

Science Teachers' Readiness and Systemic Challenges in the Pilot Implementation of the Strengthened Senior High School Curriculum

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ABSTRACT

The study examined the science teachers' readiness and systemic challenges in the pilot implementation of the strengthened senior high school curriculum in selected public schools in the Division of Rizal and Antipolo City. It uses an explanatory sequential mixed-method research design where the quantitative and qualitative data were gathered simultaneously, analyzed separately, and combined at a stage of interpretation. There are 30 science teachers participating in the quantitative component. It measured their readiness in pedagogy, curriculum knowledge, assessment practices, and systemic challenges in related instructional resources, laboratory facilities and equipment, and professional development. Qualitative data were gathered through guided interviews and analyzed using a

thematic analysis. The results showed that there is a high readiness of teachers in terms of pedagogy (M-3.62), curriculum knowledge (M-3.60, and assessment practices (M-3.62). However, the challenges regarding instructional materials were experienced to a very great Extent (M-3.26), whereas challenges concerning laboratory facilities (M-2.96) and professional development (M-3.11). No significant relationship was identified between teachers' readiness and systemic challenges. There are 7 themes that emerged from the qualitative results: transition in curriculum navigation, resource shortages, Management of time and tasks, new curriculum expectations, learner-centered and context-based instruction, stronger professional support, reflective practice, and professional resilience. The combined results show that high readiness and significant systemic barriers can coexist. Consequently, the Sci-Teach READY Teacher Support Framework was formed to strengthen the capacity of science teachers and improve systemic conditions for the successful implementation of the curriculum.

Keywords: *explanatory sequential mixed method, teacher readiness, systematic challenge, instrument validation, teacher support framework.*

INTRODUCTION

The implementation of the Enhanced K-12 curriculum represents a major shift in the system of education in the Philippine educational system. The reform widens the basis for basic education up to 13 years and aims to strengthen the foundational skills in a much simpler curriculum (Diaz, 2024). Providing the learners with access to a curriculum that would suit their learning needs. However, the success of this major change totally depends on the readiness and Preparedness of the teachers who enter the new policy (Malinao & Mjano, 2025). The role of the teacher is important because they are the frontlines of action and implementation, which is why their active participation is crucial in the effectiveness of the reform (Bacus

&Alda,2022). In particular, the launching of Senior High School in 2016 brings up different challenges because many of the teachers are new to this kind of curriculum, even though other countries had already implemented it. These changes brought limited time to prepare for a different curriculum and method that is learner-centered. These challenges are always seen in the form of insufficient training, limited time to understand a wider knowledge, and struggles in the application of strategies like the Spiral Progression Approach, which results in an equal implementation of the curriculum.

(Blando, 2025; Ignacio & Bajet, 2025). An empirical investigation is important to fill the interval between the formulation of policy and the actual practice to ensure that the purpose of K-12 reform is achieved through its actual implementation and an effective strategy to strengthen the capacity of the teacher (Magallanes et al., 2022). One of the prominent changes in the educational system of the Philippines is the revision of the new curriculum in Senior High School under DM 048 series 2025 known as the Strengthen Curriculum of the Senior High School SY 2025-2026, that streamlined tracks where the current 4 academics tracks (Academic, TVL, Sports & Arts and Design) are condensed into two: Academic Track and Technical Professional Track, Reduced core subject: The number of core subject is reduced from 15 to 5 to ensure the alignment with college requirements. It also seeks to equip learners with deeper competencies and the application of real-world scenarios. As one of the pilot implementers of the reform, Science teachers had an important role in ensuring that the changes in the curriculum would be translated into meaningful and enjoyable classrooms. The pilot implementation in the revised new curriculum of senior high school will give an opportunity to update the experiences of the teachers in science while they were facing the new guidelines, pedagogical strategy, resource challenge, and assessment practice.

Unlike quantitative research that focuses on the result, like data analysis and measurements, qualitative research stresses the narratives, emotion, and reflection of the teachers that feature in how to transfer the new policy in the actual classroom setup. It is also important to understand these experiences of the teachers through the different challenges and experiences that might directly influence the success of the reform in the curriculum. Their voices provide an important view regarding the implementation, which may not align with the intention of the policymakers. Through a continuous and strict guide on the first experience of science teachers in the revised curriculum, it stresses the study of the policy inside the classroom, where actual learning is happening. Much more on the methodological considerations, the study is directly anchored to the Sustainable Development Goal 4 (SDG 4): Quality Education, which aims for inclusivity, equality, and quality education for all and promotes lifelong learning. The analysis of the readiness of the teachers and systematic challenges in the implementation of the strengthened senior high school curriculum is an important contribution to attaining its objectives, especially in improving the quality of secondary education in the country (United Nations, 2024). Furthermore, the study also agrees with the Ambisyon Natin 2040, the long-term national vision of the Philippines for a stable, comfortable, and secure life for every Filipino.

Under this framework, it acknowledges the foundation of national development, shaping global competitiveness, productivity, and socially responsive citizens. The Basic Education Development Plan (BEDP) 2030 of the Department of Education is explicitly linked to the objectives of basic education in the Ambisyon Natin 2040, wherein the quality education serves as the primary road to national development (Department of Education,2022; National Economic and Development Authority (NEDA),2023.

By addressing these gaps, the present studies contribute to the new curriculum by raising the voices of science teachers that will serve as a feedback mechanism for policymakers, curriculum developers, and educational leaders to strengthen the future education in the Philippines.

The study aimed to analyze the teachers' readiness and challenges in the pilot implementation of the strengthened senior high school curriculum, which uses survey questionnaires, interviews, FGD for data gathering, as well as descriptive statistics such as mean, frequency, and standard deviation, thematic coding, and clustering themes, which can answer the hypotheses and assumptions of the study.

Education is the basis of the national economy because it is composed of people who have the skills, innovation, and are ready to face the challenges in the worldwide economy. In response to the need of the new society, the Department of Education launched the K-12 basic Education Program that aims to strengthen the quality of education in the country. One of the primary parts is the Strengthened Senior High School curriculum, aiming to prepare the learners for a higher level of education, employment, and being productive people. In this context, teachers are the forefront for the successful implementation of the curriculum; their readiness, knowledge, and adaptability in the changing curriculum had a bigger effect on teaching inside the classroom. As the executor of the reform in education, it is the responsibility to create a concrete objective in the new curriculum. Because of this, it is important to investigate the level of their readiness and the challenges that they might face in the new system of education. Strengthened Senior High School is part of the reform of the Department of Education to increase the level of learning and to prepare learners for the 21st century. It is implemented in the SY 2025-2026 in selected public and private schools in the Philippines, and the Division of Antipolo City is one of those selected schools that will undergo the pilot implementation. Although the objectives in the reform are positive, it maintains the critical role of the teachers in the success of the reform. There is a need for readiness in terms of pedagogy, design of the curriculum, assessment, and the use of technology in teaching. However, there are teachers in senior high school who are experiencing heavy workload, insufficient learning resources, limited training, and a lack of clear guidance coming from the administration. It shows that there are still gaps in the Preparedness and readiness for the reform to be effective. Although there is training and guidance that the department is providing, there is a remarkable interval between the policy and the actual implementation inside the classroom. Many of the teachers have a positive outlook on the reform but lack the learning materials, training, and support coming from the institution. To fully implement the reform in education.

It is important to fill that gap because the result of the study will help to plan and create policy based on evidence for the improvement in teaching and learning in senior high school. Identifying the level of readiness and challenges of the teachers will serve to create the right support mechanism, such as professional development programs, mentoring/coaching, and enough teaching materials. The creation of the Teacher Support Framework is based on data gathered and will help with the continuity of the program, because the Strengthened senior high school curriculum is in the pilot phase and requires extensive study to ensure that it will be implemented properly and soon be rolled out in the whole country.

Statement of the Problem

The pilot implementation of a strengthened senior high school curriculum has led to a deep pedagogical transition and systemic challenge in the field of teaching and curriculum Management. Amidst national mandate and educational reform, it is important to understand the level of readiness and systemic challenge to ensure the successful implementation of the curriculum and maintain the quality of education. The Second Congressional Commission on Education emphasizes the need to address the issues that involve the quality of teaching, workload of teachers, and lack of institutional support that have a direct implication in the implementation of the educational reform. Because of this, the study uses an explanatory sequential mixed methods research design, wherein the quantitative data will be gathered first followed by the qualitative to interpret, expand the quantitative results in the phase of interpretation to develop a comprehensive understanding of the phenomenon. These structures undergo a multi-phase research flow from separate data collection to integration of findings as the basis of an expected support framework for teachers. The research questions conform to an explanatory sequential mixed methods design. The first stage responsive to quantitative analysis using the survey instrument, the second stage is committed to qualitative interview and thematic analysis, the third stage is dedicated to meta-inference and is expected for the development of Teacher Support Framework as the output of the study, thus the problem statement not only responds to the empirical questions of the study but also clear aligned on the methodological structure and the purpose to develop practical intervention for teachers in times of pedagogical transition.

Specifically, it aims to answer the following research questions:

1. What is the level of science teachers' readiness in implementing the Strengthened Senior High School Curriculum in pilot schools in terms of:
 - 1.1. Pedagogical readiness;
 - 1.2. Curriculum knowledge; and
 - 1.3. Assessment practices?
2. What is the extent of the selected systemic challenges encountered by science teachers during the implementation of the Strengthened Senior High School Curriculum in terms of:
 - 2.1. Instructional resources;
 - 2.2. Laboratory facilities and equipment; and
 - 2.3. Professional development?
3. Is there a significant relationship between science teachers' readiness and the extent of systemic challenges encountered in the implementation of the Strengthened Senior High School Curriculum?
4. What are the experiences of science teachers regarding the pilot implementation of the Strengthened Senior High School Curriculum?
5. What teacher support framework may be developed to enhance science teachers' readiness and reduce challenges in the implementation of the Strengthened Senior High School Curriculum?

Purpose of the Study

The primary purpose of this study is to check the experiences of the science teachers regarding the integration of the senior high school curriculum, to provide a clear pedagogical transition and systemic challenge that the teachers are facing (Lopez,2024). This effort aims to assess the readiness with regard to the Preparedness and systemic challenges for teachers in response to the national mandate for the improvement and recommendations based on the evidence that may strengthen the policy to maintain the reform in education (Soliman & Gabutin, 2025; Stephen, 2021). It includes the study on the strengths and weaknesses of the intervention and allocation of resources, especially in teaching, where most of the teachers are needed (Demate et al.,2025).

This study aims to thoroughly assess the readiness of the science teacher and systemic challenges faced in the pilot implementation of the strengthened senior high school curriculum in the middle of existing national mandates. In a time of constant change, understanding the capabilities of the teachers is even more important to adapt to the changing pedagogical curriculum and institutions associated with those educational reforms, as stated by the Second Congressional Commission on Education, 2025. Above all, the goal of the study is to create a teacher support framework for the teacher, which will serve as a guide for administrators of the school, policy implementers, and other stakeholders in creating a program that focuses on developing the skills of the teacher and strengthening the implementation of the curriculum.

The study has its important implications for sustainable development Goal (SDG 4): Quality Education, which aims to ensure that inclusivity and quality education for all. It emphasized the need to ensure that all students receive meaningful and quality learning experiences and recognized the role of teachers as a key factor in achieving this goal. Along with this, the study also aligned with Ambisyon Natin 2040, the long-term national vision of the Philippines, which aims to achieve a stable, comfortable, and secure life for every Filipino through human resources. The effective implementation of the curriculum in senior high school is an important factor in preparing students for higher education, jobs, and productive participation in society.

Additionally, this study directly addresses the recommendation of the Second Congressional Commission on Education that emphasized the need to focus on the problems related to quality education, readiness of teachers, and systematic weaknesses in implementing the reform in education. According to

the latest report, evidence-based interventions are needed to improve the quality of education and to address the existing learning crisis in the country (EDCOM II, 2025-2026).

The purpose of the study is to contribute to national aspiration for quality, inclusive and future ready education in line with goal of SDG 4, Ambisyon Natin 2040, the reforms promoted by the EDCOM II and helps to promote ideals of Christian Stewardship that define and shape character building as an effective efficient basis for nation-building and espouse the meaning of “Helpers of God” in the assistance and promotion of the marginalized sector of society, especially young as stated by the Philosophy, vision, and mission of University of Perpetual Help System Dalta Graduate School.

Rationale using an Explanatory Sequential Mixed Methods

The study employs explanatory sequential mixed methods design as a primary methodological framework to scrutinize the complexity and multidimensional reality of the pedagogical transformations under the strengthened senior high school curriculum. This design is more applicable to the study requires a simultaneous collection analysis and integration of quantitative and qualitative data to produce a comprehensive, depth and empirical understanding of complicated education phenomena (Creswell & Plano Clark, 2023). At present context of education in the Philippines, the pilot implementation of strengthened senior high school curriculum is an important curriculum reform that aims to address the problems in the decongestion of the subjects, increase the readiness in finding jobs, and according to the students’ skills that needs in higher education and industries. This is formally set by the Department of Education (DepEd) Memorandum No. 048, s. 2025, that sets the pilot implementation for Grade 11 in school year 2025-2026 and followed by the roll out of the implementation by the year 2026-2027 (Department of Education, 2025). Because of this, it is important to analyze not only the readiness of the teachers but also the systematic challenges that may face in the actual implementation of the curriculum.

In Methodological aspect, the quantitative branch of the study is focused on the systemic measure of the level of readiness according to pedagogy, curriculum delivery, learning assessment and readiness in implementing the reform caused by the national policy. Through standardized instrument and statistical analysis, it becomes possible to determine the level of readiness, wider challenge in the aspect of resources, professional development and administrative support. At the same time, the qualitative branch gives a deeper understanding and analysis of the actual experience, perceptions and narrative of the teachers regarding their suitability of the new curriculum. Through interview, it identifies factors that may not fully reflected on statistical data, such as lack of clear guidance on implementation, lack of trainings, limited teaching resources and local contextualization that can be a challenge in the pilot schools.

In choosing explanatory sequential mixed methods design is based on the principles that the numerical data and narrative data is equally important and should be united in one stage of interpretation. In this design, the result of quantitative and qualitative data is combined to determine the compatibility, difference and extending the findings resulting in high credibility and methodological triangulation (Creswell & Plano Clark, 2023).

Additionally, the study is anchored to Republic Act No. 10533 or Enhanced Basic Education Act of 2013, which set the basis for the application of International Education, readiness for action and lifelong learning, thus the pilot implementation of the strengthened senior high school curriculum, is a concrete realization of the objectives contained in this law. In this perspective, the study does not only respond to immediate needs of Department of Education for monitoring and evaluation of the pilot implementation, instead it contributes on national and global objectives to increase the quality of education. The simultaneous use of quantitative and qualitative data in a explanatory sequential mixed methods design provides a holistic, scrupulous, and significant basis for the development of teacher support framework which is based on the empirical evidence and actual experience of the teacher.

In total, the use of explanatory sequential mixed methods design is a methodological justification and academic appropriateness because it provides a comprehensive, integrative and contextualized

understanding in the readiness of the teacher and systematic challenge in the pilot implementation of the strengthened curriculum. Above all, it is consistent with national policy of DepEd, SDG 4 and Lifelong vision of Ambisyon Natin 2040. Therefore, it is further confirmed the significance and importance of the study in the field of education and national development.

Literature Review

Thematic Synthesis of Literature

This section aims to combine the existing scholarship on teacher readiness and systemic obstacles that the teacher may encounter in the implementation of the new curriculum, particularly in the context of senior high school. The thematic analysis aims to unite the discovered strategies in different studies, emphasizing the repeated patterns of strategies adapted by the teacher, professional development, and mechanisms of support from the institution (Bacus & Aida, 2022). One recurring challenge identified in the studies is the lack of training for professionals' development and growth, which causes concern and fear among teachers regarding the effectiveness of the curriculum, as defined by Buabeng & Amo-Darko (2025) and Diaz (2024). For example, the preservice teacher often expresses confusion; therefore, it promotes a curriculum that gives priority to the practical strategies of teaching and learning inside the classroom instead of overemphasis on a particular topic, as revealed by Diem et al. (2024). This apprehension is reaching the in-service teacher who is faced with adversity because of the limited resources and increasing workload, which has resulted in burnout (Fuentes, 2025). Aside from this, the absence of practical professional growth and limited resources that end up going back to their traditional teaching, weaken the intended change on the pedagogy of the reform curriculum (Buabeng & Amo, 2025).

Moreover, this challenge stresses the importance of a comprehensive system of support, including strong training, enough school supplies, and different platforms for collaboration for the successful implementation of the curriculum and adaptation of the teacher (Bacus & Aida; Ntumi et al., 2023; Tholchan, 2025). Much more of this, there is a continued study of policy disconnect between the aspirations of the policies of the reform in the curriculum, practical and systematic support for the education, which requires urgent study of the policy (Fuentes, 2025).

These differences can be described by the gap between the progressive ideals on new models of education and pragmatic truthfulness on this application, particularly on the teacher training, allocation of resources, and administration of the curriculum as situated by (Kadirhan & Sat, 2025). In particular, the lack of depth and hands-on training reminds us of the confusion and barriers to the acceptance of innovation among educators. It indicates the present framework for professional growth often has a short duration and limited participation, which becomes an obstacle in the effective implementation of the curriculum (Yamota, 2025). And because of this, teachers always use improvisation and cooperation with their colleagues to face these kinds of challenges. It shows the nature of skills for adaptation; although commendable, it often covers up the root causes of the systemic deficiency. (Anggraeni et al., 2024; Malinao & Miano, 2025). The trust in informal networks of support teaches the critical needs for structured and long-term initiatives on the professional development created together with the teacher to ensure the relevance and its effectiveness (Agbofa et al., 2023). This gap is continuously widened because of the system of evaluation that failed to include the related systems that might result in the educator who is not ready to teach, school governance, and communication between their families and the school. (Xiao-hong et al., 2025).

This results in an implementation gap wherein most of the results in the changes to the curriculum are not fully met because of the different policy and actual skills (Bildik & Altun, 2022). These differences are further exacerbated by the initiatives in the professional growth due to the irrelevant context, which failed to address the needs and environment of the African teacher; that's why they are limited to transferring the learning skills inside the classroom (Ajani, 2023). For example, insufficient professional

growth and teaching resources are still the primary gaps in the reform of the curriculum in sub-Saharan Africa (Mordzeh-Ekpampo et al., 2025). It stresses the critical needs for a paradigm shift in professional growth at the top-down rules through local, and according to the needs of the model (Ajani, 2023).

The present reform for the curriculum and initiatives in the skills of the teachers, though it is positive, is often weakened by insufficient continuous professional growth, limited ICT integration, and not the same assessment method (Wawire et al., 2025). Aside from that, there are challenges such as work overload.

Theoretical Framework

This study is based on some of the theories of education and organization that explain the readiness of the teachers, challenges encountered, and the support needs in implementing the curriculum. Also, this study primarily served on the Updated Consolidated Framework for Implementation Research (CFIR), which is supported by the Agency Influence Framework for teacher readiness and systemic curriculum transformation perspective. The framework explained the implementation of the curriculum results on the connection between the teacher and the organization's condition, surrounded by their teacher workload. Additionally, the result of the implementation shapes the interconnected factors related to innovation, the people who implement it, and the process of implementation. Factors embedded in the context can serve as either a facilitator or a hindrance, even if a program or reform is well-designed (Damschroder et al., 2022). In the context of a strengthened senior high school curriculum, CFIR indicated that it is not enough to identify the individual characteristics of science teachers; it is necessary to find out if they possess the ability needed to implement the curriculum, as well as the institution that provides enough instructional materials, teaching and learning facilities, and professional support.

It is assumed that there may be sufficient capability and skill the teacher may have but still struggle to implement the curriculum when there is a lack of instructional materials, laboratory facilities, and equipment, or opportunities for professional development. In a wider definition, the readiness of the teachers is a multidimensional situation that may include knowledge, beliefs, motivation, confidence, and Preparedness in accepting the changes in teaching and learning.

It is important in science education because there might be a need for reform from traditional lecture and laboratory methods towards investigations, modeling, and reasoning based on the evidence (Jones & Swanson, 2022). Recent Philippine Research represents the interpretation of the curriculum, performance-based activities, and pedagogical knowledge as domains requiring continued support for teachers in curriculum implementation (Elardo, 2025). The curriculum-transformation perspective stresses the interconnection between the curriculum, pedagogy, assessment, and readiness of the teacher (UNESCO International Bureau of Education [UNESCO-IBE] 2026). As these three are the teacher-level abilities, while the instructional resources, laboratory facilities, and professional developments are external provisions that enable or restrict those capacities. In the Philippine curriculum-implementation literature, insufficient instructional materials and professional development are major obstacles in the implementation of the curriculum (Fuentes, 2025). Likewise, the Broader-curriculum-transformation literature highlights the connection among curriculum, pedagogy, assessment, teacher-training, and other education-system components (UNESCO International Bureau of Education [UNESCO-IBE] 2026).

