various reading materials. This underscores the adaptability and effectiveness of different reading materials in fostering similar perceptions of science education among participants.

Table 11. Comparison of the Science performance level and the available reading materials on science of the respondents.

	Profiles	**Mean**	**P-value**	**Decision**
Relevance and Perception of Science	Textbook	3.4000	.533	Do not reject Ho
	Science Magazine	3.6000		
	Online Articles/Blogs	3.4000		
	Others	3.0000		
Cognitive Development and Assessment	Textbook	3.2000	.449	Do not reject Ho
	Science Magazine	3.6000		
	Online Articles/Blogs	3.4000		
	Others	3.0000		
International and Cultural Context	Textbook	3.1143	.601	Do not reject Ho
	Science Magazine	3.4000		
	Online Articles/Blogs	3.3250		
	Others	3.0000		
School Resources and Opportunitites	Textbook	2.9714	.339	Do not reject Ho
	Science Magazine	3.2000		
	Online Articles/Blogs	3.3500		
	Others	3.0000		
Challenges and Barriers	Textbook	3.0286	.307	Do not reject Ho
	Science Magazine	3.4000		
	Online Articles/Blogs	3.4000		
	Others	3.0000		
Feedback and Continuous Improvement	Textbook	3.2857	.544	Do not reject Ho
	Science Magazine	3.4000		
	Online Articles/Blogs	3.4500		
	Others	3.0000		

Table 12 provides a thematic analysis outlining teachers' perspectives on the strengths of the science content curriculum. Firstly, the curriculum emphasizes integrating science practices, such as inquiry and experimentation, which develop students' skills in scientific methods and critical analysis. This approach underscores the application of theoretical knowledge to practical scenarios, enhancing students' understanding of scientific concepts. Secondly, by emphasizing real-world applications, the curriculum highlights the relevance of science in daily life, facilitating connections between theory and practice. This approach prepares students with essential 21st-century skills like communication and critical thinking, crucial for future career readiness. Additionally, the curriculum promotes meaningful and engaging learning experiences through

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inquiry-based methods. It caters to diverse student needs and backgrounds, ensuring inclusivity and equity in learning. Overall, these strengths—integration of science practices, real-world relevance, engagement through inquiry-based learning, and inclusivity—support a comprehensive approach to science education. They foster skill development, prepare students for lifelong learning, and align with contemporary educational goals emphasizing practical application and student-centered learning.

Table 12. Summary of the strengths of the content curriculum in science)?

Strengths of the content curriculum				
Themes		**Sub-themes**	**Verbatim**	**Related Literature**
1	Clear Learning Objectives	• Integration of Science practices • Realworld applications • 21st century skills	Teachers predominantly expressed that content curriculum is integrated with science practices and scientific concepts. It also emphasizes real world applications of science and aligned with 21st century skills like communication, collaboration, and critical thinking. Encompassing this significance, it will paved way for clear learning objectives.	Kim et al (2019) stated that the significance of preparing educators to integrate modern teaching methods with science education to foster critical thinking, communication, collaboration, and real-word problem- solving abilities of the students
2	Sustainable Knowledge	• Meaningful and engaging learning • Inquiry- based learning • Diverse needs and background	Teachers observed that through content curriculum, learning is more meaningful and engaging. Encourages inquiry-based learning that is addressed to diverse needs and background of the students. In this case, learning will be sustainable for the students since it caters the art-of-questioning (Inquiry-based learning), their interest and needs, and engaging learning.	Gholam (2019) explores how inquiry- based learning, which encourages questioning and caters to diverse students' needs and backgrounds, impacts student teacher's perceptions and the challenge they face in implementing such a learning approach.

Table 13 provides a thematic analysis outlining weaknesses identified in the science content curriculum.

One significant weakness highlighted by teachers is the lack of objectivity in performance expectations. This ambiguity in assessment criteria can lead to inconsistencies in evaluating students' knowledge and skills, potentially impacting their learning outcomes. Clear, standardized performance criteria aligned with learning objectives are needed to address this issue effectively.

Another logistical challenge identified is insufficient resources, including inadequate access to equipment, materials, and technology essential for effective science education. This limitation can hinder hands-on learning opportunities and practical demonstrations crucial for student engagement and understanding.

Additionally, schedule and pacing issues were noted, affecting teachers' ability to cover curriculum content adequately and maintain an appropriate teaching pace. These challenges underscore the need for improved resource allocation and scheduling to enhance the overall quality of science education delivery.