According to the Job-Demands Resource model, performance, motivation, and health in the workplace of teachers are based on the job demands, such as workload, limited time, and job resources, such as training and mentoring. When there are more and enough resources compared to the demands, teachers are more ready and motivated, but on the contrary, there is a chance of burnout and low performance (Admiraal et al., 2023; Hlad'o et al., 2024). In the context of a strengthened senior high school, the model displayed that limited materials, time, and training may weaken the ability of teachers to implement the effectiveness of the new curriculum. As stated by Damschroder et al. (2022), the updated consolidated framework for implementation of research is composed of five dimensions that affect the

success of the program, such as innovation, inner, and outer settings. This can give an active participation of the teachers, school administration, and contextual adaptation as primary factors in the successful implementation of the program. It reiterates that the readiness of the teachers is directly influenced by the support coming from the school administration and fine structures of the institution (DepEd, 2025).

The Self-Efficacy Theory of Albert Bandura, which emphasizes the modern study regarding the readiness of the teacher in the implementation of the curriculum reform. According to this theory, teachers' belief in his/her abilities is one of the major factors that affect the level of readiness and responsibility in teaching. Teachers who have high self-efficacy are much more ready to face new challenges, open to new strategies, and more capable of overcoming the systematic challenges in the classroom (Asante, 2025). This theory is used to explain how confidence, professional readiness, and pedagogical competence affect the abilities of teachers to effectively implement the strengthened senior high school curriculum. Teacher Self-Efficacy defines the teacher's beliefs in their own ability to accomplish the learning needed by the students. According to the meta-analysis of Mu et al. (2024) and Kang et al. (2025). Teachers who have high self-efficacy easily adapt to new strategies in teaching, the longer they stay in the profession, and are more open to reform in education. In this study, Teacher Self-Efficacy has been a mediating variable between resources and readiness for the teachers in implementing the strengthened senior high school curriculum.

In addition, Technological Pedagogical and Content Knowledge (TPACK) should provide further explanation of the complicated connection between technology pedagogy and knowledge for effective teaching and learning (Acopio, 2025; Obina & Pimentel, 2025). Although there are other perspectives on the integration of technology, the TPACK framework is important in research because it focuses on technology and pedagogy, which gives an in-depth perspective and ability of teachers (Li et al., 2024). This framework is crucial to understanding how the teacher uses different kinds of instructional materials in technology that align with the new curriculum.

Furthermore, to meet the variable of the systemic challenges, the study uses the Coherence Framework (Fullan and Quinn, 2023). This theory argues that the widespread change in education requires four interconnected parts: Focusing Direction, Cultivating Collaborative Cultures, Deepening Learning, and Securing Accountability. So that the strengthened senior high school curriculum will progress from the pilot phase towards national standards. This framework will be used to infer the readiness of the teachers, which is one of the secondary factors if the primary system, which is clarity of the policy and administrative support, is lacking coherence (Fullan & Quinn, 2023). It matches the criticism of EDCOM II (2024) on the system of education in the Philippines, which recognizes the misalignment as the root of the current learning crisis.

As the theory speaks, the study includes the Theory of 21st Century Pedagogies, which came from traditional constructivism. As mentioned by Schleicher (2022). The modern reforms require teachers to transition from being an instruction provider to being an orchestrator in the learning environment. This transition represents the pedagogical shift that is needed in the Matatag Agenda (DepEd, 2023). The framework suggested that the readiness of the teacher is a multi-dimensional concept that includes cognitive readiness, technological readiness, and affective readiness. According to the World Bank (2024), without this readiness, the strengthened nature of the curriculum will not result in a decrease in the level of learning poverty. In total, the theories show that the readiness of the teachers and systematic challenges in implementing the curriculum are connected factors in the process of pedagogical transition.

Conceptual Framework

The study covers six dimensions: for teachers' readiness, the domains are pedagogical readiness, curriculum knowledge, assessment practices, systemic challenges, such as instructional resources, laboratory facilities, and equipment, and professional development. These dimensions refer to teachers' capacity to translate what the curriculum intends to do into the classroom setting and the external limitations supported by the institution, but they do not represent all possible factors. The conceptual framework of the

study focuses on the analysis of readiness and systemic challenges of the teachers that they experience in the pilot implementation of the strengthened senior high school curriculum in the middle of the national mandate. Based on the theoretical basis of the study, it is assumed that the level of readiness and systematic challenges had an important influence on the success of the pedagogical transition and effective implementation of the curriculum.

The conceptual framework is related to the theory to show how the readiness of the teachers affects the implementation of the new curriculum in their challenges, resources, and level of confidence in teaching. When there is enough training, mentoring, and support from the school administration, it lessens the stress and job demands of teachers, there is high self-efficacy, and they are more effective in implementing the curriculum (Admiral et al., 2023; Mu et al., 2024).

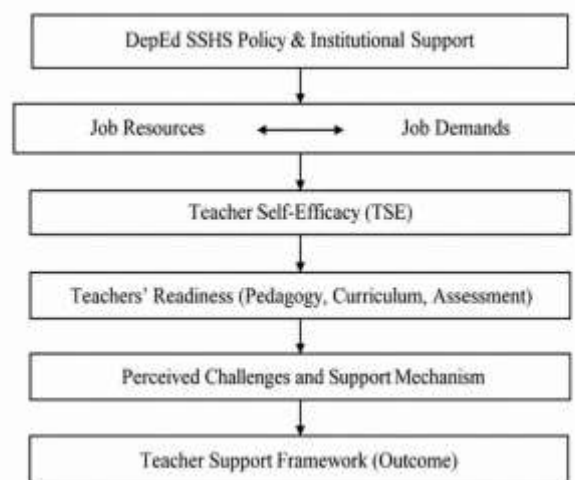


Figure 1. *Conceptual Framework of the Study*

This framework showing the readiness of the teachers is the product of a balanced correlation between job demands and job resources, which intervene in the self-efficacy and influence of the institution. According to Admiraal et al. (2023), if there are enough resources, high motivation, and readiness of the teachers, as stated by Damschroder et al. (2022), the culture, leadership, and process of the education system in schools are among the factors in the successful implementation of the curriculum. In summary, these theories give a holistic look at how the personal, professional, and institutional factors affect the success of implementation, and it may result in creating a Teacher Support Framework (TSF) that will serve as a guide for the Department of Education on capacity building of the teachers.

The study also aims to analyze qualitative and quantitative investigations on science teachers' readiness and challenges in the pilot implementation of the Strengthened Senior High School Curriculum. Comparison and relevance based on descriptive and thematic analyses will be done to create an interpretation that answers the study's hypotheses and assumptions. It also shows the primary variables, such as the readiness of the teachers and systematic challenges. The readiness of the teachers is measured in dimensions such as pedagogy, curriculum knowledge, and assessment practice. These dimensions serve as an important factor in the success of the implementation of the curriculum and pedagogical transition. Meanwhile, the systemic challenges define the obstacles that might affect the implementation of the strengthened senior high school curriculum, which includes resources, professional development, and administrative support. According to a recent study, these challenges have an important influence on the level of readiness and performance of teachers during the reform in education (Caspé & Sarrosa, 2025). The study included gathering, analyzing, and interpreting data to measure the relationship between the variables and determine the existing problem. Furthermore, based on the analysis, a teacher support

framework will be proposed that will serve as a basis for the programs that support policy and administrative intervention to further strengthen the readiness of the science teachers and address the systemic challenges. These concepts presented can be understood through the conceptual paradigm presented in Figure 2:

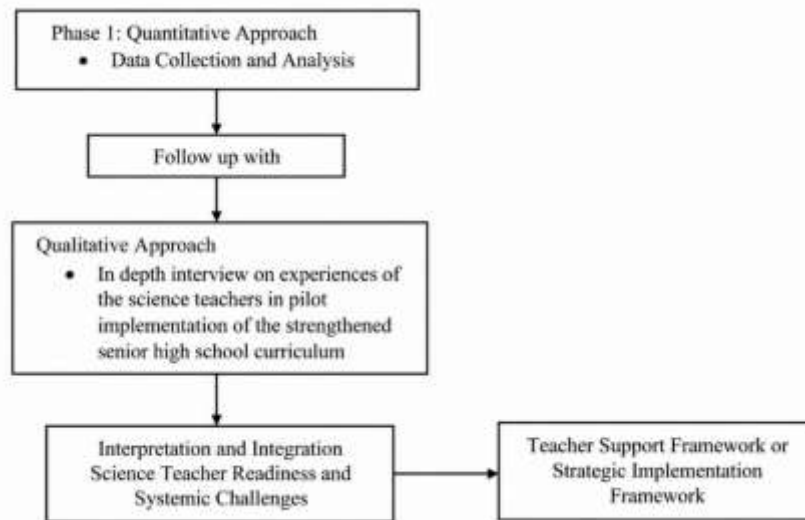


Figure 2. *The Conceptual Framework of the Study*

Review of Quantitative Studies on the Topic

The quantitative study mostly uses a wider survey and statistical analysis to measure the readiness of the teachers, perceptions on the challenges, and the effect of the intervention within the curriculum reform. This investigation mostly includes variables such as self-efficacy, job satisfaction, feeling of support, and ability to adapt the pedagogy approach to ensure the connection for the implementation of the curriculum and participation of the teachers (Lubis, 2023). Sometimes it uses a natural study of the psychometric scale to analyze the feelings and perceptions of the teachers in a new curriculum and the competition that they feel in implementing the skills of reform and broader participation in professional development (Ghamoushi et al., 2022). For example, descriptive quantitative study particularly presents a foundation to understand the current educational concept, which gives a foundation understanding, such as health benefits, and limited resources, which are important to identify the systematic weaknesses in the evaluation and implementation of the curriculum (Bravo et al., 2025).

Aside from that, this study may identify correlations between the understanding of the teachers of the reform in the curriculum and their self-efficacy while implementing, which gives insight into how it affects the perception of successful integration.(Nikoceviq-Kurti et al.,2025).as well as the quantitative research, which always investigates the level of curriculum literacy of the educator, who mostly use it in scale-development studies to measure the perception, skills, and ability that are connected to the curriculum. (Cogmen&Ozelci,2024). There are a lot of studies that use a quantitative design that measure the level of curriculum literacy, wherein the curriculum scale is mostly used in the studies (Cogmen &Ozelci, 2024). These quantitative strategies may ease the analysis of the results of the reform, such as the learning attained by the students and the total effect of the strategies in implementation. For example, different studies present the perception of the teacher in the reform of the curriculum, which are significant in their self-efficacy, wherein the understanding and collaboration are the primary factors to predict this. (Nikoceviq-Kurti et al.,2025). The quantitative design is also used in meta-analyses to combine the gathered data from different

studies, indeed offering a comprehensive statistical collective effect of the reform in education in different aspects, such as student performance and its effect on the teacher (Adeniyi et al.,2024).

Senior High School in the Philippines

According to the Program for International Assessment (PISA) 2022, only 16% of the learners in the Philippines had reached level 2 in Mathematics, 24% in reading, and 23% in science, far beyond the ordinary level in the other countries (OECD, 2023). It shows in the data that there are a lot of learners entering senior high school who have a lower level of understanding and foundational skills that may affect their track readiness and performance. World Bank (2024) expressed that there is a high learning poverty in the country, where there is 90% of the children ages 10 and below cannot read a simple text, and because of this, it recommends the implementation of learning acceleration and targeted intervention programs in Junior and Senior High Schools. It clearly shows that the weaknesses in primary skills have continued to affect the performance of the learners in Senior high school.

The Department of Education launched the MATATAG K-10 Curriculum in 2024 to reduce the learning of repeated competencies and focus on foundational skills of the learners (DepEd, 2024a). Together, the department announces the plan in a much simpler SHS curriculum that will reduce some of its core subjects and focus on “work immersion” and exit pathways towards employment and college education (DepEd, 2024b). In the recent hearing of EDCOM 2 last March 2025, it was suggested that there should only be 2 primary tracks, the Academic and Technical Vocational, to be more compatible with the Higher Education and the needs of the industry (EDCOM 2, 2025). It clearly shows that the Department of Education is trying to lighten up the curriculum and match the opportunities in the industry sector and college education.

Based on Department Memorandum No. 052, s. in 2025, the start of the pilot implementation of the Enhanced SHS Work Immersion Program in SY 2025-2026 to improve the quality of experience of the learners in the fields of industry (DepEd, 2025a). in the study of Consortia Academia (2025), even if there is a good effect in doing immersion, it needs to have a clear policy in the placement, assessment, and supervision. According to the report of Monteverde et al. (2025). There should be an alignment in the certification between senior high school and the Technical Education and Skills Development Authority (TESDA) in the Philippine Qualifications Framework (PQF) to ensure that the competencies are aligned with the industry in the country. Work immersion is really a great opportunity for senior high school students, a key to job readiness.

As shown in the study of Santos (2025). While there is a continuation of using online and blended learning in senior high school, there are still a lot of issues regarding the insufficient learning and technology resources availability, such as gadgets, internet access, and teacher readiness. On the other hand, the World Bank (2024) granted funds for education resilience and digital learning to support the educational reform. Educational digitalization has the potential to improve the quality of learning if there is enough training on the part of the teacher and access to the technology, because we all know that in our country, internet connectivity is still a challenge in Philippine Education.

According to the Basic Education Development Plan (BEDP) 2030, the purpose of the Department of Education is to improve the relevance and quality of Senior high school through stronger educational industry linkages and curriculum simplification (DepEd, 2022). As stated, the Strengthened SHS Program focuses on skills alignment, work immersion, and employability. The education reform is good, but the challenge is the implementation of these reforms in different schools; it should have a monitoring and evaluation framework for senior high school to ensure that the objectives are met.

Pilot Implementation of the Strengthened Senior High School Curriculum

The Department of Education sets the Strengthened Senior high school to make a clearer exit pathway (employment, college education, and entrepreneurship), decongest the present curriculum, and align with the industries and much higher education. EDCOM 2 (2025). It formally announces the pilot

implementation in Grade 11 for the SY 2025-2026, attaching the process for the selection of schools that will undergo the pilot implementation (DepEd, 2025a). In a much wider context of the reform that is aligned with the MATATAG thrust of K-12 upgrade and strong foundation of the competencies in the earlier grade level (DepEd, 2024a; DepEd, 2024b). In this article, the pilot implementation is designed to test the simpler curriculum and a clearer transition toward college education and employment, before it rolls out in the whole country.

According to DM 048, s. in 2025, incoming Grade 11 learners only for SY 2025-2026 will undergo the pilot implementation, and the process of the selected schools was done through nomination from each regional office through a joint memorandum, where there is a clearer mandate on the reporting and coordination of the system. (DepEd, 2025a). In relation to this, the Department released an interim assessment and grading guidelines for the pilot implementation to ensure that there is a standard procedure while testing the new educational design (DepEd, 2025c). It shows that there is a clear scope and sequence of the pilot implementation about standardization, assessment, and structured governance.

In the public hearing of EDCOM 2, it was suggested that the reduction be four tracks into two tracks (Academics and Technical Professionals), to be simpler and more aligned in the higher education and labor market (EDCOM 2, 2025). The Senate also expresses its support for reviewing the senior high school electives and general education subjects for continuing transition to college (SENATE/EDCOM, 2025). A much simpler complement on MATATAG to decongest to K-10 that started by phase last SY 2024-2025 (DepEd, 2024, 2024b). These macro-tracks and decongested core may give a much clearer competency and progression.

It is set in the DM 074, s. In 2025, a temporary grading and assessment framework for the pilot, including the alignment of learning competencies and reporting mechanics while collecting evidence on the effect of the curriculum, is also expected to deliver the regular learning progress data and implementation reports to pilot schools to decide on how to scale up the program (DepEd, 2025c). An earlier standardized assessment is the key to comparing the results before the national rollout. At this time, the department may give ample time to comprehensively check the data coming from the pilot schools. It is stipulated in the memorandum that the Central, Regional and Division offices must create a coaching, technical assistance and data systems for the pilot schools, parallel to the earlier MATATAG policy (DO 010, s. 2024) that defines the overall principles in the phase implementation, teacher support, and resource provisioning on the K-10 that can be used to as a model in the senior high school pilot (DepEd, 2024a). There is a critical aspect in the quality of the pilot delivery, such as teacher professional development, instructional coaching, and logistics (learning resources and scheduling), because of limited access. There is no concrete resources available, especially in the teaching resources.

Effective studies, such as quasi-experimental and longitudinal research on the learning gains and employability of the pilot cohort as compared to the non-pilot cohort, Implementation fidelity, such as measuring the dosage of professional development/ coaching, immersion hours/quality, and assessment alignment. Check on the outcomes based on the region, urban-rural, and track the accessibility in the immersion placements. These gaps are directly addressed in the interim monitoring and evaluation. (DepEd, 2025b, 2025c). To address these gaps, there should be an instructional focus, such as curriculum mapping on the existing teaching guides, and a common formative assessment. Teacher professional development, creating lesson studies that focus on the new strands. Use pilot cards (attendance, completion, assessment proficiency, and immersion quality for monthly review of the pilot implementation of the strengthened senior high school curriculum.

Pedagogy Strategy

Active learning is a short lecture combined with peer instruction, problem-solving, and small group work that is continuously seen as effective instead of pure lecture. It clearly shows in the recent update about meta-analysis on STEM that there is an increase in the performance and much lower failure rates in

those courses that use active learning (Ballen et al., 2025). It is helpful that there is a regular check for understanding, peer discussion, and problem-based tasks for the learner. (Ballen et al., 2025; Freeman et al., 2014). This strategy is very helpful, especially since competencies in every subject under the strengthened curriculum focus on the real-world application and reflection of the learner on the subject.

A wider scope in the meta-analytic and systematic evidence saying there is an improvement in terms of academic achievement, motivation, and higher-order thinking using Project-Based Learning, especially if it ties in a clear standard, rubrics, and public product (Zhang et al., 2023). Since the competencies in the strengthened curriculum are more focused on application in real-world scenarios, it is helpful to the teachers to use Project-Based Learning, where the learners can apply what they know through different projects and innovations. A guided inquiry and not a pure discovery has much stronger evidence to increase the conceptual understanding and research skills (Strat et al., 2024; Urdanivia Alarcon et al., 2023). The learning outcomes are much more effective when there is an inquiry-based approach, with scaffolding, such as questions with guides and tables, and formative feedback. In the recent systematic reviews, it was seen that Universal Design for Learning has the greatest impact for access, engagement, and learning outcomes if there is a clear alignment in the assessment and technology (Almeqdad et al., 2023; Bray & Dolan, 2024; Ewe, 2023). It means that the teacher can plan multiple means, such as action/expression, engagement, together with formative checks, for the delivery of the lesson since a strengthened curriculum is outcome-based learning.

In DO 010, s. 2024 (MATATAG) set the principles of decongest, standard alignment, and assessment integration that support the use of these strategies. Additionally, for the teachers and instructional leaders, this document is a primary guide in lesson planning, choosing the appropriate strategies, and class recording (DepEd, 2024 Division guidance, 2024). It is important that teachers know how to create a lesson plan and an assessment to measure if the learning has taken place.

Resource Challenge

According to the EDCOM 2 Year Two report, insufficient textbooks remain a challenge in Philippine Education, with 94% target, but still, in 35% deliverables are up to January 2025. It only indicates that there is a problem in terms of logistics and administration (EDCOM 2, 2025). This shows that there is a learning gap, especially in the new curriculum. This weakens instructional coherence and equity. That's why it needs to fast-track the procurement and last-mile delivery, especially to the schools in far-flung areas. As shown in the research and policy reviews, insufficient and wrong distribution of teachers, heavy workload, and mismatched subjects taught hinder the quality of teaching (Frianeza, 2024; rivera et al., 2025). That's why the Department of Education responds through flexible guidelines to align the insufficient resources and teacher concerns (DepEd, 2024b). Until now, there have been no teaching resources given to the teachers, which is why teachers always find ways to look for their references in teaching. It's hard to gather resources if there are no concrete teaching and learning materials used by the teachers. Training and workshops are limited; there is not enough time for the teacher to rely on watching educational videos, but realia, an actual demonstration of teaching on how to teach a certain subject, especially if the teacher is required to teach a subject that is not aligned with their specialization. A teacher factor is a resource challenge, with a curriculum reform that targeted professionals' development, workload rationalization, and deployment that must be addressed.

The Quality Basic Education Development Plan (QBEDP) 2025-2035 is urging the government to give teacher devices, Learning Materials, and reliable internet connectivity to leverage the ed tech (DepEd, 2025b). But still, there are schools in the region that do not have access to ICT, and digital resources are critical in remediation and assessment, yet the poor internet connectivity and device gaps hinder the school, especially in the far-flung areas.

For TVL/TechPro in the Senior high school, insufficient equipment, laboratory tools, and industry placement are always a challenge, which can affect the quality of practical application of the competencies

(Consortia Academia, 2025). In a wide coverage, there are a lot of senior high school teachers reporting resource-related challenges in the implementation of the curriculum. (RISE Journal, 2024). With this, if there is not enough equipment and partnerships, there is limited job-readiness in the TechPro Track and the applied learning in SHS.

In the worldview context, learning poverty becomes rampant while there is a challenge in public finances, especially in the post-pandemic period (World Bank, 2024b). In the Philippines, there is a resource mobilization, but the execution is slow in expenditures, procurement bottlenecks, and absorptive capacity (Reuters, 2024; CPBRD, 2024). The fund is not enough if there are unclear expenditures. It needs to have a reform in the procurement, project Management, and result-based allocation.

EDCOM 2 suggested that the reform in textbook logistics, teacher deployment, and infrastructure delivery must have working data systems (EDCOM 2, 2025a; EDCOM 2 portal, 2025b). The world Bank service delivery study (2025) suggested a resource flow from the Local Government Unit towards the school level needs based on the evidence. If the procurement, logistics, and materials input are fine, then there will be no more service delivery delays.

Overall, the resource challenges, such as classroom, textbooks/Learning materials, teachers, Professional Development, ICT /connectivity, TVL equipment, and budget execution, are interconnected with governance and logistics. If there is no clear monitoring and evaluation and data-driven allocation, then it would be hard for the school to deliver quality education under the new reform (EDCOM 2, 2025a/ World Bank 2025). The recent initiatives give the policy window to fix the supply chain resources; however, it needs to have a strict implementation and partnership between the LGU and the private sector.

Assessment Practice

Formative assessment that has learning interactions, success criteria, and quality feedback has increased academic performance and self-regulated learning in K-12 (Sortwell et al., 2024; Yao, 2024). In a whole, mostly in meta-analysis, formative assessment is most effective if the feedback is done and focuses on the next stage of learning (Sortwell et al., 2024; Yao, 2024). To be more effective in a classroom, short-cycle formative checks should be done (exit ticket, hinge questions and make sure that the feedback is actionable. It is important that the design of feedback (timeliness, specificity, feed-up feedback, feed-up forward). Guidance report of EEF features the feedback not only on the number of comments but also on the quality and connection of the objectives. The clear objectives and work samples help with its consistency (EEF, 2021/2024 updates). Much better than the teacher, tech-enabled feedback and moderation like peer/department calibration for a better standardization. A recent study shows that retrieval practice and spaced practice improve retention and the right design of the question, and not purely recall, helps transfer toward a much higher performance (Opitz et al., 2024; Corral et al., 2025) s defined in this article, In Senior high school, it is effective to use a formative engine, such as regular retrieval and spacing, for senior high school subjects.

Authentic assessments, such as performance tasks, capstone, and portfolios, help in the 21st-century skills and applications. However, it needs to have a clear rubric and process like a standard setting to maintain validity and reliability (Vlachopoulos, 2024). In this part, the teacher must use task blueprints, exemplar work, and moderation to lessons in the rater drift. It's good to have an authentic task in TVL/SHS and a project-based context if there are rubrics and calibration. Conducting reviews indicating a higher level of classroom assessment is dependent on constructing validity, reliability, and fairness. It needs to have a clear understanding and systematic reviews, design, and data gathering (Scrip.org). In this article, implement a departmental marking guide, blind/dual marking for fairness as represented in DO 010, s. 2024 (MATATAG) that classroom assessment is in line with the standards and continues its provision on DO 8, s. 2015 and DO 31, s. 2020. For the strengthened senior high school curriculum, the Department of Education released DM 074, s. in 2025, the interim guidelines on assessment and grading to standardize the reporting weights and alignment of the new subject offerings while in its pilot phase (DepEd, 20250.

The schools should map the classroom assessment on the MATATAG standards and follow the interim grading for the pilot senior high school to ensure the data is comparable. At an international level, it uses a bigger assessment like PISA to benchmark the system performance and competency profile. If this were done, there would be a clearer direction for remediation and curriculum improvement.

The most important evidence for formative assessment is that it provides high-quality feedback, and authentic tasks have strong rubric and moderation. In the Philippines, it gives a clear guide on the different memorandum that talks about classroom assessment to understand the grading system in the senior high school pilot. The next step would be discipline in monitoring and evaluation, like item analysis, and the use of data for instructional coaching.

Teachers' Readiness in the Pilot Implementation

The readiness of the teacher is rooted in the subject matter expertise and TPACK (integration of pedagogy and technology). In the Philippines, the DO 010s. 2024 (MATATAG) that the teacher should align themselves in lesson planning and classroom assessment with the standards and competency progression. In the local study, it is seen that Preparedness is an advantage if there is a clear curriculum guide and a teacher's development program, like inclusive education and a flipped classroom (Lorenzo, 2024, IEOER-IMRJ, 2024). In this study, curriculum alignment and targeted professional development are the foundations of classroom readiness. There is an increase in readiness if there is a clear standard and model lesson exemplar.

In the inclusive classroom, it attributes the Preparedness in differentiation, behavior support, and collaboration for SPED coordinators. There is a study from 2023-2024 in the Philippines (Iloilo and other divisions), reportedly moderate to high with regard to readiness, but there is an empty space in the materials (IEOER-IMRJ, 2024; Teacher Readiness & Challenges in Inclusive Classroom, 2024). There is a readiness gap; teachers are ready in terms of disposition and basic knowledge, but it needs to be systematic school-level support, such as e.g., class size, materials, and coaching) for a true inclusive practice. From the 2024-2025 study, digital readiness or ability to use learning Management systems, video AI/automated feedback, etc., had a strong connection in 21st-century instruction and motivation of teachers (AJL2C, 2025). Study from the region showing a positive level of readiness, but it is not equal; it depends on access, age, and experience, such as flipped classroom readiness (Lorenzo, 2024). There is evidence from the region (Hong Kong) in 2025 that supports blended teaching readiness is a multidimensional (skills, beliefs, and supports) that needs to be seen (Deng, 2025). I have ed-tech access plans on this topic. Digital readiness should be high but heterogeneous, which needs to be tiered for its quality.

According to DO 010, s. 2024 classroom assessment should align with the standards and DM 074, s. 2025 for the SHS pilot interim for the grading system in order to be comparable, and this readiness inside the classroom should require data literacy (formative checks, item analysis to align with classroom teaching. In EDCOM 2 (2025), it presents related policy notes that overload administrative tasks interrupt the time on teaching inside the classroom and the teacher's Preparedness. It needs to have a workload reform and organize the non-teaching tasks to strengthen the instructional focus. Teachers' readiness is not only about skills but also depends on the time and condition; the less the paperwork, the more time for preparation for the lesson, and eventually benefits the quality of teaching (EDCOM 2, 2025).

Another factor is the class suspension because of heat, limitation on the connectivity affect the delivery of instruction because even teachers suffer heat stress that hinders the concentration and readiness to teach (Reuter, 2024). In the report of digitalization challenges, it is seen that it is not equal in the infrastructure and devices; there should be a contingency pedagogy (heat adaptive, schedules, offline-capable learning materials, and local connectivity plans to maintain the teacher's readiness in front of environmental and infra shocks.

The quantitative study mostly uses a wider survey and statistical analysis to measure the readiness of the teachers, perceptions on the challenges and effect of intervention inside the curriculum reform. This

investigation is mostly included in the variable like self-efficacy, job satisfaction, feeling of support and ability to adapt the pedagogical to ensure the connection for the implementation of the curriculum and participation of the teachers (Lubis, 2023). Sometimes it uses a natural study of the psychometric scale to analyze the feelings and perceptions of the teachers in a new curriculum and the competition that they feel in implementing the skills on reform and broader participation in the professional development (Ghamoushi et al., 2022). For example, the descriptive quantitative study particularly presents a foundation to understand the current educational concept, that gives the foundation understanding such as health benefits, limited resources that important to identify the systematic weaknesses on the evaluation and implementation of the curriculum (Bravo et al., 2025).

Aside from that, This study may identify correlations between the understanding of the teachers on the reform in the curriculum and their self-efficacy while implementing, which gives insight on how its affect the perception in successful integration.(Nikoceviq-Kurti et al.,2025).as well as the quantitative research always investigate the level of curriculum literacy of the educator, which mostly use in the scale-development studies to measure the perception, skills and ability that have connection in the curriculum.(Cogmen&Ozelci,2024). There are a lot of studies that uses quantitative design that measure the level of curriculum literacy, wherein the curriculum scale are mostly used in the studies (Cogmen &Ozelci, 2024). These quantitative strategies may ease for analyzation in the result of the reform, such as attained learning of the students and the total effect of the strategies in implementation. For example, different study presents the perception of the teacher in the reform of the curriculum which are significant in their self -efficacy, wherein the understanding and collaboration are the primary factors to predict this. (Nikoceviq-Kurti et al.,2025). The quantitative design also used in meta-analysist to combine the gathered data from different study, indeed offer a comprehensive statistical collective effect of the reform in education in different aspect such as student performance and its effect to the teacher (Adeniyi et al.,2024).

Review of Qualitative Studies on the Topic

Qualitative research frequently dives into the detailed experience and perception of the educator regarding curriculum reform. Mostly, it uses semi-structured interviews, focus groups, and observation inside the classroom to gather rich and descriptive data (Yulin & Danso, 2025). This strategy gives way for the researcher to find the root of the perception of the teachers, pedagogical skills, and challenges they face in implementing the curriculum (Demate et al.,2025), which gives an in-depth contextual understanding of progress inside the classroom (Christensen, 2024). For example, many qualitative studies have already delved into the views of the teachers on the changes of the curriculum, investigating the perception of challenges in implementation and possible solutions (Unsal et al., 2019). That investigation mostly shows complicated connections, a structured and contextualized organization, and the teacher's pedagogical belief that serves as an intermediary and implementation of the policy(Drenoyianni & Bekos, 2023). It is often emphasized in the study on how the systematic factors, such as the availability of resources, support from the administration, and opportunity for professional development, have a deeper connection with the capacity and willingness of the teacher to use the new curriculum (Demate et al., 2025). Aside from this, qualitative research is important to identify a particular need and concerning each discipline that may be overlooked by a wider quantitative assessment, which can be seen in teachers' requests that can be needed in teaching and learning resources (Mekheimer, 2025). This study is commonly used in different research designs that noticeably favor qualitative approaches to investigate the challenges that teachers may face during training, implementation, and to assess the competency of the teachers (Ramli et al., 2024). This strategy allowed for a much deeper, complicated analysis and was dependent on the phenomenal context, especially when investigating personal matters and practical challenges inside the educational environment (Niu & Niranjana, 2025). For Example, the qualitative questions are crucial for exposure and strengthening the perspective of the teachers on the new context of education that is introduced through curriculum reform, such as life skills (Johannesen et al., 2024). Through this natural methodology, researchers are

getting a comprehensive understanding of the lived experiences of the teachers, which identifies particularly the obstacles in effective implementation, such as not enough training and limited resources (Buabeng & Amo-Darko, 2025; Danial et al., 2024; Hambabi et al., 2024).

There are also investigation that uses qualitative methodology, such as descriptive phenomenology, a particular one that aims to clarify the lived experiences of teachers who face the new mandate of the curriculum, analyze their emotional response, adaptation strategies, and specific challenges in the implementation of the curriculum (Markham, 2025). This study often shows that despite the challenges, teachers are trying hard to implement the learning according to the competencies that stress a critical need for synergistic support coming from different stakeholders to ensure the successful implementation (Limiansi et al., 2023). It consistently featured in different studies that the implementation of the curriculum is facing a significant obstacle because of the limited resources and personal and professional competencies of the teachers. Studies have shown insufficient training and professional growth, including the absence of administrative support and limited resources, as repeated issues that affect teachers' ability to integrate the new curriculum (Malinao & Miano, 2025). These qualitative Insights strengthened the need for the target interventions that respond to both systematic and individual factors that serve as barriers to a successful curriculum reform (Addai-Mununkum & Setordzi, 2023). Aside from this, it indicates the perception of the teachers that support and convenience are important in the first stage of implementation of the curriculum, which has a direct impact on the successful pedagogical transition (Law, 2024). The qualitative details and analysis give an important insight into the complicated aspect of the curriculum reform; it stresses the importance of understanding personal experience to establish and maintain the changes in education. For example, this qualitative phenomenological study, particularly on the lived experience of the teachers who implement the new curriculum, features their role as conductors of holistic and inclusive learning, despite the challenges such as limited teaching resources and time (Fuentes, 2025). Additionally, this qualitative assessment features the critical needs for strengthening programs for professional development and enhanced allocation of resources to relieve the systematic obstacles and strengthen the educational sector, which has the greatest role in changing the curriculum (Bacus & Alda, 2022; Baloyi et al., 2023; Buabeng & Amo-Darko, 2025; Malinao & Miano, 2025). Moreover, as revealed by Tran & Lee (2025). Qualitative research in curriculum reform analyzed the perception of the teachers in autonomy and challenges in implementing what they faced, which was mostly seen as a vague guide, additional workload, and limited support that weakens the empowerment despite the objectives of the policy.

Review of Mixed Methods Research on a Similar Problem

The research that uses a mixed methods design gives a strong strategy in the study of implementing the curriculum through a combination of quantitative and qualitative data, which gives a much more comprehensive understanding of its inherent complexity. (Christensen, 2024). This methodology is important in exploring the connection between the readiness of the teachers, administrative support, and results of the learners within the context of a bigger reform in education (Demir, 2024; Ntumi et al., 2023). Through this integration of numerical assessment of the training of teachers and deeper observation and interview regarding the challenge pedagogy, the mixed methods study gives a clearer picture of the differences between the experience and actual effect of the changes in the curriculum, as well as the critical factors that affect the success of integration (Demir, 2024; Hambabi et al., 2024). The two strategies give way to the researchers to triangulate the discovery, thus increasing the validity and reliability of the conclusions about the different aspects of the challenge and advocacy of the adopted curriculum. Aside from that, the mixed methods design is effective in getting the details right in implementing the curriculum through displaying how quantitative measures of following the policy are aligned or deviating from the qualitative experience of the educator and students (Motsi & Makgato-Khunou, 2024). This study can measure the effectiveness of the pedagogical strategy in implementing the curriculum, which is important for the statistical connection and details of the lived experience of the teachers (Baluyos et al., 2020). This

integration gives way to a holistic perspective that goes beyond the simple statistical correlation to examine the root cause of the observed trends and differences in the readiness of the teacher and curriculum delivery (Aslam et al., 2024). The natural investigation mostly bridges between the expected policy and the real happening inside the classroom, which gives a practical insight for the curriculum implementer and the head of the Department of Education, who aims to optimize the initiatives in the curriculum reform (Pak et al., 2020).

The natural skills that fit the mixed methods allow researchers to address complex questions coming from different perspectives, though the design can be an obstacle to the effective implementation of the curriculum (Pregoner, 2025). However, the comprehensive nature of mixed methods strategies, such as convergent parallel or explanatory sequential design, offers a complete understanding of the obstacle and true challenge in implementing that is not fully met by the quantitative and qualitative methods only (Taylor et al., 2025). In a concurrent mixed-methods design, the researcher should use the strengths of both quantitative descriptive- comparative research and qualitative insights to present a wider understanding of the process of changes in the curriculum in the education of teachers. A comprehensive strategy gives way to a much deeper exploration of the analyzed phenomenon, which resulted in a holistic understanding and a strong conclusion through simultaneously collecting and analyzing the data (Haile & Mckonnen, 2024).

In fact, the complementarity of this method is crucial to acquiring a rich and deeper understanding of different aspects of factors that affect the adoption of teachers in the new framework of the curriculum. Integration is very useful to the researcher in social science, wherein the obstacle of characteristics and connections of people is needed to have a multifaceted strategy that understands the social phenomena. Much of the research on mixed methods is known for the use of wicked problems in education, creating a new theory and promoting skills in research that are sensitive to culture (McChesney, 2021). It is because of the combination of qualitative and quantitative methods that can give a much more comprehensive explanation and rich understanding of the problem in research, rather than achieving any strategy alone (Afshar & Hafez, 2021).

The comprehensive strategy allows for triangulation of data, which strengthens the results and reliability of the research discovered. In particular, the design of research in mixed-method research can be filled with the nature of limitation only for quantitative or qualitative strategies; indeed, it widens the factor and depth of the study (Peter & Fabregues, 2023). This combination also allowed for a complementary approach, wherein the results of the methodology explained and clarified what has been discovered, resulting in a more nuanced interpretation of the challenges and successes of the strengthened curriculum of Senior High School (Grande et al., 2023). It gives the researcher the ability to address questions that are not fully discussed using one method; indeed, it gives a much more significant solution to the different obstacles in the issue of education (Montoya et al., 2025).

Aside from this, the encounter on the discovery from different data, such as responses in the survey and data coming from interviews, can be affirmed in total evidence for the conclusion of the study, confirming the insight and offering a stronger understanding from the perspective of a teacher. (Ampofo et al., 2020). A multi-pronged strategy is effective in the assessment of implementation of the policy, identifying the obstacles and suggesting a target intervention in the educational reform (Arban et al., 2024). Through giving a depth and breadth of strategies, research in mixed methods offers a strong interpretation of the obstacles in social phenomena that allows expression in different views and a more complete understanding of the issue under research (Oranga, 2025; Versfield et al., 2022).

A comprehensive strategy allows the researcher to analyze the "why" behind the observed phenomena, which offers a much deeper power in explaining through combining numerical patterns in the contextualized experiences of the people (Rana & Chimoriya, 2025). The nuanced understanding from the mixed methods is particularly important in education, wherein the complicated interaction between the policy, pedagogy, and factors of the people often complicates a simple analysis (McChesney, 2021). The combined methodology improves the ability to easily understand the findings because it gives a strong

framework for matching the potential differences or seeming contradictions of the results from different strands of data, which in the end creates a complete and believable understanding for a wider audience (Kaifez et al., 2021; Musandu et al., 2023).

Such a strategy is effective in bridging the descriptive statistics and the lived experience of the educator; indeed, it builds a rich insight into the challenges and opportunities within the educational reform. (Chandrakumar & Vivek, 2023; Oranga et al., 2025). The holistic perspective is important for the development of interventions and policies that are aligned based on evidence, both effective in context and connected, that go beyond the superficial analysis to address the root cause of the systematic challenge in implementing the curriculum (Sharma et al., 2023).

Research Gap and Justification

Despite the benefits of mixed methods in research in education and the increase in popularity (Gerius et al., 2025), there is still a wide gap in the study that combines the perception of both respondents inside the mixed methods framework to explore the complexity of educational phenomena like reform in curriculum (Minadzi et al., 2022). There is a lack of research equipment to triangulate the data from different stakeholders, such as teachers, administration, and students, to comprehensively analyze the different aspects of the effect of a strengthened curriculum. This deficiency is acknowledged when it comes to the systematic challenge and readiness of the teachers in running the natural pedagogical transition, which mostly has a bigger change in the organization and instruction (Diaz, 2024). Much more of it describes a lot of studies, the challenges in a descriptive way, and less on the part of giving a strong framework, evaluation, and correlation in the different systems. Especially regarding the international perspective in the emerging trend in research of the teachers' educational contexts (Colebra & Luna, 2025) 2025. Aside from this, there are studies that fail to discuss the paradigmatic stance based on their mixed-methods approach. This is critical for understanding the interpretative lens that was transferred in the combined data (O Sullivan et al., 2024). This deficiency is mostly limited to the transferability and generalizability of the discoveries because of the philosophical basis that has a deeper influence on the design of research, interpretation of data, and subsequent theoretical contributions (Bacus & Alda, 2022). As a result of this, there is a clearer need for research that not only combines the different perspectives but also provides a clearer explanation of the theoretical framework that guides the integration of quantitative and qualitative data to give a better understanding and effective analysis in the initiative of the curriculum reform (Pregoner, 2025).

This kind of research is not just about academic work; it's a primary effort to unify the individual perception of new methodology in teaching. Indeed, it contributes to the new insights in psychological education and strategy instruction (Jamiko et al., 2023). The creation of mixed methods in the study, especially showing a strategy in integration, is crucial to overcome the present limitations and to improve the application in understanding the transformation in education (Zhou et al., 2023). The critical gap shows them the need for the study not only to use a strong mixed method design, but it also follows the systematic guide for integration and creation of meta-inference, which has not been much improved in the present research in education (Bagnall et al., 2024). This methodological rigor is important to meet the epistemological transfer toward a holistic approach and sensitive research context, which goes beyond pure experimental design, which may not fully address the obstacle aspects of modern environmental education (Minnaert, 2023). Therefore, priority should be given in the next research on the study that has a clear detail of their mixed methods designs, including the reasons for integration and particular analytical strategies that are used to combine quantitative and qualitative data (Costa, 2024). Aside from that, the use of methodological study instead of paradigm is helpful to meet the visible division between the methodologies that will lead to a better understanding of the complications in the phenomenal education (Johnson et al., 2022). In addition, the needs in conducting the research are rooted in three critical pillars: 1. Learning crisis and systematic alignment, in the recent international assessment and national evaluation, have proven the

deepening learning crisis in the Philippines, characterized by an allowed level of proficiency and a high level of competence (OECD,2023). Determined by the Second Congressional Commission on Education (EDCOM II), the systematic misalignment is one of the main reasons for the crisis, wherein the intended curriculum does not match the actual teaching inside the classroom (EDCOM II,2024). While the Department of Education started the pilot phase of a strengthened senior high school curriculum, there is an urgent need for empirical data to determine if the new framework effectively reduces the dense content of the curriculum or only adds to the existing burden in implementation. This study is reasonable because it provides a critical evaluation of the first wave of reform, which has a solid structure to reverse the learning poverty (World Bank, 2024), 2.) As stated by Nilsen & Birken (2024), bridging the gap between readiness and implementation, the educational reform often fails not because of the wrong decision but because of the lack of application of implementation science at the classroom level. While emphasizing the Matatag Agenda, a meaningful and responsive curriculum is the success of the pedagogical change that depends entirely on the teachers who serve as orchestrators of learning instead of interviewers only (Department of Education, 2023; Schleicher, 2022). Through this investigation, particularly on the pedagogical, technological, and psychological readiness of the pilot teachers, as determined by the study, the specific areas where professional development is lacking are identified. Without this study, the national implementation of curriculum is at risk of repeating the gaps in implementation that were observed in the past reform in K-12 (Fullan & Quinn, 2023), 3.) Strategic alignment in national and international mandates, this study is timely, novel, and significant because it matches the primary goal of Ambisyon Natin 2040, which aims to produce Filipino workers with global competitiveness and resilience (NEDA, 2023). Aside from this, as the world approaches the 2030 deadline for Sustainable Development Goals, the Philippines should produce concrete progress on SDG 4 (Quality Education) (United Nations, 2023). Justified by the study, the investment in the pilot program is based on a strategic implementation model or teacher support framework based on data. This framework will serve as a basis to create policy to ensure that the strengthened senior high school curriculum will result in real Socioeconomic progress for the graduates, instead of remaining only as theoretical policy change.