Table 13. Summary of the weaknesses of the content curriculum in Science?

Weaknesses of the content curriculum				
Themes		**Sub-themes**	**Verbatim**	**Related Literature**
1	Lack objectivity	• Ambiguity in performance expectations	Teachers expressed their problems on the objectivity of performances evaluation due to ambiguity in performance expectations.	Karabacak et al (2019) delves into teacher's perspective regarding the challenges and issues they face in performance evaluations, including the lack of clear criteria or expectations that can lead to subjective assessments and potential biases in the evaluation processes.
2	Logistical Challenges Impacting Overall Experience	• Insufficient Resources • Schedule and Pacing	Teachers indicated logistical challenges impacting their overall experience, including logistics and time preparation issues. Needed equipment are insufficient and unprepared teachers due to lack of time for training.	Ravago & Villanueva (2024) stated that firsthand experiences of teachers during the pandemic highlighting the various challenges they encountered in adapting to remote or hybrid teaching formats, including logistical hurdles, inadequate resources, and limited training opportunities which significantly impacted their overall teaching experiences.

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Table 14 shows the assessment methods identified that best measure the content curriculum's learning objectives and the needs of the learners are output-based assessments that include:

Performance-Based Tasks: These assessments require students to demonstrate their understanding and application of knowledge and skills by completing specific tasks or activities. Examples include experiments, simulations, presentations, or creative projects where students showcase what they have learned.

Project-Based Assessment: Project-based assessments involve students working on extended projects or tasks that require critical thinking, problem-solving, collaboration, and creativity. These assessments often mimic real-world scenarios, allowing students to apply their learning in practical ways.

The emphasis on output-based assessment methods reflects a shift towards assessing students' abilities to apply their knowledge and skills in authentic contexts. Performance- based tasks and project-based assessments align well with the goals of a content curriculum by promoting deeper learning, critical thinking, and the application of concepts to real-world situations. These methods also cater to diverse learning needs by providing hands-on, engaging learning experiences that appeal to different learning styles.

Table 14. Summary of the perceptions of the respondents on assessment methods content curriculum's learning objective and needs of the learners?

Assessment Methods				
Themes		**Categories**	**Description**	**Related Literature**
1	Output- based Assessment	• Performance- Based Tasks • Project- Based Assessment	Teachers believed that Performance-based tasks require students to apply their knowledge and skills to real world scenarios or problems and project-based assessments are beneficial for learners who thrive in hands- on, practical learning environments.	Gratchev (2024) investigates how replacing traditional exams with project-based assessments impacts students' performance and their learning experiences particularly in terms of applying knowledge to real-world scenarios and engaging in practical, hands-on learning.

National Learning Camp (NLC) Implementation Plan SY 2023-2024 Implementers: Department of Education (DepEd), School District Offices (SDO) Management Team, School Heads, Teachers, Parents, Students, Stakeholders

Time Duration: March 4, 2024, to December 2024 (with specific activities scheduled throughout the school year)

Objectives of the Plan:

1. To provide updates and coordination among SDO Management Team on NLC/EOSY Classes.
2. To ensure smooth administration of National Learning Camp Assessment (NLCA).
3. To determine the specific learning camps of students and provide necessary training for teachers.
4. To conduct advocacy and orientation sessions for stakeholders on NLC/EOSY classes.
5. To organize and monitor the readiness of schools for NLC/EOSY implementation.
6. To monitor, observe, and provide technical assistance during the implementation phase.
7. To evaluate the implementation of NLC and EOSY classes through a program implementation review.
8. To recognize milestone accomplishments and consolidate reports for higher offices.

Legal Bases:

1. Curriculum Implementation:

DepEd Order No. 32, s. 2015 - Policy Guidelines on the Implementation of Grades 1 to 10 of the K to 12 Basic Education Curriculum (BEC) Effective School Year (SY) 2015-2016. DepEd Order No. 42, s. 2016 - Policy Guidelines on Daily Lesson Preparation for the K to 12 Basic Education Program.

DepEd Order No. 31, s. 2018 - Policy Guidelines on the K to 12 Basic Education Program DepEd Order No. 7, s. 2019 - School Calendar for School Year 2019-2020

2. Assessment and Evaluation:

DepEd Order No. 8, s. 2015 - Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program.
DepEd Order No. 42, s. 2016 - Policy Guidelines on the National Assessment of Student Learning for the K to 12 Basic Education Program.