METHODS

Research Design: Explanatory Sequential Mixed Methods Designs

The study uses explanatory sequential mixed methods to examine the readiness of science teachers and the systemic challenges experienced in the pilot implementation of the strengthened senior high school curriculum in the Philippines. The design is suitable if the objectives of the researcher are to identify the pattern and result from the quantitative data, and afterward use qualitative evidence to explain, deepen the understanding, and provide context for the identified results. Through this, it gives the researcher a wider understanding not only of the readiness of the teachers but also the Extent of the challenges in implementation and the experiences required by the curriculum. Explanatory sequential has two primary phases: first, the collection and analysis of data, and second, the gathering and analysis of qualitative data. The results in the first phase serve as the basis for the development and implementation of the second phase. After that, the results on the quantitative and qualitative data are combined to come up with a general integration. The design permitted the researcher to identify the pattern and come up with a better understanding of the factors. This is particularly useful when the quantitative results are insufficient, and the complexity of challenges in education is high. (Creswell & Baez, 2021). The design is suitable because the pedagogical transition needs a statistical measure of the readiness and a deeper narrative on the challenges in the pilot schools (Ozer, 2021). This merging of data will be processed in the interpretation phase to see the unity and difference of the results. (Sunderji & Waddell, 2021).

It also employed a descriptive-correlational approach for quantitative components, as it sought to determine the level of readiness of teachers and systemic challenges in pilot implementation of the strengthened senior high school curriculum, and the relationship of its variables, as the qualitative approach

was used to explore the lived experience of the teachers in pilot implementation of the curriculum. The design is important in the Philippine context because the implementation of the curriculum depends on the ability and skills of the teachers and the organizational conditions that support the classroom activities. Through the sequential process of quantitative and qualitative investigation, it identifies the field that needs attention and the factors that explain the continuity of the curriculum. The identified factors will serve as a basis for planning at the school level, developing professional development, and decision-making regarding the strategies and resources in teaching.

Overall, the explanatory sequential mixed methods research design gives a systematic method to measure the teachers' readiness and systemic challenges, then explain the results through their experiences. It requires the use of a clearer sequential gathering of data, appropriate participants, and instruments that can help in identifying the results and ethical standards, and orderly integration of the two data sets. When carried out according to its principle, the design helps develop a contextual interpretation of the implemented curriculum and gives an empirical basis framework.

Research Local and Context

The study uses explanatory sequential mixed methods to examine the readiness of science teachers and the systemic challenges experiences in the pilot implementation of the strengthened senior high school curriculum in the Philippines. The design is suitable to if the objectives of the researcher to identify the pattern and result from the quantitative data and afterwards use qualitative evidence to explain, deepen the understanding and context on the identified results. Through this, it gives the researcher a wider understanding not only of the readiness of the teachers but also the extent of the challenges in implementation and the experiences required by the curriculum. Explanatory sequential has two primary phase first, the collection and analysis of data and the second is the gathering and analyzing of qualitative data. The results in the first phase serve as the basis for development and implementation of the second phase. After that the results on the quantitative and qualitative data are combined to come up with general integration. The design permitted the researcher to identify the pattern and come up with a better understanding of the factors. This is particularly useful when the quantitative results are insufficient and the complex of challenges in education. (Creswell & Baez, 2021). The design is suitable because the pedagogical transition needs a statistical measure on the readiness and deeper narrative on the challenges in the pilot schools (Ozer, 2021). This merging in data will be processed in interpretation phase to see the unity and difference of the results. (Sunderji & Waddell, 2021).

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Phase 1: Quantitative Strand

Research Design

The study employs a descriptive-correlational design to determine the level of readiness of science teachers and systemic challenges to the experiences of the pilot implementers of the strengthened senior high curriculum in selected public schools in the Region of Rizal. The study aimed to propose a teacher support framework or strategic implementation framework to achieve a successful implementation of the curriculum. The design features of the quantitative approach using a survey questionnaire and examining the relationship between teachers' readiness and systemic challenges. Also, its purpose is to measure the level of readiness in dimensions of pedagogy, curriculum knowledge, and assessment practices, and the systemic challenges in terms of Instructional materials, laboratory facilities, and equipment, and professional development. It uses a Likert-scale survey questionnaire to collect measurable data regarding the level of readiness of the teachers and systemic challenges. These data will be analyzed using statistical methods such as Cronbach's alpha for reliability test, weighted mean, standard deviation, and inferential statistics, depending on the learning problem Caspe & Sarrosa, 2025). The discussion of the findings, the results coming from the two aspects, is to integrate or compare. The triangulation will serve as validation: If the quantitative data shows a high readiness, while the qualitative data reveals disappointment. The study will identify social desirability bias or lack of support structure (Harris & Jones, 2022).

This is the most important part of the research design because this is where a deeper interpretation is formed of the pedagogical transition and the basis for the Teacher Support Framework, which is the expected output of the study (Aquino, 2024). By combining these two methods, the study provides a 360-degree evaluation of the pilot implementation of the curriculum, and by directly comparing and linking statistical results and emerging themes.

Variables and Operational Definitions

Teacher Readiness. Operationally, it measures through curriculum knowledge, assessment skills, and digital readiness (Balansag et al., 2024). **Systemic Challenges:** It refers to the facility deficiencies, limited time in planning and training skills for the new core subjects, such as General Science, Life and Career Skills (DepEd, 2025; Lopez & Garcia, 2023). In the study, readiness will be measured using the Likert-scale survey questionnaire that is divided into three dimensions:

Pedagogical competencies- the ability to select and use appropriate teaching strategies that the teacher may use in the classroom.

Curriculum knowledge- level of knowledge in the goal, content, and standards in the senior high school curriculum.

Assessment practices- ability to develop and use diagnostic, formative, and summative assessments.

Systemic Challenges. It defines the challenges of administrative, professional development, teaching resources, and laboratory equipment that affect the effective implementation of the curriculum. In this study, the systemic challenges will be measured based on the perception of the teachers regarding the following factors: Lack of resources that may affect teaching in the classroom. Administrative support and professional development. These are also measured with the use of a 5-point Likert scale, where a higher score means a higher level of challenge (Barcelona & Cacharo, 2025). **Implementation level of Senior High School Curriculum.** It identifies the level of success in implementing the strengthened senior high school curriculum in pedagogical transition and response to the national mandate. In this study, it will be measured based on the following indicators: Effective lesson delivery, alignment of instruction in the curriculum standards, level of adaptation of the new curriculum, and perceived effectiveness of the curriculum.

Population and Sampling Procedures

This section presents the population of the research study and the method of sampling acquisition. It uses an explanatory sequential mixed-methods research design to collect and analyze the quantitative data, followed by qualitative data, for a much deeper understanding of the readiness and challenges of the teachers in the pilot implementation of the strengthened senior high school curriculum. The population comprised 30 eligible Grade 12 science teachers: 7 – Mayamot National High School, 7 – Antipolo City Senior High School, 5 – Cainta Senior High School, 3 – Angono National High School, 6 – Rizal National Science & Technology High School, and 2 - Tanay Integrated National High School. All those who were invited and given a consent form agreed to undergo the study. The pilot implementer of the strengthened curriculum according to the new memorandum of the Department of Education Memorandum No. 12, s. in 2026, of the six schools selected from Region IV-A CALABARZON out of 891 schools all over the Philippines, the schools were selected based on their readiness, including having sufficient teaching staff, available learning resources, and strong stakeholder support (Joint Memorandum OM-OSEC-OUOPS-2025-01-03469 by the Department of Education).

For the quantitative group, a sample participant as total enumeration of science teachers teaching science in pilot schools was utilized to ensure equal representation from each school, and pilot implementation requires a limited number of teachers and school participants, as these maximize the number of participants, cater to eligible grade 12 science teacher for the pilot implementation and this provide the study a broader range of situations across participating schools. The sampling method considers that the target participants met the criteria set, the availability, vicinity, and accessibility at a given time to partake.

Instrumentation (Validity and Reliability)

To obtain valid data, research instruments must be identified to further validate the study. In quantitative tools, for validity, it uses a content validity index (CVI) coming from the experts to ensure the alignment of the new learning competencies (Alvarado, 2023). The 3 experts chosen to validate the questionnaire are experts in curriculum and pedagogical fields. For reliability, we will ensure that Cronbach's Alpha is utilized to ensure the internal consistency of the item (DeVellis & Thorpe, 2021). The results showed Teachers Readiness and Systemic Challenges have 0.86 and 0.752, respectively, interpreted as Good and Adequate. The main instrument in gathering and collecting data was research-made survey questionnaires because they measure the readiness of the teachers in terms of pedagogy, knowledge on the curriculum and assessment, and the systemic challenges in the implementation of the curriculum in terms of instructional resources, laboratory facilities and apparatus, support needs in coaching and mentoring, professional development, and capacity building for teachers. A 4-point Likert scale will be utilized to eliminate neutral bias. In scoring and interpreting the result of the survey, range intervals were specified and follow:

Teachers' Readiness

Scale		Agreement label	Readiness Equivalent
4	3.26-4.00	Strongly Agree	Very High Readiness
3	2.51-3.25	Agree	High Readiness
2	1.76-2.50	Disagree	Low Readiness
1	1.00-1.75	Strongly Disagree	Very Low Readiness

Systemic Challenges

Scale		Verbal Interpretation
4	3.26-4.00	Very Great Extent
3	2.51-3.25	Great Extent
2	1.76-2.50	Low Extent
1	1.00-1.75	Very Low Extent

For content validity of the questionnaire, the researcher first submitted the letter to the pool of expert panels as a validator and began the preliminary evaluation, rating the item's relevance, assessing clarity, and responsiveness. A revision of the items based on the result of the content validity index, if needed. A validation of the survey questionnaire was conducted by an Educational Program Specialist in Science, a Supervising Educational Program Specialist of the Department of Education, a researcher, and a professor from the University of Perpetual. The overall CVI (Content Validity Index) for Teachers' Readiness and Systemic Challenges is 0.91 and 0.96, respectively, which indicates Excellent/ Highly Valid for both parts of the questionnaire.

The revision of the survey questionnaire was made in accordance with suggestions and recommendations. After the validation and revision of the instrument, pilot testing was administered to 10 science teachers in the same division, but not in the main sample, to assess the items' clarity and readability. In item analysis, it uses Cronbach's alpha and item-total correlations. The survey was administered through a paper-and-pencil or a secure online google form, which was estimated to take around 10-12 minutes. For quality, it included time monitoring. Languages can be used in Filipino and English. For qualitative instruments, the sets of interview questionnaires validated by the same expert validator, revised questions were obtained before the administration of the interview, either face-to-face or online. Consent was obtained first before administering the survey and interview.

Data Gathering Procedure

The researcher first submitted the endorsement for the conduct of the study of the approved research to the Schools Division Research Coordinator, addressed to the School Division Superintendent of Antipolo City, and the Division of Rizal. The request letter highlights the purpose of the study and the number of participants needed. After receiving approved endorsement approval via email, a letter was submitted to the School Head of Selected Pilot Schools in the Division of Antipolo City and Rizal Province. The school head refers to the subject group head or senior high school coordinator for endorsement to the target respondents. For quantitative data gathering, the researcher's approved survey questionnaire instrument from the expert validators was administered through a google form and a pen and paper subject for monitoring. Data gathering was concurrently conducted after the approval of the request. The first template observed ethical standards, letting participants understand the research rationale and requesting their agreement to participate. A consent form was provided to inform participants of their rights and privacy. Results collected were tabulated and submitted for statistical analysis with the guidance of the statistician. Data was gathered through technology-assisted techniques, such as a Google form. Research title and questions were stated clearly; a semi-structured interview was conducted for the convenience of the participants to give them time to think about the study. For the implementation of simultaneously distributing online surveys and face-to-face or virtual interviews in the first quarter of the implementation. It will also use a member-checking to confirm the correctness of the qualitative data (Estrellado, 2023).

Statistical Treatment of Data

Quantitative: the quantitative data gathered through survey questionnaires, collected and cleaned, and analyzed using statistical software. It uses descriptive statistics such as mean and standard deviation for the level of readiness and systemic challenges encountered during the pilot implementation of the curriculum. The Pearson product-moment correlation was used to determine the significant relationship between teachers' readiness and systemic challenges. Mixed-Methods: Development of a Joint Display to show the integration of statistics and experience of the teachers (Fetters & Molina-Azorin, 2021).

Phase 2: Qualitative Strand

Research Design/Tradition

For qualitative design, a semi-structured interview and focus group discussion (FGD) are employed to determine the systematic challenges and lived experiences of the teachers in the pilot implementation of the curriculum. This provided an in-depth description of experiences that the survey cannot fully measure, such as administrative support, lack of resources, and professional development (EDCOM II, 2024). It uses Thematic Analysis to identify the emerging theme coming from the field-based insights and challenges in the implementation (Braun & Clarke, 2022). where emerging patterns and themes will be identified by the participants. After separate examinations, the two sets of data will be combined in the interpretation stage to determine the congruence, difference, and relationship between numerical results and the narrative experience of the teachers. This qualitative part of the study uses Interpretative Phenomenological Analysis (IPA). This tradition was chosen to explore more deeply how teachers interpreted their experiences in the middle of the pedagogical transitions (Smith & Fielden, 2024). IPA stresses the lived experiences of the participants, which are important in identifying the systematic challenges that were not captured in numerical data (Miller et al., 2023).

Participant Selection

The researcher used criterion purposive sampling as the participants had direct experience in the pilot implementation of the curriculum. The participant's selection comes from schools that piloted the curriculum in the Division of Rizal and Antipolo, based on the memo issued by the department of Education. These are Grade 12 science teachers who are currently employed in a piloted school and handled science in Grade 12, or science teachers who had a teaching load in both grade 11 and Grade 12 science subjects and are direct implementers of the subject. According to Moser and Korstjens (2023), this strategy is fine in choosing the participants who have direct experience in this phenomenon study. The criteria are: 1. Teachers are permanent in the pilot school, 2. He/she taught core or specialized subjects in the strengthened shs curriculum. Saturation: The identification of the last participants is guided by data saturation, wherein the gathering of information will stop if no themes or perceptions appear from the interviews (Hennick & Kaiser, 2022). Meanwhile, for the qualitative group, respondents were composed of science teachers who are directly involved in the study. Semi-structured Interviews and Focus Group Discussion (FGDs). The same informed consent was also administered before the interview started. The result of the survey was not disclosed during the interview.

Data Generation Techniques

In a qualitative part of the study, the researcher uses different kinds of methodology to gather data to have an in-depth and comprehensive understanding of science teachers in the readiness and systemic challenges in the pilot implementation of the strengthened senior high school curriculum.

To create rich data, the following methods will be used:

Semi-Structured Interviews: They will be carried out to strike a balance between guiding the discussion and freedom for the participants to express their thoughts (DeJonckee & Vaughn, 2023).

Reflexive Journaling: The researcher will record the observations and personal reactions after the interview to maintain the reflexivity and reduce bias (Olmos-Vega et al., 2022). This gives the researcher the opportunity to gather individual or group responses regarding their perceptions of the readiness and systemic challenges in the pilot implementation of the curriculum. The semi-structured interview was conducted with eligible Grade 12 science teachers who are the pilot implementers of the strengthened curriculum. This delves into the teachers' understanding of pedagogical readiness, curriculum knowledge, and assessment practices. Laboratory Preparedness, instructional materials used, and teacher training and development. The interview may last up to 45 minutes, depending on the flow of the interview for 30 teachers who are also in the same group in the quantitative strand. Focus group discussions (FGD) are applied to share common experiences, knowledge, and recommendations. This may include 6-8 teachers and last for about 60-90 minutes. Informed consents for the interview were obtained in face-to-face or audio recording and transcribed verbatim. Journals and notes were maintained throughout the process. Qualitative data is collected in the same way as quantitative data, but it is analyzed independently, and the identified results are merged.

Data Analysis Procedure

The data analysis procedure conducted in the study was conducted in three phases: the quantitative data analysis, qualitative analysis, and integration of the results of the study.

Thematic Analysis. This was utilized to have an in-depth analysis of the qualitative findings, which complement the quantitative results regarding teachers' readiness and challenges, and support needs in the pilot implementation of a strengthened senior high school curriculum. A thematic analysis can be done in many ways. The best tool or method for this process is determined based on the Data, context, and constraints of the data-analysis phase and the researcher's personal style of work. (Rosala, 2022).

The qualitative data will be checked using Reflexive Thematic Analysis of Braun and Clarke (2022). This process will go through six stages:

1. Familiarization: Repeatedly read the transcript of interviews.
2. Coding: Application of labels to those important parts of data using computer-assisted data.
3. Generating Initial Theme: Integration of codes to build a preliminary theme.
4. Reviewing Themes: Assurance that the theme matches the whole data set.
5. Defining and Naming Themes: Explaining the essence of each created theme.
6. Reporting: Weaving of narratives and direct quotations coming from the teachers to support the argument of the research.

The following analysis techniques were utilized to ensure the reliability and accuracy of the results and interpretation of the data. The study employs descriptive-correlational analysis using statistical software.

Mean. This was used to determine the overall level of teachers' readiness and challenges. in the Strengthened Senior High School implementation among pilot schools in the Region of Rizal and Antipolo that were selected by the Department of Education.

Standard deviation. used to feature the extent to which participants' answer vary around the mean.

Cronbach Alpha. This determined the consistency and reliability of the teacher-made survey questionnaire. This statistical treatment is applicable because it uses a Likert scale point. It also verifies whether the survey items within each domain, such as readiness, challenges, and support needs. Reliability testing ensures that the survey items designed to measure a specific construct consistently reflect the same underlying concept when administered to different groups of respondents (Pallants, 2020). It ensures that the items are met in each domain.

Pearson's r correlation is to quantify the strength and direction of linear relationship between two continuous variables.

Integration Procedures

In an explanatory sequential mixed-methods research design, the quantitative stage serves as an empirical basis for the next stage, which is the qualitative. The numerical discoveries will guide the researcher in identifying the results that need an explanation and choosing the respondents who would give helpful insight. This initiative ensures that, between the two phases, the qualitative investigation is not carried out separately, but spontaneously explains, deepens, and gives context to the quantitative discoveries, and develops interview guide questions that correspond to the factors originating from the observed pattern. In choosing convergence at the interpretation stage, the objectives are to create a holistic understanding in the pilot implementation of the strengthened senior high school curriculum. As explained by Creswell and Baez (2021), the data collection in the last stage allows the researcher to validate the quantitative results using the qualitative details. Through this, the statistic of readiness gives the contexts of the actual experience of the teachers that may result in a stronger and more reliable conclusion (Sunderji & Waddell, 2021).

According to Feters and Tajima (2022), they stressed that the integration needs comprehensive planning, especially when findings from phase 1 inform the data collection process of the next phase. In the context of the study, the quantitative stage gives a preliminary assessment of the readiness of the teachers and systemic challenges they experience in the implementation of the curriculum. This serves as a guide in qualitative investigation to identify the needs and additional explanations coming from the experience of the teachers. The combined discoveries give an empirical basis for the teacher framework. The framework prioritized professional development, collaborative planning, curriculum guide, necessary instructional materials, and laboratory facilities and equipment. Overall, the quantitative results serve as a basis for the phase of qualitative through identified explanation, participants who would give an impactful insight, and interview questions that produced important contextual evidence. It strengthened the systematic methodological relationship and supported a much more comprehensive understanding of the readiness of science teachers. And the systemic challenges experienced. The framework remains a proposed output that requires additional strengthening and analysis to determine its appropriateness and effectiveness.

The study uses a joint display or integration matrix to combine the quantitative and qualitative discoveries systematically and to create a comprehensive understanding of science teachers' readiness and systemic challenges in the pilot implementation of the strengthened senior high school curriculum. It serves as an analytical presentation of numerical results together with qualitative themes. Through this, it examined how they are connected, providing additional explanation or differences between the two sets of data. It emphasized the importance of joint display in clarifying and implementing the systematic integration identified in the research. In the study, the qualitative and quantitative data were separately examined before the integration. It gives quantitative results on the level of readiness in terms of pedagogy, curriculum knowledge, and assessment practices, likewise in the systemic challenges such as instructional materials, laboratory facilities, and professional development. Meanwhile, the qualitative results provide a contextual insight regarding the experiences and support needed by the teachers during the implementation of the curriculum. Also, the matrix supports the interpretation of the integration of those that are not meaningful in statistics between readiness and systemic challenges.

In the review phase, the researcher pays attention to three possible outcomes of integration:

1. Convergence: Both lead to the same conclusion with reference to two data sets, just like the identification of insufficient instructional materials as one of the challenges.
2. Divergence: when there are contradicting results (example: high survey readiness but many complaints in the interview). These differences cannot be considered an error but an opportunity for a deeper analysis (O'Cathain, 2022).
3. Expansion: when the qualitative part provides an explanation for an aspect not measured by the survey, such as the emotional aspect of the pedagogical transition of the teachers (Bazeley, 2021).

Ethical Considerations

This research was carried out with strict compliance with international standards of research ethics. The study emphasized the principles of beneficence and non-maleficence and justice for all the teacher-participants. (National Ethics Committee, 2022). The research ensures that participation is voluntary and without any form of coercion, especially since the participants are under the hierarchy of the Department of Education. Anonymization: The researcher uses pseudonyms or codes instead of real names in all transcripts and reports. Data Disposal: All digital recording and survey data will be permanently deleted after years from the end of the study, according to the data retention policy for academic research (Moser & Korstjens, 2023).

Before any gathering of data, each participant is given an Informed Consent Form (ICF) in Filipino or English, depending on their availability. It explained in detailed documents the objectives of the study, the length of their participation, and possible discomfort and their right to withdraw from the studies (Estrellado, 2023). A digital survey uses click-through consent before getting to the questions to ensure that the respondents are responding with sufficient knowledge and consent (Diliman et al., 2024). To ensure the integrity of the study, the researcher's protocol is subjected to review and approval by the Ethics Review Committee. The clearance coming from the university will serve as proof that research design has undergone evaluation to safeguard the welfare of the people as part of the study (Alvarado, 2023). The data gathering will not start until the certificate of approval is obtained.

As part of academic integrity and transparency, the researcher reveals the limited use of Artificial Intelligence (AI) tools, such as Gemini or ChatGPT) in creating the framework of the methodology and transferring technical terminology. According to the new guidelines for the graduate students (2025-2026), AI is used as an aid for editing and structuring, but the interpretation of data, creating themes, and final analysis is originally done by the researcher (UNESCO, 2023; Academic Integrity Board, 2026). All quotations and ideas derived from the authors are properly acknowledged through text citations.

RESULTS

Quantitative Findings

Table 1. *The Profile of the Respondents in terms of School*

School	Frequency	Percent
Angono National High School	3	10.0
Antipolo City Senior High School	7	23.3
Cainta Senior High School	5	16.7
Mayamot National High School	7	23.3
Rizal National Science High School	6	20.0
Tanay-Sampaloc Integrated National High School	2	6.7
Overall	30	100.0

*Legend: F = frequency; % = percentage

Note. N = 30. Frequency indicates the number of science teacher respondents from each pilot school; percent indicates the proportion of the total respondents.

Table 1 shows the 30 respondents from six pilot schools. Antipolo City Senior High School and Mayamot National High School had the highest number of respondents, with 7 each or (23.3%), followed by Rizal National Science High School, accounting for 6 or (20.0%), and Cainta Senior High School with 5 or (16.7%). Angono National High School had three respondents (10.0%), while Tanay-Sampaloc Integrated National High School had 2 respondents (6.7%).

Table 2. *The Profile of the Respondents in terms of Grade Level Taught*

Grade Level Taught	Frequency	Percent
Both Grade 11 and Grade 12 Teaching Science subject	6	20.0
Grade 12 Teaching Science subject	24	80.0
Total	30	100.0

**Legend: F = frequency; % = percentage.*

Note. $N = 30$. Frequency indicates the number of science teacher respondents by grade level taught; percent indicates the proportion of the total respondents.

Table 2 shows that most of the respondents taught Grade 12 science subjects, with 24 (80.0%), while there are 6 (20.0%) respondents who taught science subjects in both Grades 11 and 12. Also, the profile of the respondents implies that the result of quantitative data essentially manifests the experience of Grade 12 science teachers in handling science subjects in Grade 12. Thus, the results should be perceived as within the framework of teachers piloting the strengthened senior high school curriculum.

Problem No. 1: What is level of science teachers' readiness in implementing the strengthened senior high school curriculum in pilot schools in terms of: pedagogical readiness, curriculum knowledge, and assessment practices?

Table 3 presents the level of science teachers' readiness in implementing the strengthened senior high school curriculum in terms of pedagogical readiness.

Table 3. *The Level of Science Teachers' Readiness in Implementing the Strengthened Senior High School Curriculum in Pilot Schools in Terms of Pedagogical Readiness*

PEDAGOGICAL READINESS	Mean	SD	Verbal Interpretation
I can effectively facilitate inquiry-based and investigative science learning activities.	3.43	0.68	Strongly Agree
I can differentiate science instruction to address learners' diverse abilities, interests, and learning needs.	3.53	0.57	Strongly Agree
I am confident in using collaborative learning strategies to promote scientific understanding.	3.73	0.52	Strongly Agree
I can integrate problem-based learning into my science lessons.	3.73	0.52	Strongly Agree
I can integrate real-world applications and contextualized examples into science lessons.	3.87	0.35	Strongly Agree
I am confident integrating technology and digital tools into science instruction to enhance learning in implementing the strengthened SHS curriculum.	3.63	0.56	Strongly Agree
I can facilitate meaningful classroom discussions that encourage scientific reasoning and critical thinking.	3.67	0.48	Strongly Agree
I can select appropriate teaching methods that align with the competencies of the strengthened SHS curriculum.	3.53	0.57	Strongly Agree
I am confident in conducting laboratory safely and in accordance with established laboratory safety procedures.	3.47	0.57	Strongly Agree

I am prepared to implement learner-centered teaching strategies in science classes.	3.57	0.57	Strongly Agree
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Overall	3.62	0.39	Strongly Agree
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**Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree*
 Note. $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point agreement scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree.

Table 3 shows that the science teachers strongly agree that they can integrate real-world applications and contextualized examples into science lessons, with the highest mean ($M = 3.87$, $SD = 0.35$). Generally, the science teachers strongly agree on their level of pedagogical readiness in implementing the Strengthened Senior High School Curriculum ($M = 3.62$, $SD = 0.39$). This standard indicates that teachers viewed on their own as efficient of transforming strengthened senior high school curriculum into student-centered and localized science instruction.

Table 4 presents the level of science teachers' readiness in implementing the strengthened senior high school curriculum in terms of curriculum knowledge.

Table 4. *The Level of Science Teachers' Readiness in Implementing the Strengthened Senior High School Curriculum in Pilot Schools in Terms of Curriculum Knowledge*

CURRICULUM KNOWLEDGE	Mean	SD	Verbal Interpretation
I can interpret curriculum guides, learning standards, and instructional references.	3.53	0.57	Strongly Agree
I understand the content standards and performance standards of the strengthened SHS curriculum.	3.57	0.63	Strongly Agree
I can align my lesson objectives, learning activities, and assessments with the curriculum standards.	3.70	0.47	Strongly Agree
I can develop instructional plans that reflect the expected learning outcomes of the strengthened SHS curriculum.	3.60	0.56	Strongly Agree
I am familiar with the learning competencies prescribed in the strengthened SHS curriculum.	3.60	0.67	Strongly Agree
I keep myself updated on curriculum revisions, implementation guidelines, and policy issuances related to the strengthened SHS curriculum.	3.73	0.52	Strongly Agree
I have a clear understanding of the goals and objectives of the strengthened SHS curriculum.	3.63	0.67	Strongly Agree
I am knowledgeable about the interdisciplinary and contextualized approaches promoted in the strengthened SHS curriculum.	3.43	0.63	Strongly Agree
I understand how to unpack learning competencies and use them in curriculum and lesson alignment.	3.60	0.62	Strongly Agree
I understand how the strengthened SHS curriculum prepares learners for higher education, employment, and lifelong learning.	3.57	0.73	Strongly Agree
Overall	3.60	0.49	Strongly Agree

**Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree*

Note. $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point agreement scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree.

Table 4 shows that the science teachers strongly agree that they keep themselves updated on curriculum revisions, implementation guidelines, and policy issuances related to the Strengthened Senior High School Curriculum, which has the highest mean ($M = 3.73$, $SD = 0.52$). Generally, the science teachers strongly agree on their level of readiness in terms of curriculum knowledge in implementing the Strengthened Senior High School Curriculum ($M = 3.60$, $SD = 0.49$). The findings indicate that teachers typically maintain the curriculum knowledge aimed at explaining and implementing the strengthened curriculum. The focus on maintaining current with curriculum review also informs that readiness entails sustained involvement with policy releases and implementation instructions rather than understanding obtained only at the beginning of the pilot implementation of the curriculum.

Table 5 presents the level of science teachers' readiness in implementing the strengthened senior high school curriculum in terms of assessment practices.

Table 5. *The Level of Science Teachers' Readiness in Implementing the Strengthened Senior High School Curriculum in Pilot Schools in Terms of Assessment Practices*

ASSESSMENT PRACTICES	Mean	SD	Verbal Interpretation
I design assessments that are aligned with the learning competencies of the strengthened SHS curriculum.	3.67	0.48	Strongly Agree
I use varied assessment methods, including formative, summative, written assessments, projects, and performance tasks as appropriate to the intended learning outcomes.	3.63	0.56	Strongly Agree
I develop authentic performance tasks that allow students to demonstrate scientific knowledge and skills in real-world contexts.	3.67	0.48	Strongly Agree
I use assessment results to modify instructional strategies to improve student learning outcomes	3.53	0.73	Strongly Agree
I ensure that assessment tasks are appropriate for students with diverse learning needs and abilities.	3.60	0.56	Strongly Agree
I encourage students to engage in self-assessment and peer assessment to improve their learning.	3.47	0.57	Strongly Agree
I prepare clear scoring rubrics and assessment criteria before administering performance-based assessments.	3.67	0.55	Strongly Agree
I analyze assessment results to identify the competencies students had mastered and those they have not yet mastered.	3.70	0.47	Strongly Agree
I ensure that my assessment practices are fair, and inclusive of learners with diverse needs.	3.73	0.45	Strongly Agree
I am confident in implementing the assessment policies and guidelines of the strengthened SHS curriculum.	3.57	0.73	Strongly Agree
Overall	3.62	0.43	Strongly Agree

*Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree

Note. $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point agreement scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree.

Table 5 shows that the science teachers strongly agree that they ensure their assessment practices are fair and inclusive of learners with diverse needs, with the highest mean ($M = 3.73$, $SD = 0.45$). Generally, the science teachers strongly agree on their level of readiness in terms of assessment practices in implementing the Strengthened Senior High School Curriculum ($M = 3.62$, $SD = 0.43$). The results indicated that the assessment was not restricted to the different uses of the test but was not incorporated with integration, righteousness, and attentiveness to the diversity of the learner in terms of learning. This implies that teachers were typically equipped to modify assessment practices to the skills-based standards of a strengthened curriculum.

Problem No. 2: What is extent of selected systemic challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum in terms instructional resources, laboratory facilities and equipment, and professional development?

Table 6 presents the extent of selected challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum in terms of instructional resources.

Table 6. *The Extent of Selected Systemic Challenges Encountered by the Science Teachers During the Implementation of the Strengthened Senior High School Curriculum in Terms of Instructional Resources*

INSTRUCTIONAL RESOURCES	Mean	SD	Verbal Interpretation
The shortage of curriculum-aligned instructional materials affects my ability to implement the strengthened SHS curriculum effectively.	3.40	0.62	Very Great Extent
Science textbooks aligned with the strengthened SHS curriculum are insufficient.	3.50	0.63	Very Great Extent
The unavailability of laboratory manuals, activity sheets and learning modules limits the conduct of science learning activities.	3.27	0.87	Very Great Extent
The digital instructional materials (e.g., videos, simulations, interactive resources) are inadequate to support science teaching.	3.17	0.87	Great Extent
The available instructional materials are not fully aligned with the learning competencies of the strengthened SHS curriculum.	3.03	0.61	Great Extent
The available instructional materials do not cover the full range of competencies required in the strengthened SHS curriculum.	3.17	0.70	Great Extent
The insufficient funding limits the procurement and development of instructional materials for science classes.	3.37	0.76	Very Great Extent
The instructional materials provided are not sufficient to accommodate the number of students in the class.	3.23	0.68	Great Extent
The limited availability of teacher's guides and reference materials makes lesson preparation more difficult.	3.17	0.75	Great Extent
Delays in the distribution of instructional materials negatively affect lesson implementation.	3.27	0.74	Very Great Extent
Overall	3.26	0.48	Very Great Extent

**Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree*

Note: $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point extent scale, where 4 = Very Great Extent, 3 = Great Extent, 2 = Low Extent, and 1 = Very Low Extent.

Table 6 shows that science teachers experience the insufficiency of science textbooks aligned with the Strengthened Senior High School Curriculum to a very great Extent, which has the highest mean ($M = 3.50$, $SD = 0.63$). Generally, the science teachers experience systemic challenges related to instructional resources to a very great Extent during the implementation of the Strengthened Senior High School Curriculum ($M = 3.26$, $SD = 0.48$). The results indicated that instructional resource constraints comprise a major implementation involvement when teachers account for a high level of readiness. The inefficiency of curriculum-based modules or textbooks and other instructional materials may therefore necessitate a need for teachers to reinforce, adjust, and design instructional resources to continue the required learning activities.

Table 7 presents the extent of selected challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum in terms of laboratory facilities and equipment.

Table 7. *The Extent of Selected Systemic Challenges Encountered by the Science Teachers During the Implementation of the Strengthened Senior High School Curriculum in Terms of Laboratory Facilities and Equipment*

LABORATORY FACILITIES AND EQUIPMENT	Mean	SD	Verbal Interpretation
The insufficiency of laboratory chemicals and consumable materials affect the conduct of science learning activities.	3.33	0.76	Very Great Extent
The laboratory room is inadequate for conducting science experiments.	2.77	0.86	Great Extent
The lack of appropriate laboratory equipment hinders the conduct experiment-based learning activities.	3.20	0.81	Great Extent
The laboratory space is too small or inadequately designed to conduct science laboratory activities safely and effectively.	3.10	0.76	Great Extent
The school's laboratory infrastructure requires improvement to support safe and effective science laboratory activities.	3.07	0.87	Great Extent
The limited access to functional laboratory apparatus restricts the conduct of laboratory activities.	2.97	0.85	Great Extent
The laboratory safety equipment (e.g., fire extinguishers, goggles, first-aid kits) is inadequate.	2.93	0.94	Great Extent
Some laboratory apparatuses are nonfunctional and inadequately maintained.	2.67	0.80	Great Extent
The laboratory equipment and apparatus require upgrading and replacement.	2.87	0.78	Great Extent
The laboratory has an inadequate ventilation for conducting science activities safely.	2.67	0.76	Great Extent
Overall	2.96	0.62	Great Extent

*Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree

Note. $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point extent scale, where 4 = Very Great Extent, 3 = Great Extent, 2 = Low Extent, and 1 = Very Low Extent.

Table 7 shows that science teachers experience insufficient laboratory chemicals and consumable materials needed to conduct science learning activities to a very great Extent ($M = 3.33$, $SD = 0.76$). They also experience, to a great Extent, a lack of appropriate laboratory equipment, which hinders the conduct of experiment-based e-learning activities ($M = 3.20$, $SD = 0.81$). Generally, the science teachers experience

systemic challenges related to laboratory facilities and equipment primarily during the implementation of the Strengthened Senior High School Curriculum ($M = 2.96$, $SD = 0.62$).

Table 8 presents the extent of selected challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum in terms of professional development.

Table 8. *The Extent of Selected Systemic Challenges Encountered by the Science Teachers During the Implementation of the Strengthened Senior High School Curriculum in Terms of Professional Development*

PROFESSIONAL DEVELOPMENT	Mean	SD	Verbal Interpretation
Access to continuing professional development is limited.	3.07	0.74	Great Extent
The mentoring and coaching support during curriculum implementation are inadequate.	2.80	0.89	Great Extent
The professional development activities are conducted infrequently.	2.90	0.84	Great Extent
The specialized training on the strengthened SHS curriculum is insufficient.	3.27	0.78	Very Great Extent
The training provided does not adequately prepare me to implement the strengthened SHS curriculum.	3.03	0.85	Great Extent
Opportunities for hands-on workshops on lesson planning and instructional delivery aligned with the strengthened SHS curriculum are insufficient.	3.27	0.69	Very Great Extent
The professional development opportunities are not aligned with the specific needs of science teachers implementing the strengthened SHS curriculum.	3.10	0.80	Great Extent
Limited opportunities for collaboration with science teachers.	3.33	0.76	Very Great Extent
Teaching workloads limit my participation in professional development programs.	3.20	0.76	Great Extent
The professional development activities rarely include opportunities to share best practices and collaborate with fellow science teachers.	3.17	0.75	Great Extent
Overall	3.11	0.57	Great Extent

**Legend: 3.25-4.00 Strongly Agree, 3.24-2.50 Agree, 2.49-1.75 Disagree, 1.74-1.00 Strongly Disagree*
 Note. $N = 30$. M = mean; SD = standard deviation. Responses were measured using a 4-point extent scale, where 4 = Very Great Extent, 3 = Great Extent, 2 = Low Extent, and 1 = Very Low Extent.

Table 8 shows that science teachers experience limited opportunities for collaboration with other science teachers to a very great extent ($M = 3.33$, $SD = 0.76$). Additionally, they experience great extent teaching workloads that limits their participation in professional development programs ($M=3.20$, $SD=0.76$). Generally, the science teachers experience systemic challenges related to professional development to a great extent during the implementation of the Strengthened Senior High School Curriculum ($M = 3.11$, $SD = 0.57$).

Problem No. 3: Is there a significant relationship between science teachers' readiness and systemic challenges encountered in strengthened senior high curriculum implementation

Table 9 presents the significant relation between science teachers' readiness in terms of pedagogical readiness and the extent of systemic challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum implementation.

Table 9. *Significant Relationship Between Science Teachers' Readiness in terms of Pedagogical Readiness and the Extent of Systemic Challenges Encountered in Strengthened Senior High School Curriculum Implementation*

Systemic Challenges	Teachers' Readiness: PEDAGOGICAL READINESS			
	Pearson Correlation	p-value	Decision	Interpretation
INSTRUCTIONAL RESOURCES	.092	.628	FR	NS
LABORATORY FACILITIES AND EQUIPMENT	.336	.070	FR	NS
PROFESSIONAL DEVELOPMENT	.222	.239	FR	NS

*Legend: FR- Failed to Reject; R- Rejected; NS- Not Significant; S- Significant

Note. $N = 30$. r = Pearson correlation coefficient; p = two-tailed probability value; H_0 = null hypothesis. The level of significance was set at $\alpha = .05$. A p-value greater than .05 indicates a nonsignificant relationship.

Table 9 shows the relationship between science teachers' pedagogical readiness and the extent of systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum. As observed, instructional resources ($r = .092$, $p = .628$), laboratory facilities and equipment ($r = .336$, $p = .070$), and professional development ($r = .222$, $p = .239$) all have p-values greater than the .05 level of significance; thus, the results are not significant. Hence, there is no significant relationship between science teachers' pedagogical readiness and the systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum.

Table 10 presents the significant relationship between science teachers' readiness in terms of curriculum knowledge and the extent of systemic challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum implementation.

Table 10. *Significant Relationship Between Science Teachers' Readiness in terms of Curriculum Knowledge and the Extent of Systemic Challenges Encountered in Senior High School Curriculum Implementation*

Systemic Challenges	Teachers' Readiness: CURRICULUM KNOWLEDGE			
	Pearson Correlation	p-value	Decision	Interpretation
INSTRUCTIONAL RESOURCES	-0.119	0.531	FR	NS
LABORATORY FACILITIES AND EQUIPMENT	0.143	0.450	FR	NS
PROFESSIONAL DEVELOPMENT	0.071	0.708	FR	NS

*Legend: FR- Failed to Reject; R- Rejected; NS- Not Significant; S- Significant

Note. $N = 30$. r = Pearson correlation coefficient; p = two-tailed probability value; H_0 = null hypothesis. The level of significance was set at $\alpha = .05$. A p-value greater than .05 indicates a nonsignificant relationship.

The table shows the relationship between science teachers' curriculum knowledge and the extent of systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum. As observed, instructional resources ($r = -.119$, $p = .531$), laboratory facilities and equipment ($r = .143$, $p = .450$), and professional development ($r = .071$, $p = .708$) all have p-values greater than the .05 level of significance; thus, the results are not significant. Hence, there is no significant relationship between

science teachers' curriculum knowledge and the systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum.

Table 11 presents the significant relationship between science teachers' readiness in terms of assessment practices and the extent of systemic challenges encountered by the science teachers during the implementation of strengthened senior high school curriculum implementation.