DepEd Order No. 29, s. 2019 - Policy Guidelines on the Implementation of the Basic Education Exit Assessment for Schools Division Offices in the K to 12 Basic Education Program.

3. Program Evaluation:

DepEd Order No. 2, s. 2015 - Guidelines on the Establishment and Implementation of the Results-Based Performance Management System (RPMS) in the Department of Education DepEd Order No. 40, s. 2017 - Operational Guidelines on the Implementation of School- Based Management (SBM) Grants

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These policies and guidelines are based on relevant educational laws such as the Republic Act No. 10533 or the Enhanced Basic Education Act of 2013, Republic Act No. 9155 or the Governance of Basic Education Act of 2001, and other pertinent legislation that governs curriculum, assessment, and program evaluation in the Philippines.

Table 15. Proposed Science curriculum contextualized implementation plan of the National Learning Camp (S.Y. 2024-2025).

KEY TASK	ACTIVITIES	OBJECTIVE	TIMELINE	RESOURCES			EXPECTED OUTPUT
				HUMAN	MATERIAL	FINANCIAL	
I- Pre Implementation Phase	Coordination meeting among SDO Management Team on NLC/EOSY Classes	To provide updates on the next phase of NLC implementation	March 4, 2024	SDO Management Team	NLC Action Plan	0	NLC/EOSY Action Plan Presented
	Orientation on the administration of National Learning Camp Assessment (Online)	To ensure smooth conduct of NLC Assessment	March 6, 2024	CID Team	Slide decks on NLCA	24,000.00	NLCA Orientation conducted
	Administration of National Learning Camp Assessment	To administer NLCA and determine the specific learning camp of students	Grades 7 & 8 March 11-April 12, 2024 Grades 9 & 10 April 15-May 17, 2024	DTC, ICTU, EPSs, PSDSs, STC, SITO, Examiners	WiFi	310,000.00	NLCA pre assessment administered
	Update school heads on NLC and EOSY classes (online)	To report accomplishments and update SHs on NLC/EOsY classes.	April 5, 2024	SDO Top Management Team and School Heads	WiFi	24,000.00	Report on accomplishments ad update disseminated
	Printing of NLC and EOSY advocacy materials	To print NLC and EOSY advocacy materials	April 6, 2024	School Heads	Tarpaulin	200,000.00	Advocacy materials printed and distributed to all
	Orientation of NLC/EOSY classes to stakeholders by PSDSs and School Heads	To further advocate NLC and EOSY to stakeholders	Dependent on the schedule set by districts and schools	PSDSs, School Heads and Stakeholders	NLC Slide decks, meals and snacks	200,000.00	Stakeholder oriented
	Submission of list of learners per learning camp based on LOP and teacher-facilitator to handle each camp per learning area	To determine the number of learners per camp and number of NLC facilitators	April 8-19, 2024	Teachers, School Heads, PSDS, and EPSs	List of learners and teachers per camp per learning area	0	Data on the number of learners and teachers per camp per learning area
	Training of Science teachers Teaching Grades 9-11 on NLC/EOSY classes	To conduct training-workshop on NLC/EOSY classes	May 3-7, 2024	School Heads, Teachers, Training Team	Training Materials Board and lodging	Elementary: 8.4M Secondary: 1.2M	Teachers to handle NLC and EOSY trained
	Checking on the completeness and appropriateness of learning resources per camp	To conduct inventory and evaluation of LRs per camp per learning area	May 8-11, 2024	School Heads, Master Teachers, Teachers, PSDS and EPSs	Learning Resources per camp per learning area	2M	LRs as to completeness and appropriateness checked
	Conduct placement	To assess the level	May 13-14,	School Heads	List of	0	Organized list