Table 11. *Significant Relationship Between Science Teachers' Readiness in terms of Assessment Practices and the Extent of Systemic Challenges Encountered in Senior High School Curriculum Implementation*

Systemic Challenges	Teachers' Readiness: ASSESSMENT PRACTICES			
	Pearson Correlation	p-value	Decision	Interpretation
INSTRUCTIONAL RESOURCES	-0.038	0.841	FR	NS
LABORATORY FACILITIES AND EQUIPMENT	0.294	0.115	FR	NS
PROFESSIONAL DEVELOPMENT	0.066	0.729	FR	NS

*Legend: FR- Failed to Reject; R- Rejected; NS- Not Significant; S- Significant

Note. $N = 30$. r = Pearson correlation coefficient; p = two-tailed probability value; H_0 = null hypothesis. The level of significance was set at $\alpha = .05$. A p-value greater than .05 indicates a nonsignificant relationship.

The table shows the relationship between science teachers' assessment practices and the extent of systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum. As observed, instructional resources ($r = -.038$, $p = .841$), laboratory facilities and equipment ($r = .294$, $p = .115$), and professional development ($r = .066$, $p = .729$) all have p-values greater than the .05 level of significance; thus, the results are not significant. Hence, there is no significant relationship between science teachers' readiness in terms of assessment practices and the systemic challenges encountered during the implementation of the Strengthened Senior High School Curriculum.

Problem No. 4: What are the experiences of science teachers regarding the pilot implementation of the strengthened senior high school curriculum?

Qualitative Results

Table 12 presents emerging themes, codes, and sample statements on science teachers' experiences with the pilot implementation of the strengthened senior high school curriculum.

Table 12. *Emerging Themes, Codes, and Sample Statements on Science Teachers' Experiences with the Pilot Implementation of the Strengthened Senior High School Curriculum*

Emerging Theme	Codes	Sample Statements
Navigating Curriculum Transition	Initial uncertainty; adjustment to curriculum changes; learning while implementing; difficulty interpreting requirements; modification of lesson plans; gradual confidence-building; adaptation to new requirements	P01: "During the beginning of the pilot implementation, I was still trying to understand the changes in the curriculum and how I could apply them in my science classes. I had to adjust many of my lesson plans and activities, but eventually I became more comfortable with the new expectations."

		P03: "I felt overwhelmed by the changes in content, pacing, and assessment. As the implementation continued, I learned to adjust my teaching and became more confident in handling the new requirements." P04: "I experienced the pilot implementation as a period of adjustment... I learned to be flexible because not everything could be implemented exactly as planned." P15: "Initially, I struggled with some unfamiliar parts of the curriculum... my confidence improved."
Resource Constraints	Insufficient laboratory equipment; unavailable instructional materials; limited laboratory space; expired or nonfunctional materials; inadequate learning resources; resource-dependent modification of activities; use of alternative and improvised materials	P01: "There were activities that required actual experimentation, but we did not have enough equipment for all the students, yung ibang chemicals expired na, hindi na gumagana ng maayos." P06: "Implementing them consistently was difficult because our laboratory resources were limited. I had to think of alternative activities whenever the required equipment or materials were not available." P13: "There were laboratory activities that I could not conduct exactly as written because some equipment was unavailable. I learned to improvise using safe and locally available materials whenever possible." P18: "Implementation was sometimes limited by the resources available in our school. I had to balance what the curriculum required with what we could realistically provide."
Time and Workload Management	Increased preparation time; additional lesson planning; assessment preparation; curriculum pacing; competing school responsibilities; ancillary tasks; laboratory scheduling; time constraints; organization of workload	P03: "Time was a major problem. Sometimes I wanted to conduct an activity properly, kaya lang yung schedule sa laboratory ay minsan nag conflict with other teacher na gusto gumamit, 1 lang ang room for laboratory." P06: "The increased workload was difficult for me. Aside from teaching, I had other ancillary task, and the new curriculum required additional planning and preparation."

		P12: “The challenge was finding enough time to complete these activities while still covering the required competencies.” P17: “The pilot increased my workload, especially when I had to prepare new lessons and assessment activities... I had to become more organized with my time.”
New Curriculum Expectations	Unfamiliar competencies; interpretation of competencies; changes in assessment; competency–activity–assessment alignment; inquiry-based requirements; new lesson planning expectations; unclear guidance; curriculum unpacking; adjustment to new standards	P02: “I had difficulty understanding some of the new competencies because the guidance was not always detailed. There were times when I had to consult other teachers to make sure I was interpreting the requirements correctly.” P04: “There were times when the curriculum requirements were clear, but there were also situations where I had to interpret them based on our classroom conditions.” P19: “The experience made me rethink how I plan lessons, assess learners, and use laboratory activities.” P25: “The pilot made me more conscious of alignment among competencies, activities, and assessment.”
Stronger Professional and Institutional Support	Need for continuous training; administrative support; curriculum guidance; peer collaboration; coaching and mentoring; provision of instructional materials; laboratory support; teacher consultation; professional learning opportunities; shared responsibility	P11: “I was not alone because my colleagues and school leaders also tried to help. The experience taught me that curriculum implementation requires cooperation.” P16: “We shared lesson ideas, activities, and even assessment tools. That collaboration helped me avoid feeling that I had to solve every problem by myself.” P21: “Teachers can adapt when they are given enough time, guidance, and opportunities to collaborate. When those things are missing, even capable teachers can experience difficulty.” P14: “Teachers also need resources, training, time, and administrative support. Without those things, it becomes difficult to implement the curriculum as intended.”

Professional Resilience and Reflective Practice	Flexibility; resourcefulness; improvisation; reflective teaching; trial and modification of strategies; professional growth; perseverance; willingness to adapt; learning from experience; continuous improvement	P09: “It pushed me to examine my teaching practices and look for better ways of presenting science concepts... I also saw the pilot as an opportunity for professional growth.” P20: “Whenever an activity did not work, I tried to understand why and changed my approach the next time. That helped me gradually improve my implementation.” P26: “I learned which approaches worked better for my students and which ones needed modification. It gave me the opportunity to experiment and reflect.” P27: “The pilot was demanding, but it also strengthened my commitment to improving science instruction... teachers can still make meaningful adjustments for their students.”
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Legend: P = Participant

Table 12 shows the seven themes that teachers experienced during the pilot implementation from two closely connected positions. They were recipients of the strengthened Senior High School Curriculum, which brought new expectations, but they were also the people who had to translate those expectations into classroom experiences. The following sections present these experiences in greater detail.

1. Navigating Curriculum Transition

The first theme describes how teachers experienced the movement from their previous teaching practices toward the requirements of the strengthened curriculum. The accounts indicate that this transition was gradual. Teachers did not immediately become familiar with all aspects of the curriculum upon its introduction. Instead, understanding developed while implementation was already taking place.

P01 recalled having to understand the curriculum while determining how it could be applied in science classes:

“During the beginning of the pilot implementation, I was still trying to understand the changes in the curriculum and how I could apply them in my science classes. I had to adjust many of my lesson plans and activities, but eventually I became more comfortable with the new expectations.” (P01, Q1)

The statement captures two points in the participant's experience. The first was uncertainty at the beginning of implementation. The second was the gradual development of familiarity as the teacher revised lessons and worked with the curriculum in actual classes. Adjustment, therefore, did not occur before implementation alone; it continued as the teacher gained experience with the curriculum.

P03 described a similar beginning but emphasized the number of changes that had to be handled at the same time:

“My experience during the pilot was not easy, especially at the beginning. I felt overwhelmed by the changes in content, pacing, and assessment. As the implementation continued, I learned to adjust my teaching and became more confident in handling the new requirements.” (P03, Q1)

For P03, the transition involved content, pacing, and assessment rather than a single instructional change. The participant's increasing confidence came after continued implementation. This suggests that the pilot period itself served as a learning period for teachers.

The experience was also recognized as an important lesson by a respondent:

“I learned that curriculum change requires continuous teacher preparation and adjustment. We cannot expect to understand everything at once, especially during a pilot.” (P01, Q9)

The respondent's statement recognizes adjustment as part of curriculum implementation rather than as evidence that teachers were unwilling to change. In the implementation of new curriculum, some understanding develops only when teachers begin using it and encounter questions that were not apparent during orientation or initial preparation.

The experiences under this theme therefore show that curriculum transition was a process of familiarization, application, and revision. Teachers learned about the strengthened curriculum through documents and orientations, but they also learned from teaching it. Their accounts point to readiness as something that continued to develop during implementation.

2. Resource Constraints

The Resource Constraints theme emerged from many participants' experiences, particularly in science instruction because it depends on laboratory equipment, appropriate facilities, and instructional resources. The responses showed occasions when teachers understood what an activity required but could not conduct it as intended due to the unavailability of necessary resources or their unsuitability.

P01 described the condition of laboratory resources:

“Lack of sufficient laboratory equipment. There were activities that required actual experimentation, but we did not have enough equipment for all the students, yung ibang chemicals expired na, hindi na gumagana ng maayos.” (P01, Q3)

This statement illustrates that the difficulty involved both quantity and usability. Equipment was insufficient for the learners, while some materials were already expired or no longer functional. Such conditions limited the extent to which students could participate directly in laboratory work.

When asked which challenge had the greatest effect on teaching, P01 returned to the same concern:

“For me, the lack of laboratory equipment had the greatest impact because science learning is more meaningful when students can actually perform experiments. Without enough equipment, I had to replace some activities with demonstrations.” (P01, Q4)

The shift from student experimentation to teacher demonstration shows how resource availability changed the intended learning experience. The lesson could continue, but the form of participation changed. Students who were expected to perform an investigation could instead become observers of an activity conducted by the teacher.

Other participants addressed the limitation by improvising with available materials. P13 shared:

"I had to become more resourceful during the pilot. There were laboratory activities that I could not conduct exactly as written because some equipment was unavailable. I learned to improvise using safe and locally available materials whenever possible." (P13, Q1)

Improvising became a practice that allowed some activities to continue, adding to teachers' responsibility. Resourcefulness became part of the implementation process because the materials envisioned in an activity were not always available in the school.

The participants' experiences under this theme reveal a gap between planned curriculum activities and the material conditions in which these activities were implemented. Teachers responded through demonstrations, modifications, locally available materials, and alternative activities. These adjustments allowed instruction to continue, although they did not always reproduce the same experience that students would have had if complete laboratory resources had been available.

3. Time and Workload Management

The implementation of the strengthened curriculum also affected teachers' time management and workload. This includes preparing new lessons, developing assessments, pacing the curriculum, and teaching alongside ancillary responsibilities.

P06 described the additional demands:

"The increased workload was difficult for me. Aside from teaching, I had other ancillary task, and the new curriculum required additional planning and preparation." (P06, Q3)

The participant's account shows that the workload created by the strengthened curriculum was added to responsibilities that teachers already carried. Preparing for implementation was therefore not performed in isolation from existing duties.

P17 likewise associated the pilot with additional lesson and assessment preparation:

"The pilot increased my workload, especially when I had to prepare new lessons and assessment activities. Even though it was tiring, it also encouraged me to improve my teaching. I had to become more organized with my time." (P17, Q1)

The statement reveals both the burden and the teacher's response to it. Increased preparation was tiring, yet it led the participant to become more deliberate in organizing available time.

Time constraints also appeared in relation to shared facilities. R03 explained:

“Time was a major problem. Sometimes I wanted to conduct an activity properly, kaya lang yung schedule sa laboratory ay minsan nag conflict with other teacher na gusto gumamit, 1 lang ang room for laboratory.” (P03, Q3)

Here, time related to resources. A laboratory might be available, but access depended on scheduling because several teachers had to use the same room. The finding shows that implementation challenges did not always fall neatly into one category. A shortage of facilities could create scheduling problems, while scheduling problems could affect curriculum pacing.

The participants consequently had to decide how to use limited instructional and preparation time. Their experiences suggest that workload during the pilot was not merely an increase in the number of tasks. Teachers also had to manage competing demands while learning new requirements and preparing lessons that were appropriate to the curriculum.

4. New Curriculum Expectations

While the first theme describes the experience of moving through curriculum change, New Curriculum Expectations concerns what teachers were being asked to do differently. Participants referred to competencies, assessment, lesson planning, inquiry-oriented activities, and the need to establish closer alignment among intended outcomes, classroom activities, and assessment.

P04 described having to interpret some curriculum requirements:

“There were times when the curriculum requirements were clear, but there were also situations where I had to interpret them based on our classroom conditions.” (P04, Q1)

This experience shows that curriculum documents did not automatically determine what would happen in the classroom. Teachers still exercised professional judgment when applying requirements to the conditions they encountered.

For P19, implementation showed a reconsideration of several parts of teaching:

“The experience made me rethink how I plan lessons, assess learners, and use laboratory activities.” (P19, Q1)

The word rethink is important in this account. The strengthened curriculum was experienced not simply as additional content to teach but as a reason to revisit existing instructional practices.

P25 particularly emphasized considering the alignment:

“The pilot made me more conscious of alignment among competencies, activities, and assessment. I started asking myself whether the activities I was giving really helped students achieve the intended learning outcomes.”
(P25, Q1)

The participant's statement indicates a shift from completing classroom activities to examining their purpose. The activity itself was not considered sufficient to make teachers question whether it contributed to the expected learning outcome.

These experiences distinguish the new curriculum expectations from the broader transition process. Teachers were becoming accustomed to change. They were also interpreting what the curriculum expected

of their planning, instruction, and assessment, and determining how to enact those expectations in their classrooms.

5. Learner-Centered and Contextualized Teaching

Despite the difficulties encountered during the pilot, participants also identified changes in their classroom practices. The theme Learner-Centered and Contextualized Teaching reflects experiences involving inquiry, problem solving, active participation, real-life examples, practical learning, and attention to learner readiness.

While P12 valued the opportunity for learners to participate more actively:

“The curriculum encouraged us to use more inquiry and problem-solving activities. I appreciated this because students were given opportunities to think and participate.”

(P12, Q1)

Rather than describing learners primarily as recipients of information, the participant referred to opportunities for them to think and participate. This reflects a classroom experience in which learners were expected to take a more active role in science learning.

P23 noticed a similar response from students:

“Students seemed more engaged when they were allowed to investigate and discuss science concepts.” **(P23, Q1)**

Investigation and discussion gave learners opportunities to engage with concepts rather than depend entirely on teacher explanation. The observation also suggests that changes in teaching practice could be seen in the way learners responded during lessons.

Contextualization was evident as P07's account:

“I became more conscious of using examples that students could relate to... I found that students became more interested when the lessons were contextualized.” **(P07, Q1)**

Relating science to familiar situations became a deliberate teaching choice of the participant rather than an incidental example used during discussion.

These experiences show that participants recognized value in the instructional direction of the strengthened curriculum. However, learner-centered teaching also existed alongside the resource and time limitations discussed in the preceding themes. Inquiry and practical activities required preparation, appropriate materials, and sufficient time. Thus, teachers' positive experiences with learner-centered approaches were closely connected with the conditions that enabled or restricted those approaches.

6. Stronger Professional and Institutional Support

The sixth theme, Stronger Professional and Institutional Support, emerged from the assistance they received and the additional support they believed should be necessary. Their responses pointed to collaboration among teachers, school-level assistance, professional development, access to learning resources, and clearer or more sustained guidance.

According to P16:

“We shared lesson ideas, activities, and even assessment tools. That collaboration helped me avoid feeling that I had to solve every problem by myself.”

(P16, Q1)

The exchange of materials and ideas provided an immediate form of assistance. Teachers who encountered similar problems could compare experiences and identify possible ways of responding to them.

Formal support was also available in some cases. R01 stated:

“Our school inform us about the online seminar about the strengthened curriculum.” **(P01, Q7)**

The response shows that information about professional development reached teachers through the school. At the same time, the participants' accounts indicate that access to an orientation or seminar did not necessarily address every issue that arose during actual classroom implementation.

When asked on additional support needed, R01 suggest practical training:

“I think science teachers need regular hands-on training that focuses on the actual competencies in the strengthened curriculum.” **(P01, Q8)**

The emphasis on *regular* and *hands-on* training indicates a preference for continuing professional assistance connected to classroom work. This is different from viewing curriculum preparation as a one-time orientation before implementation.

The same participant identified concrete needs when making recommendations:

“Learning Resources and IM's (Instructional Materials). Equipment and tools for the activity.” **(P01, Q10)**

The support sought by teachers therefore extended beyond professional development. It included the physical and instructional resources necessary for implementing science activities.

Taken together, the participants' statements show that professional and institutional support on several levels. Colleagues helped one another with immediate classroom concerns; schools facilitated access to available training; and teachers called for further assistance in the form of practical professional development, instructional materials, equipment, and curriculum-specific guidance. Support was therefore experienced not as a single intervention but as a combination of human, instructional, and institutional resources.

7. Professional Resilience and Reflective Practice

The last theme, Professional Resilience and Reflective Practice, shows how teachers responded when implementation did not proceed as expected. Participants examined their practice, modified activities, improvised materials, tried alternative strategies, and used classroom experience to make subsequent decisions.

P09 viewed the implementation as an opportunity to reconsider teaching practice:

"It pushed me to examine my teaching practices and look for better ways of presenting science concepts... I also saw the pilot as an opportunity for professional growth." (P09, Q1)

The participant did not describe professional growth as separate from the difficulty of implementation. Instead, the challenge itself prompted closer examination of teaching practices.

P20 explained how reflection occurred after an activity:

"Whenever an activity did not work, I tried to understand why and changed my approach the next time. That helped me gradually improve my implementation."
(P20, Q1)

This statement shows reflection as an action connected to subsequent teaching. The participant identified what had not worked and used that experience to alter the next lesson.

A similar process was described by P26:

"I learned which approaches worked better for my students and which ones needed modification. It gave me the opportunity to experiment and reflect."
(P26, Q1)

Rather than assuming that one strategy would work across situations, the participant evaluated approaches according to students' responses. Experimentation, modification, and reflection became part of the implementation experience.

Resourcefulness is another thing, as P13 explained:

"I learned to improvise using safe and locally available materials whenever possible." (P13, Q1)

Such adaptations demonstrate teachers' efforts to keep instruction moving despite limitations. However, these accounts should not be interpreted to mean that individual resourcefulness removed the need for adequate systemic support. Teachers could modify activities and improvise materials, but their earlier accounts still identified laboratory equipment, instructional resources, training, time, and guidance as necessary conditions.

Professional resilience was therefore not simply persistence despite difficulty. It involved making judgments, evaluating experiences, changing strategies, seeking alternatives, and learning from implementation itself. Reflection became a means which teachers gradually strengthened their practice during the pilot.

Integration of Results

Table 13. *The Joint Display of Quantitative and Qualitative Findings on Science Teachers' Readiness and Systemic Challenges in the Pilot Implementation of the Strengthened Senior High School Curriculum*

Area of Integration	Quantitative Finding	Corresponding Qualitative Finding	Integrated Interpretation
Pedagogical Readiness	Teachers strongly agreed on their level of pedagogical readiness ($M = 3.62$, $SD = 0.39$). Contextualizing science lessons through real-world applications received the highest mean ($M = 3.87$, $SD = 0.35$).	Learner-Centered and Contextualized Teaching reflected inquiry, problem solving, contextualization, real-life applications, and learner engagement. Professional Resilience and Reflective Practice showed teachers modifying strategies and reflecting on their practice.	Both indicate that teachers were able to employ learner-centered and contextualized approaches while adapting their teaching during implementation.
Curriculum Knowledge	Teachers strongly agreed on their level of readiness in curriculum knowledge ($M = 3.60$, $SD = 0.49$).	Navigating Curriculum Transition and New Curriculum Expectations revealed initial uncertainty, unfamiliar competencies, curriculum unpacking, adjustment to new standards, and gradual confidence-building.	Teachers generally perceived themselves as knowledgeable about the curriculum, but their narratives show that this knowledge developed through actual implementation and adjustment.
Assessment Practices	Teachers strongly agreed on their level of readiness in assessment practices ($M = 3.62$, $SD = 0.43$).	New Curriculum Expectations included changes in assessment and competency–activity–assessment alignment. Teachers described becoming more conscious of aligning competencies, activities, and assessment.	The quantitative result indicates readiness in assessment, while the qualitative accounts show how teachers worked toward alignment as they implemented the new curriculum.
Instructional Resources	Challenges involving instructional resources were experienced to a very great extent ($M = 3.26$, $SD = 0.48$).	Resource Constraints included unavailable instructional materials, inadequate learning resources, and the use of alternative or improvised materials.	Both strands identify inadequate instructional resources as a substantial implementation challenge.
Laboratory Facilities and Equipment	Challenges involving laboratory facilities and equipment were experienced to a great extent ($M = 2.96$, $SD = 0.62$). Insufficient chemicals and consumable materials were experienced	Resource Constraints included insufficient equipment, limited laboratory space, expired or nonfunctional materials, and modification of laboratory activities.	The qualitative data directly support the quantitative finding that laboratory conditions constrained science activities.

	to a very great extent ($M = 3.33$, $SD = 0.76$).		
Professional Development and Support	Professional development challenges were largely experienced ($M = 3.11$, $SD = 0.57$). Limited opportunities for collaboration received the highest mean ($M = 3.33$, $SD = 0.76$).	Stronger Professional and Institutional Support reflected the need for continuous training, curriculum guidance, collaboration, coaching, mentoring, and administrative support.	Both strands point to the need for sustained professional and institutional support during implementation.
Readiness in the Presence of Systemic Challenges	No significant relationships were found between the three readiness categories and instructional resources, laboratory facilities and equipment, or professional development (all $p > .05$).	Teachers described substantial constraints but also reported adaptation, collaboration, resourcefulness, reflection, and gradual confidence-building under Professional Resilience and Reflective Practice and Navigating Curriculum Transition.	The qualitative findings show how readiness and systemic difficulties can coexist. Teachers continued to adapt despite the challenges they encountered.

The table reveals that the two strands largely complement one another. The high levels of self-reported readiness coexist with substantial system-wide challenges. Teachers strongly agreed that they were ready across pedagogy, curriculum knowledge, and assessment. At the same time, instructional resources were experienced as a challenge to a very great Extent and laboratory facilities and professional development to a great Extent. Their statements similarly describe resource limitations and implementation difficulties, but they also show teachers modifying lessons, contextualizing instruction, collaborating, improvising, and considering their practices.

Several points of convergence emerged from integrating the findings. The clearest convergence is about instructional and laboratory resources. Quantitatively, instructional resource challenges were experienced to a very great Extent ($M = 3.26$, $SD = 0.48$), while challenges involving laboratory facilities and equipment were experienced to a great Extent ($M = 2.96$, $SD = 0.62$). The qualitative theme *Resource Constraints* reflects the same conditions. Participants described insufficient laboratory equipment, unavailable instructional materials, limited laboratory space, and expired or nonfunctional materials. Some teachers reported modifying activities or using alternative and improvised materials when the resources prescribed for laboratory work were unavailable. One participant experienced insufficient equipment for students and chemicals that were already expired or unusable. Therefore, the two converge in identifying resource availability as a prominent systemic difficulty in teaching science.

It is also evident in pedagogical readiness. Science teachers strongly agreed on their level of pedagogical readiness ($M = 3.62$, $SD = 0.39$), with the integration of real-world applications and contextualized examples receiving the highest rating ($M = 3.87$, $SD = 0.35$). The qualitative theme *Learner-Centered and Contextualized Teaching* closely reflects this result. Participants described using inquiry, problem-solving activities, real-life applications, contextualization, and differentiated support. One teacher observed that students became more interested when lessons were contextualized, while others described greater learner participation through inquiry and investigation. Thus, the teachers' quantitative assessment of their pedagogical readiness is supported by accounts of how these approaches appeared in their classroom experiences.

Similarly, regarding assessment practices, teachers strongly agreed on their level of readiness in this area ($M = 3.62$, $SD = 0.43$). In the qualitative findings, *New Curriculum Expectations* included changes

in assessment and the alignment of competencies, learning activities, and assessment. One participant stated that the pilot made the teacher more conscious of such alignment, while another described reconsidering lesson planning, assessment, and laboratory activities. The qualitative strand, therefore, adds experiential detail to the quantitative finding by showing how assessment readiness was exercised and refined during implementation.

Professional development provides another point of convergence. Quantitative findings show that professional development challenges were experienced to a great Extent ($M = 3.11$, $SD = 0.57$), with limited opportunities for collaboration among science teachers receiving a particularly high rating ($M = 3.33$, $SD = 0.76$). Correspondingly, the qualitative theme *Stronger Professional and Institutional Support* identified continuous training, curriculum guidance, peer collaboration, coaching, mentoring, administrative support, and professional learning opportunities as important conditions of implementation. Participants also described sharing lesson ideas and assessment tools and emphasized that teachers needed sufficient time, guidance, and opportunities to collaborate.

Taken together, these areas of convergence show a consistent pattern across the two data sources. Teachers reported readiness to undertake the instructional responsibilities of the strengthened curriculum while also facing material, laboratory, professional development, time, and workload constraints. The qualitative narratives strengthen this pattern by showing that teachers did not respond to these conditions passively. Adaptation, collaboration, improvisation, and reflection became part of their implementation experiences.

The integration also revealed areas where the quantitative and qualitative findings do not completely correspond. The most evident difference concerns curriculum knowledge. In the quantitative result, science teachers strongly agreed on their level of readiness in terms of curriculum knowledge ($M = 3.60$, $SD = 0.49$). The qualitative results, however, describe uncertainty during the initial stages of implementation. Under *Navigating Curriculum Transition*, teachers reported trying to understand the changes, revising lesson plans, and gradually becoming more comfortable with the new expectations. Some participants initially felt overwhelmed by changes in content, pacing, and assessment before becoming more confident as implementation continued.

This difference does not necessarily mean a direct contradiction. The quantitative measure reflects teachers' overall assessment of their readiness, whereas the qualitative narratives reflect the readiness of teachers. The teachers could therefore report a generally strong level of curriculum knowledge while recalling uncertainty and adjustment during the early stages of the pilot implementation of the curriculum. This qualitative finding adds a temporal dimension not directly represented by the overall quantitative mean: readiness at the time of assessment may have developed partly through experience during implementation. Participants described curriculum transition as a process of familiarization, application, and revision.

Another apparent divergence emerges when the high levels of teacher readiness are considered alongside the substantial systemic challenges. Teachers strongly agreed on their readiness in pedagogical practices, curriculum knowledge, and assessment practices, yet they experienced instructional resource challenges to a very great Extent and laboratory and professional development challenges to a great Extent. Rather than being mutually exclusive, the qualitative narratives indicate that these conditions occurred simultaneously. Teachers modified activities when resources were unavailable, collaborated with colleagues, reorganized their time, and reflected on strategies that needed modification. This suggests that perceived readiness did not mean an absence of implementation difficulty.

The non-significant relationships provide another point that requires careful interpretation. Pedagogical readiness, curriculum knowledge, and assessment practices have no significant relationship to the three systemic challenge dimensions at the .05 level of significance. For example, pedagogical readiness has no significant relationship to instructional resources ($r = .092$, $p = .628$), laboratory facilities and

equipment ($r = .336$, $p = .070$), or professional development ($r = .222$, $p = .239$). Also, no significant relationship pattern was observed for curriculum knowledge and assessment practices.

At first, this may appear to diverge from the qualitative accounts in which teachers frequently connected their implementation experiences with available resources, professional support, workload, and institutional conditions. However, the two results answer different questions. The correlation analysis determines whether variation in measured systemic challenges is statistically significant and related to variation in teachers' readiness. The qualitative findings describe how teachers experienced and responded to those conditions. A challenge can therefore be widely experienced and meaningfully discussed by participants without producing a statistically significant correlation with their readiness scores.

This distinction is particularly visible in the theme *Professional Resilience and Reflective Practice*. Teachers described changing approaches when activities did not work, learning which strategies were more suitable for their learners, and continuing to adjust despite the demands of the pilot. Accordingly, the integrated findings do not support the conclusion that systemic challenges caused lower or higher teacher readiness. Instead, they show that teacher readiness and systemic challenges coexisted during implementation, with the qualitative findings documenting the adaptive practices teachers used while working within those conditions.

Overall, the merged findings present teacher readiness as more complex than a single measure of Preparedness. Quantitatively, teachers strongly agreed on their readiness across pedagogy, curriculum knowledge, and assessment practices. Qualitatively, that readiness appeared as something enacted and, in some cases, strengthened through adjustment, collaboration, reflection, and resourcefulness. This integrated result is consistent with the study's convergent design, in which the two provide different but complementary views of the same implementation experience.

Problem No. 5: What teacher support framework may be developed to enhance science teachers' readiness and reduce challenges in the implementation of the Strengthened Senior high School Curriculum?

“Proposed Science Teachers' Readiness Enrichment and Adjustable Development” (Sci-Teach READY Teacher Support Framework).

The present study created a Sci-Tech READY Teacher Support Framework for science teachers in selected public schools piloting the strengthened senior high school curriculum in the Division of Antipolo and Rizal. The results showed that the respondents demonstrated high readiness of in terms of pedagogy, curriculum knowledge, and assessment practices. The findings further revealed that systemic challenges are evident in spite of high level of teachers' readiness

“Proposed Science Teachers' Readiness Enrichment and Adjustable Development” (Sci-Teach READY Teacher Support Framework).

The Sci-Teach READY is an evidence-based practical output created to depend on science teachers' readiness and covered systemic challenges during the implementation of strengthened senior high school curriculum. The framework acknowledges that high teacher readiness can co-occur with systemic challenges. Teacher showed a strong readiness in pedagogy, curriculum, and assessment but they also experienced shortcomings in instructional resources, laboratory facilities, and professional development.

Program Title:

Science Teachers' Readiness Enrichment and Adjustable Development” (Sci-Teach READY Teacher Support Framework).

Rationale

Science teacher can be highly ready to implement the strengthened senior high school curriculum while experiencing essential systemic challenges. Also, the study finds there is no significant relationship between the teacher readiness and systemic challenges. Therefore, the teacher framework should not be created on the premise that systemic challenges necessarily lessen teacher readiness. Rather, it should acknowledge that teachers may stay equipped and adaptable even while doing under challenging conditions. The qualitative findings strengthen this point: teachers replied to challenges through collaboration, discussion, improvisation and contextualization of activities. As the teacher framework has two goals: maintain and reinforce what the teachers still do well and decrease the systemic obstacles that make the curriculum implementation difficult.

General Objective

To provide a feasible support mechanism that strengthens science teachers' pedagogical, curricular and assessment readiness and addressing the instructional materials, laboratory facilities and professional support essential for efficient curriculum implementation.

Specific objectives

The framework aims to:

1. Maintain and enhance science teachers' pedagogical readiness.
2. Refine science teachers' understanding of curriculum competencies, performance standards, and content standards.
3. Enhance authentic, teacher-made, and competency-aligned assessments.
4. Elevate access to adequate, curriculum-aligned instructional resources.
5. Reform the safety, adequacy, functionality, and availability of laboratory facilities and equipment.
6. Deliver hands-on professional development.
7. Intensify mentoring, coaching, peer support, and collaboration among science teachers.
8. Create a continuous monitoring and feedback mechanism for curriculum implementation.
9. Provide appropriate time and workload support during the implementation of the Strengthened Senior High School Curriculum.
10. Sci-Teach READY Framework Components.

Target Participants

The primary participants of the proposed program are senior high school science teachers in selected public schools piloting the strengthened senior high school curriculum in the Division of Antipolo and Rizal, School heads, master teachers and other school personnel serve as instructional support personnel, mentors, and facilitators during the implementation of the program.

Table 14. *Implementation Matrix*

Domain	Identified need/ Challenge	Teacher Support Intervention	Activities	Expected Output	Responsible Persons
Pedagogical readiness	Insufficient knowledge about the strengthened curriculum	Pedagogical proficiency	LAC session, peer- collaboration, demonstration teaching	95% of the teachers enhanced use of teaching strategies.	School head, Master Teachers, Subject Group Head
Curriculum Knowledge	Essential for learner-centered and inquiry- based strategies	Strengthened curriculum training, seminar and	Training, workshops, unpacking of learning	95% of the teachers enhanced knowledge	Subject Group head, Master Teachers

		capacity building.	competencies	and understanding on the curriculum	
Assessment Practices	Struggle aligning the assessment with the learning outcome	Assessment program	Seminar and training on different kind of assessment	95% of the teachers enhanced assessment alignment and practices	School Testing Coordinator, Teachers
Instructional Materials	Obsolete and Insufficient learning resources	Instructional development and sharing best practices	Contextualized learning materials either digitally or manual	95% Availability of instructional materials	Learning Resource coordinator, Subject Group head
Laboratory Facilities and Equipment	There is not enough space for laboratory equipment	Improvement of laboratory resources	Procurement, inventory, contextualized laboratory activities	95% Intensified access to laboratory resources	Science laboratory coordinator, teachers, property custodian
Professional Development	Insufficient training and seminar for strengthened curriculum, limited collaboration among science teachers	Sharing best practices and collaboration	LAC session, Focus group discussion, peer-mentoring	95 % Intensified learning society	School Head, Master Teachers, Subject group Head, Teachers
Monitoring and Feedback	Requirement for continuous monitoring	Constant monitoring and enhancement system	Classroom feedback meetings, and self-assessment	98% Improvement of the activity	School Head, Master teachers, Subject Group

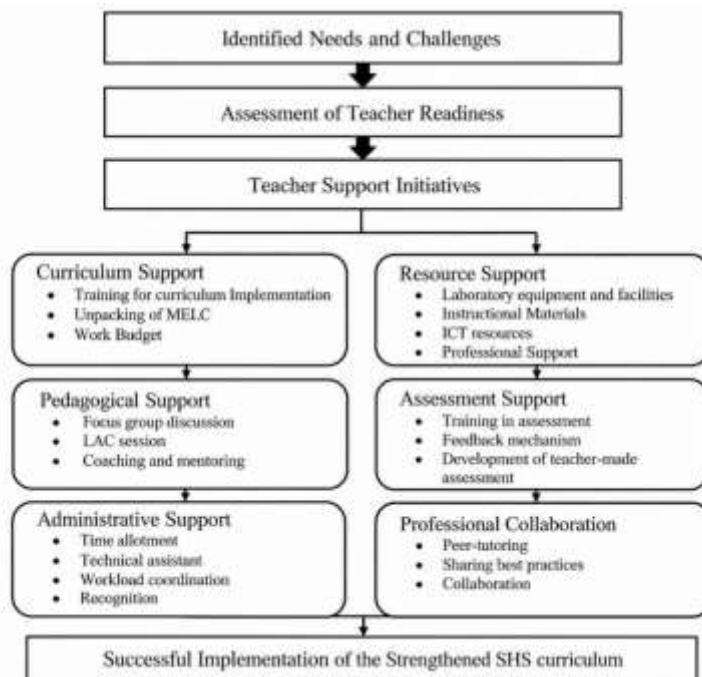


Figure 3. *Sci-Teach READY Framework Model*

Proposed Budgetary Requirements

The estimated budget for the pilot implementation of Project Sci-Tech READY covers the instructional materials, training sessions, mentoring, monitoring, and evaluation. The fund for this program may come from school MOOE or canteen fund subject for accounting and procurement guidelines.

Monitoring and Evaluation

Monitoring and evaluation of the proposed program may be conducted through attendance records, output checking, mentor observations, peer feedback, and reflection journals. On the other hand, the program may be evaluated through pre- and post-assessments of the program.

The evaluation may focus on teachers demonstrating improvement in the following areas: pedagogical readiness, curriculum knowledge, assessment practices. School heads and science mentors may also document whether the program produces more stable collaborative systems, such as sharing of best practices, regular mentoring, and ongoing reflective practice.

DISCUSSION

Interpretation of Integrated Findings

1. Level of Science Teachers' Readiness in Implementing the Strengthened Senior High School Curriculum in terms of:

1.1 Pedagogical Readiness

The findings showed that the science teachers strongly agreed on their level of pedagogical readiness in implementing the Strengthened Senior High School Curriculum ($M = 3.62$, $SD = 0.39$). Among the indicators, incorporating real-world applications and contextualized examples into science lessons obtained the highest mean ($M = 3.87$, $SD = 0.35$). Thus, the respondents perceived themselves as capable of using instructional practices that reflect the learner-centered and contextualized direction of the strengthened

curriculum. This quantitative finding converged with the qualitative theme, Learner-Centered and Contextualized Teaching. The participants described experiences involving inquiry, problem solving, active participation, practical science learning, contextualization, and the use of real-life applications. Teachers also observed that learners became more interested when science lessons related to situations they could understand, and that participation increased when students had opportunities to investigate and discuss science concepts. The convergence between the two strands suggests that the teachers' reported pedagogical readiness was not limited to a general perception of confidence. Their accounts also reflected classroom practices that corresponded with learner-centered and contextualized teaching.

This finding is consistent with Ballen (et al., 2025), who stressed the value of active learning, peer interaction, problem-solving activities, and student participation in STEM learning. Zhang (et al., 2023) similarly showed that project-based learning can support achievement, motivation, and higher-order thinking when activities are connected to clear standards and authentic applications.

Moreover, Strat et al. (2024) and Urdanivia Alarcon (et al., 2023) found stronger evidence for guided inquiry when learners receive appropriate scaffolding and formative feedback. These studies support the instructional direction reflected in the participants' statement of inquiry and problem-solving activities.

In addition, Schleicher (2022) presented 21st-century pedagogies. This perspective describes contemporary curriculum reform as requiring teachers to move from being primarily providers of instruction toward becoming facilitators or orchestrators of learning environments. In this study, the teachers' ability to contextualize lessons, engage learners, and use problem-solving strategies reflects this shift in instructional practice. Although pedagogical readiness was generally strong, inquiry-based and investigative science learning obtained a lower mean than contextualization. This is consistent with Elardo (2025), who identified pedagogical knowledge and performance-based activities among the areas that require continued attention during curriculum implementation. Thus, the integrated findings show a generally strong pedagogical foundation while still noting the need to strengthen particular practices that require more specialized preparation and resources.

1.2 Curriculum Knowledge

The science teachers also strongly agreed on their level of readiness in terms of curriculum knowledge ($M = 3.60$, $SD = 0.49$). Keeping themselves updated on curriculum revisions, implementation guidelines, and policy issuances obtained the highest mean ($M = 3.73$, $SD = 0.52$). The quantitative result indicates that teachers generally perceived themselves as knowledgeable about the strengthened curriculum and its requirements.

The qualitative findings provided a more qualified view of this readiness. Under Navigating Curriculum Transition, participants experienced initial uncertainty, difficulty with changes, modification of lesson plans, and confidence-building. Similarly, teachers described unfamiliar competencies, the need to interpret some requirements, curriculum unpacking, changes in assessment, and closer alignment among competencies, activities, and assessment. Therefore, the findings show partial divergence with complementarity rather than direct contradiction. The quantitative data represent the teachers' overall assessment of their curriculum knowledge, while the qualitative accounts reveal how that knowledge developed during implementation. Teachers could perceive themselves as knowledgeable while still remembering uncertainty at the start of the pilot implementation. Their statements revealed that curriculum knowledge was strengthened through familiarization, application, consultation with colleagues, and continued classroom experience.

This finding is consistent with Cogmen and Ozelci (2024), who viewed curriculum literacy as involving the teacher's knowledge, perceptions, skills, and capacity to understand and work with curriculum requirements. Curriculum knowledge, therefore, is not simply Awareness that a curriculum exists. It includes the ability to interpret standards and competencies and translate them into instructional decisions. The finding also supports Elardo (2025), who identified curriculum interpretation as an area needing continued support during curriculum implementation. The participants' experiences of gradually

learning to interpret competencies and align lesson components show that understanding a new curriculum may develop while implementation is already underway. The divergence also relates to Bildik and Altun (2022), who discussed an implementation gap that may arise when curriculum reform expectations do not immediately correspond with actual practices and capabilities. In the present study, the early uncertainty expressed by teachers does not necessarily indicate inadequate readiness. Instead, it suggests that readiness developed as teachers encountered and interpreted new requirements in actual classroom situations.

The finding also corresponds to the curriculum-transformation perspective of UNESCO-IBE (2026), which accentuates the interrelationship among curriculum, pedagogy, assessment, and teacher readiness. The teachers' narratives support this interrelated view since understanding the curriculum required them to rethink lesson planning, instructional activities, and assessment at the same time. Overall, the integrated finding shows that curriculum knowledge should be viewed as developmental rather than static. Teachers generally perceived themselves as ready in this area, but their accounts show that such readiness was strengthened as they went through the demands of pilot implementation.

1.3 Assessment Practices

The findings showed that the science teachers strongly agreed on their level of readiness in terms of assessment practices ($M = 3.62$, $SD = 0.43$). Ensuring that assessment practices were fair and inclusive of learners with diverse needs, which received the highest mean ($M = 3.73$, $SD = 0.45$). The teachers also strongly agreed that they aligned assessments with learning competencies, used varied assessment methods, developed authentic performance tasks, prepared scoring criteria, and analyzed assessment results. This quantitative result converged with and was supported by the qualitative theme, New Curriculum Expectations. Participants described growing more aware of the relationship among competencies, learning activities, and assessment. One participant specifically explained that the pilot led to a closer examination of whether classroom activities actually contributed to the intended learning outcomes. The qualitative result, therefore, enhances the depth of the numerical finding by showing that assessment readiness involved actual reconsideration of how assessment fitted into the wider instructional process. This finding is consistent with Vlachopoulos (2024), who pointed out the importance of clear rubrics and processes like standard setting to maintain the validity and reliability of authentic assessment. The strong readiness reported by teachers to prepare criteria, align assessment with competencies, and uphold fairness aligns with these principles.

This is also supported by Almeqdad et al. (2023), Bray and Dolan (2024), and Ewe (2023) in their review of Universal Design for Learning. They emphasized access, engagement, and alignment in assessment and technology. Furthermore, UNESCO-IBE (2026) presents curriculum, pedagogy, assessment, and teacher readiness as linked components of curriculum transformation. The present integrated finding reflects this relationship. The teachers' readiness in assessment did not operate independently of their understanding of competencies or instructional planning, but the pilot encouraged them to consider alignment. The finding is also relevant to the interim assessment and grading provisions. The Department of Education issued guidelines intended to standardize assessment and reporting during the pilot phase and ensure alignment with the new curriculum structure. Teachers' strong readiness in assessment suggests they generally perceived themselves as capable of meeting these expectations.

2. Extent of Selected Systemic Challenges Encountered by Science Teachers

2.1 Instructional Resources

The findings showed that science teachers experienced challenges related to instructional resources to a very great Extent ($M = 3.26$, $SD = 0.48$). The insufficiency of science textbooks aligned with the Strengthened Senior High School Curriculum obtained the highest mean ($M = 3.50$, $SD = 0.63$). They also experienced shortages of curriculum-aligned instructional materials and limited funding for procuring and developing materials.