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	test to the campers.	of performance of the campers.	2024	and Teachers	students per learning camp		of campers
	Organization of classes per learning camp	To organize class per camp per learning area	May 15-17, 2024	School heads and Teachers	List of organized class	0	Classes organized
	Monitor the readiness of the School: 1. Learning camps 2. LRs 3. Advocacy Materials 4. Class Program 5. Organized committees 6. School NLC/EOSY Implementation	To Monitor the schools' learning camps, LRs, Advocacy Materials, Class Program, Organized committees, NLC/EOSY implementation plan	May 20-23, 2024	SDO Top Management, PSDSs & EPSs	Monitoring tool	200,000.00	Readiness of schools monitored
II-Implementation Phase	1.M&E, Camp observation and TA on: a. Classroom Instruction b. Collaborative expertise c. Progress of learners d. Test construction (HOTS) e. fun-filled activities and other strategies	To monitor, conduct camp observation and provide TA	NLC and EOSY implementation proper timeline	SDO Top management, PSDs, & EPSs	Monitoring tool	200,000.00	School Monitored, observed and provided TA
III-Post Implementation Phase	Conduct Program implementation review with the school heads	To evaluate the implementation of NLC and EOSY classes	July 30, 2024	SDO top management, PSDSs, EPSs and School Heads	Supplies and Materials Meals and Snack	50,000.00 73,600.00	PIR Conducted
	Recognition of milestone accomplishment on the implementation of NLC and EOSY classes	To recognize school heads, teachers, learners and stakeholders	December 2024 (During Pammadayaw)	SDO Top Management, PSDSs, EPSs, and School Heads, Teachers, Learners and stakeholders	Plaque of Recognition	150,000.00	NLC Milestone of accomplishments recognized
	Consolidation and submission of NLC and other EOSY classes to top management and higher office	To encapsulate all NLC and EOSY report	December 2024 or as required by the higher offices	SDO Top Management, PSDSs, EPSs, School Heads and Teachers	School reports on NLC and EOSY classes	0	NLC and EOSY Classes consolidated and submitted

Table 15 shows Proposed contextualized implementation plan of the National Learning Camp for the school year 2023-2024. This contextualized plan is anchored with the action plan of the DepEd CAR, SDO-Apayao on the implementation of the National Learning Camp. The plan is divided into three key tasks (Pre-Implementation Phase, Implementation Phase and Post-Implementation Phase). During the pre-implementation phase, teachers and head teachers will conduct pre-assessment (placement test) to determine the level of performance of the campers. This is to ensure that the students will be categorized according to the level of contextualized activities for their needs.

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Conclusions

Based on the results of the study, several key insights and recommendations emerge to enhance the curriculum's effectiveness. The study involved 18 predominantly female students aged 13-15 years from low-income families, highlighting the importance of gender, age, and socio-economic sensitivity in curriculum design for inclusivity.

Overall, participants rated the science curriculum as "Good" across dimensions like relevance, cognitive development, international context, school resources, challenges, and feedback. While equitable performance was noted across sex, socio-economic status, and reading material availability, significant age-related differences were found in cognitive development, international context, resources, and challenges. This underscores the need for age-appropriate adjustments to better meet developmental stages.

Strengths identified included clear learning objectives and sustainable knowledge integration, yet weaknesses in assessment objectivity and logistical challenges were noted. Teachers recommended output-based assessments to better measure learning goals and address resource deficiencies through enhanced support and training.

To enhance the curriculum, recommendations include tailored modifications for diverse age groups, integrating objective assessments, addressing logistical challenges with adequate resources and support, and establishing robust feedback mechanisms for continuous improvement. These measures aim to contextualize learning experiences, ensuring relevance, inclusivity, and educational effectiveness.

Implementing these recommendations can enhance the National Learning Camp's science curriculum, aligning it closely with learner needs and improving educational outcomes comprehensively.

Recommendations

1. Schools in Apayao should incorporate performance-based tasks and project-based assessments into the science curriculum. These methods, which involves applying knowledge to real-world scenarios and engaging in practical learning, are believed by teachers to better measure the curriculum's learning objectives and cater to diverse learning.

2. To address the lack of objectivity in performance evaluations, it is essential for teachers to develop clear, detailed criteria for assessments. This will help minimize ambiguity and ensure that evaluations are fair and consistent across different teachers and student groups.

3. DepEd administrators should ensure that schools have sufficient resources and provide adequate training time for teachers. This includes funding for necessary equipment and materials as well as scheduling professional development sessions well in advance to prepare teachers effectively for their roles in the National Learning Camp.

4. Schools should continue to emphasize the integration of science practices, real-world applications, and 21st century skills such as communication, collaboration, and critical thinking in the curriculum. These elements contribute to clear learning objectives and prepare students for future challenges.

5. Teachers may be encouraged to use inquiry-based learning methods that make learning meaningful and engaging. By catering to the diverse needs and backgrounds of students, this approach ensures that knowledge is sustainable and relevant.

Declaration of no conflict of interest

The author hereby declares no conflict of interest and this article is her original work.

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