This quantitative finding converged with the qualitative theme, Resource Constraints. Participants experienced unavailable instructional materials, inadequate learning resources, insufficient laboratory materials, and modification of activities because required resources were unavailable. Some teachers resorted to alternative materials or improvisation so that instruction could continue. Therefore, it points to the same implementation concern. Teachers understood what the curriculum required, but the availability of materials sometimes limited how closely they could follow those requirements in practice.

This finding is consistent with the EDCOM II, which identified continuing concerns involving textbook availability and delivery in the Philippine basic education. It also notes that resource shortages reflect problems in logistics and administration and can weaken instructional coherence during curriculum implementation.

The finding also supports Fuentes (2025), who identified insufficient instructional materials as a major obstacle in curriculum implementation. Also, Mordzeh-Ekpampo et al. (2025) reported that insufficient teaching resources remained among the major gaps in curriculum reform. Although these studies were conducted in different contexts, they show that curriculum change often faces difficulty when classroom-level resources do not develop at the same pace as policy expectations.

Supporting these findings, Kadirhan and Sat (2025) emphasized a gap between reform aspirations and pragmatic implementation. This is particularly evident in teacher training, resource allocation, and curriculum administration. In the present study, this gap was visible when teachers modified intended activities because instructional materials were either unavailable or inadequate.

This convergence aligns with Damschroder et al. (2022), who stressed that contextual conditions may hinder implementation even when the reform itself is well designed. The data show that teacher readiness alone cannot compensate for the lack of instructional resources. Resources are necessary to translate curriculum expectations into classroom practice.

2.2 Laboratory Facilities and Equipment

Science teachers experienced challenges involving laboratory facilities and equipment to a great Extent ($M = 2.96$, $SD = 0.62$). Teachers experienced insufficient laboratory chemicals and consumable materials to a very great Extent ($M = 3.33$, $SD = 0.76$), while the lack of appropriate laboratory equipment was also identified as a considerable challenge ($M = 3.20$, $SD = 0.81$).

The quantitative result converged with the Resource Constraints theme in the qualitative findings. Teachers described insufficient laboratory equipment, expired chemicals, nonfunctional materials, and limited laboratory space. One participant explained that some experiment-based activities had to be replaced with demonstrations, while another described using safe, locally available materials.

This convergence matters because the laboratory issue was not only an infrastructure concern. It directly affected the form of science learning that could be provided. When students could not perform an intended experiment because equipment or consumables were lacking, teachers altered the activity, demonstrated the procedure, or improvised available materials.

This finding is consistent with Jones and Swanson (2022), who described contemporary science education reform as moving toward investigation, modeling, and data-driven reasoning. Such practices depend upon environments in which learners can engage in practical and investigative work. The absence of adequate laboratory equipment and materials can therefore restrict the pedagogical transition expected by the curriculum.

The result is likewise consistent with Buabeng and Amo (2025), who noted that limited resources can weaken intended pedagogical changes and lead teachers to continue or return to more traditional instructional practices. In this study, the replacement of student experimentation with demonstrations illustrates how resource conditions can alter the intended learning experience.

The integrated result, therefore, distinguishes between being ready to implement science activities and having the conditions necessary to implement them as intended. The teachers' willingness and

pedagogical competence were apparent, but laboratory limitations constrained the range and form of learning activities available to students.

2.3 Professional Development

Based on the findings, Science teachers experienced systemic challenges related to professional development to a great extent ($M = 3.11$, $SD = 0.57$). Limited opportunities for collaboration with other science teachers received the highest mean ($M = 3.33$, $SD = 0.76$). Specialized training and hands-on workshops were likewise experienced as insufficient, while teaching workload limited teachers' participation in professional development programs.

This result converged with the qualitative theme, Stronger Professional and Institutional Support. Teachers identified continuing training, curriculum guidance, teacher collaboration, coaching, mentoring, instructional resources, laboratory support, and administrative assistance as necessary forms of support. Some participants described sharing lesson plans, activities, and assessment tools with colleagues, while others expressed a need for regular hands-on training focused on the actual competencies of the strengthened curriculum. The qualitative findings also complement the quantitative results by showing that professional development took more than one form. Formal seminars and online orientations were available in some situations, but teachers still sought continuing assistance related to classroom implementation. This suggests that access to an orientation does not necessarily address the questions and difficulties that arise once teachers begin using the curriculum.

This finding is consistent with Buabeng and Amo-Darko (2025) and Diaz (2024), who identified inadequate professional development as a continuing challenge during curriculum reform. It is also consistent with Yamota (2025), who reported that professional development of short duration and limited participation may become an obstacle to effective implementation.

Furthermore, Bacus and Aida (2022), Ntumi et al. (2023), and Tholchan (2025) emphasized that curriculum implementation needs thorough support that combines training, school resources, and opportunities for collaboration. The strong concern about limited collaboration in the present study reinforces the importance of professional learning that goes beyond individually attended training sessions. Agbofa et al. (2023) similarly underlined the need for structured and sustained professional development rather than dependence on informal support networks. This is relevant to the experiences of teachers who relied on colleagues to clarify curriculum expectations, exchange learning materials, and share assessment tools.

The workload component of the finding also corresponds with Fuentes (2025), who associated curriculum reform difficulties with limited resources and increasing workload. The qualitative theme Time and Workload Management reinforces this concern, with teachers describing additional lesson preparation, assessment preparation, curriculum pacing, ancillary responsibilities, and laboratory scheduling. This pattern is consistent with the Job Demands–Resources Model discussed by Admiraal et al. (2023) and Hlad'o et al. (2024). The model recognizes workload and limited time as demands, while training and mentoring operate as resources that can support teachers in their work. The present integrated finding shows both sides of this relationship: teachers required professional support while simultaneously facing workload conditions that made participation in such support more difficult.

3. Significant Relationship Between Science Teachers' Readiness and the Extent of Systemic Challenges Encountered in Senior High School Curriculum Implementation

In the analysis of whether science teachers' readiness has a significant relationship to the extent of systemic challenges experienced during implementation, it was revealed that there is no significant relationship between pedagogical readiness, curriculum knowledge, and assessment practices, and the three systemic challenges: instructional resources, laboratory facilities and equipment, and professional development at the .05 level of significance.

Specifically, Pedagogical readiness has no significant relationship to instructional resources ($r = .092$, $p = .628$), laboratory facilities and equipment ($r = .336$, $p = .070$), or professional development ($r = .222$, $p = .239$). Curriculum knowledge likewise had no significant relationship with instructional resources ($r = -.119$, $p = .531$), laboratory facilities and equipment ($r = .143$, $p = .450$), or professional development ($r = .071$, $p = .708$). The same pattern was observed for assessment practices in relation to instructional resources ($r = -.038$, $p = .841$), laboratory facilities and equipment ($r = .294$, $p = .115$), and professional development ($r = .066$, $p = .729$). All p -values exceed the 0.05 level of significance.

When considered alongside the qualitative results, an apparent divergence emerges. The correlation analysis did not establish a significant relationship between teacher readiness and systemic challenges, yet the participants repeatedly described resources, facilities, workload, professional development, and institutional support as important parts of their implementation experience.

This difference is not necessarily contradictory because the two strands address different aspects of the problem. The correlation analysis determines whether teachers who reported higher or lower systemic challenges also tended to report systematically higher or lower readiness scores. The qualitative strand, in contrast, shows how those challenges were experienced and managed during implementation. Therefore, a difficulty may be widely experienced and important to teachers without necessarily producing a statistically significant association with their readiness scores.

The theme Professional Resilience and Reflective Practice is particularly useful in understanding this result. Teachers described modifying unsuccessful activities, reflecting on their practice, improvising materials, seeking alternatives, and learning from implementation. These experiences suggest that teachers could continue to exercise professional competence even in the presence of difficult implementation conditions. In other words, a teacher could report being ready pedagogically while still lacking laboratory materials or could understand the curriculum while simultaneously needing additional institutional support.

Admiraal et al. (2023) and Hlad'ó et al. (2024) propose that adequate job resources such as training and mentoring can support readiness and motivation, whereas excessive demands and inadequate resources may weaken performance. Similarly, Caspe and Sarrosa (2025) identified systemic challenges as factors that may influence teacher readiness and performance during educational reform. The qualitative evidence implies that the interaction between teacher readiness and implementation conditions may be more complex than the correlation coefficients alone can represent.

This finding is consistent with Damschroder et al. (2022). CFIR recognizes that implementation results arise from interactions among the innovation, the individuals implementing it, the organizational setting, and the implementation process. From this perspective, readiness is only one part of a wider implementation system. The influence of resources or professional support may operate through different organizational and individual processes instead of through a simple direct association with readiness.

The finding can also be interpreted alongside Anggraeni et al. (2024) and Malinao and Miano (2025), who described teachers responding to implementation difficulties through improvisation and cooperation with colleagues. They also cautioned that teacher adaptability, although valuable, can sometimes conceal more profound systemic deficiencies. This point is particularly relevant to the present findings. Strong teacher readiness should not be interpreted as evidence that resources, facilities, or professional support are already adequate.

The result also supports the Coherence Framework of Fullan and Quinn (2023). The framework stresses focusing direction, cultivating collaborative cultures, deepening learning, and securing accountability as mutually connected conditions for educational change. The absence of significant correlations does not reduce the importance of these conditions. Instead, the evidence suggests that individual readiness and systemic support should be monitored as distinct but complementary aspects of implementation.

Theoretical Contributions

The findings of the present study add a practical dimension to the theoretical frameworks used. One of the clearest points that emerged is that teacher readiness and the conditions surrounding implementation do not develop at the same rate. Science teachers generally considered themselves ready in pedagogy, curriculum knowledge, and assessment, yet they also reported problems with instructional materials, laboratory facilities, and professional development. This aligns with the Updated Consolidated Framework for Implementation Research of Damschroder et al. (2022), which recognizes that implementation is shaped not only by the people carrying out a reform but also by the setting in which they work. Teachers may possess the needed skills and still encounter difficulty when materials, facilities, or support are not sufficient.

In addition, the selected systemic challenges are not significantly related to teachers' readiness. This was somewhat unexpected because the conceptual framework assumed that available resources and institutional support would be related to teachers' capacity to implement the curriculum. The qualitative accounts, however, help explain why high readiness and substantial challenges appeared at the same time. Teachers did not simply stop when materials were unavailable or when an activity could not be carried out as planned. They improvised, consulted colleagues, changed strategies, and learned from implementation experience. This is particularly evident in the emerging themes Professional Resilience and Reflective Practice and Navigating Curriculum Transition.

This result also gives a more nuanced reading of the Job Demands-Resources Model. Admiraal et al. (2023) and Hlad'o et al. (2024), identify workload and limited time as demands, while training and mentoring serve as resources that may support motivation and readiness. The teachers in this study clearly experienced these demands. They spoke about additional preparation, competing responsibilities, and limited opportunities for professional learning. The finding suggests that readiness may be maintained even when the balance between demands and resources is less than ideal.

The findings also strengthen the relevance of teacher self-efficacy in understanding curriculum reform. Self-efficacy is the teacher's belief in their ability to respond to instructional demands and adopt new practices. Asante (2025), Mu et al. (2024), and Kang et al. (2025) associate stronger self-efficacy with openness to new strategies and greater capacity to adjust to educational change. This is reflected in participants' experiences. Their confidence did not mean that implementation was easy. Rather, confidence appeared alongside trial and error, modification of activities, and continued learning. In this sense, readiness may involve the ability to work through uncertainty, not simply the absence of uncertainty.

The study also supports Fullan and Quinn's (2023) Coherence Framework. The framework emphasizes clear direction, collaborative cultures, deep learning, and accountability in sustaining educational change. This is reflected in the participants' repeated concern about collaboration, curriculum guidance, training, and administrative support. Teachers were able to adjust individually, but their accounts also showed that implementation became easier when they could consult colleagues, share materials, and receive clearer guidance. This suggests that curriculum reform cannot rely on individual teacher effort alone. The organizational environment still matters, even when teachers are personally ready.

Finally, the findings relate to the 21st Century Pedagogies perspective discussed by Schleicher (2022). The strengthened curriculum expects teachers to provide learning experiences that are more contextualized, inquiry-oriented, and learner-centered. The teachers' strong pedagogical readiness and their accounts of using real-life applications, inquiry, and problem-solving show that this shift was already visible in their practice. At the same time, the difficulties they encountered with laboratories, materials, and preparation time show that changing pedagogy is not simply a matter of changing teaching beliefs. It also requires conditions that allow the intended practices to take place.

Taken together, the study contributes to the theoretical understanding of teacher readiness by showing that readiness during curriculum reform is not a fixed condition that is unrelated to experience. It

can develop while teachers are already implementing the curriculum, and it can remain relatively strong even when the surrounding system presents difficulties.

Methodological Reflections on Sequential Design

An explanatory sequential mixed-methods design provided a broader view of what occurred during the pilot implementation of the Strengthened Senior High School Curriculum. The quantitative data established the level of science teachers' readiness, the Extent of the systemic challenges they encountered, and the relationships between these variables. The qualitative data added the teachers' actual experiences during implementation. Considering the two sets of data together made it possible to see not only the general patterns in the results but also the experiences behind them.

This became evident in the findings on curriculum knowledge. Quantitatively, science teachers strongly agreed on their level of readiness in this area. The qualitative findings, however, showed that some teachers initially experienced uncertainty when dealing with unfamiliar competencies and new curriculum expectations. They had to become familiar with the curriculum, clarify some competencies, and adjust as they implemented it. When these findings were considered together, the difference between them became understandable. The teachers' strong curriculum knowledge did not necessarily mean that they were already familiar with every aspect of the curriculum at the beginning of the pilot implementation. Their experiences suggest that part of this readiness developed as they worked with the curriculum.

The same design was useful in interpreting the results on the relationship between teachers' readiness and systemic challenges. The quantitative analysis found no significant relationship between the areas of science teachers' readiness and the systemic challenges included in the study. The qualitative findings nevertheless showed that teachers experienced problems involving instructional resources, laboratory conditions, workload, professional development, and institutional support. These concerns were part of their actual experience, even though they were not significantly related to the teachers' readiness scores. Teachers also described how they adjusted their strategies, sought help from colleagues, improvised when resources were lacking, and reflected on their teaching practices.

There were also findings in which the quantitative and qualitative data clearly supported each other. This was evident in instructional resources, laboratory facilities, and equipment. The quantitative results showed that there were considerable systemic challenges, while the teachers' accounts described what these difficulties looked like in practice. They spoke about insufficient equipment, limited laboratory space, unavailable or unusable materials, and instances when planned activities had to be changed. In this case, the qualitative findings gave context to the Extent of the challenges shown in the quantitative results.

Using an explanatory sequential mixed-methods design was therefore helpful because the two sets of data contributed different forms of evidence to the same research problem. Some findings confirmed one another, while others appeared different at first. These differences became useful in understanding the results rather than being treated simply as inconsistencies. By comparing and integrating the quantitative and qualitative data, the study was able to present a more complete account of science teachers' readiness and the systemic challenges they experienced during the pilot implementation of the Strengthened Senior High School Curriculum.

Ethical and AI-Transparency Considerations

The study is carried out in accordance with the established ethical principles in research, which include planning, data analysis, interpretation, and presentation of results. It stresses the protection of rights, welfare, dignity, and private information of the participants. The study reflects the principles of beneficence, non-maleficence, and justice, especially since the respondents are science teachers of the Department of Education. And because of this, the researcher makes sure that their participation in the study is voluntary.

Before the start of data gathering, each of the participants is given an informed consent form (ICF) through paper and pen and in google form that was written in english. It is clear in the document that the explanation of the objective of the research study, their participation, and its purpose, and their right not to participate in the study. For the participant who answered through Google Form, they used a click-through consent procedure before they could access the survey questionnaire. In this way, their participation was based on the information and free will. The study was done in accordance with the Data Privacy Act of 2012(Republic Act No. 10173) in gathering, possessing, storing data, and data elimination, to protect the welfare and privacy of the respondents. It uses pseudonyms or participant codes in the transcript, a qualitative narrative. Research records, including survey responses and digital interview materials, are considered confidential and legitimately used for research purposes. The digital record will be permanently disposed of at the proper time.

Limitations of the Study

Several limitations should be considered when interpreting the findings. First, the quantitative data were obtained from 30 science teachers from six pilot schools. While these respondents represented the participating schools covered by the study, the small sample limits the statistical power of the correlational analysis and the generalizability of the findings. This is particularly important for results that were close to, but did not reach, statistical significance, such as the relationship between pedagogical readiness and laboratory facilities and equipment ($r = .336$, $p = .070$).

Second, science teachers' readiness was based on self-reported perceptions. The results in pedagogical readiness, curriculum knowledge, and assessment practices reflect how teachers assessed their own readiness rather than how their practices were directly observed in the classroom. Responses may therefore have been influenced by how participants assessed their own experiences. The qualitative data provided further context but did not remove the limitations associated with self-report measures.

The timing of the study is another consideration. Data were gathered during the pilot implementation of the Strengthened Senior High School Curriculum, when teachers were still becoming familiar with the curriculum. The qualitative findings showed that some teachers experienced initial uncertainty and gradually developed confidence as they worked with the new competencies and expectations. Thus, the findings reflect teachers' readiness and experiences at a particular point in the implementation. These may change as the curriculum becomes more established and further resources, training, and support become available. The study was also limited to the dimensions identified in its conceptual framework. Teacher readiness covered pedagogical readiness, curriculum knowledge, and assessment practices, while systemic challenges covered instructional resources, laboratory facilities and equipment, and professional development. Other factors associated with curriculum implementation were outside the scope of the study. These may include school leadership, teacher self-efficacy, learner characteristics, class size, funding, and differences in implementation across schools.

Moreover, the correlational analysis examined relationships between the variables and did not establish causation. The not significant results do not mean that systemic challenges have no relevance to teacher readiness. They only indicate that significant relationships were not established using the variables, respondents, and measures included in this study. Finally, the qualitative findings were based on the teachers' accounts of their experiences during the pilot implementation. These accounts provided depth to the quantitative results, but they remain specific to the participating teachers and pilot schools. They should not be assumed to represent the experiences of all science teachers implementing the Strengthened Senior High School Curriculum.

Despite these limitations, integrating the quantitative and qualitative findings provided a fuller understanding of the conditions surrounding the pilot implementation. The findings showed that science teachers could demonstrate readiness in pedagogy, curriculum knowledge, and assessment practices while also experiencing challenges in instructional resources, laboratory facilities and equipment, and

professional development. This distinction matters when considering the support teachers need as the strengthened senior high school curriculum continues to be implemented.

Summary of Key Findings

The following sentences are significant outcomes of the study:

1. In the level of science teachers' readiness in implementing the Strengthened Senior High School Curriculum, the teachers strongly agreed on their pedagogical readiness, curriculum knowledge, and assessment practices. This indicates that the science teachers generally perceived themselves as ready to address the instructional, curriculum, and assessment requirements of the strengthened curriculum.
2. In the extent of systemic challenges encountered by science teachers, challenges related to instructional resources were experienced to a very great extent, while challenges involving laboratory facilities and equipment and professional development were experienced to a great extent. These findings show that systemic concerns remained evident during the pilot implementation despite the teachers' reported readiness.
3. In the relationship between science teachers' readiness and the extent of systemic challenges encountered, there was no significant relationship between pedagogical readiness, curriculum knowledge, and assessment practices and the systemic challenges involving instructional resources, laboratory facilities and equipment, and professional development. Thus, the null hypotheses were not rejected.
4. The experiences of science teachers during the pilot implementation of the Strengthened Senior High School Curriculum have seven themes that emerged: Navigating Curriculum Transition, Resource Constraints, Time and Workload Management, New Curriculum Expectations, Learner-Centered and Contextualized Teaching, Stronger Professional and Institutional Support, and Professional Resilience and Reflective Practice. These themes reflect the teachers' experiences of adjustment, resource limitations, workload demands, changing curriculum expectations, instructional adaptation, need for support, and continued professional resilience during implementation.

Conclusions and Meta- Inference

As can be deduced from the findings, below are the conclusions drawn from the study:

1. Science teachers demonstrated strong readiness to implement the Strengthened Senior High School Curriculum in terms of pedagogy, curriculum knowledge, and assessment practices.
2. Pilot implementation took place under systemic conditions. Challenges involving instructional resources, laboratory facilities and equipment, and professional development remained evident.
3. No significant relationship was found between science teachers' readiness and the selected systemic challenges.
4. Teachers' experiences demonstrated that curriculum implementation involved a process of adjustment. Initial uncertainty, unfamiliar competencies, workload demands, and resource limitations were met through consultation, modification of activities, collaboration, improvisation, and reflection.

Recommendations

1. School Administration may sustain teachers' pedagogical readiness, curriculum knowledge, and assessment practices through continuous professional learning, collaboration, and curriculum guidance.
2. DepEd Administrators, School Administration, and Policymakers and Curriculum Developers may prioritize the provision of sufficient and curriculum-aligned science instructional resources.

3. DepEd Administrators and School Administration may improve the availability and condition of laboratory facilities, equipment, chemicals, and consumable materials needed for science activities.
4. DepEd Administrators and School Administration may provide sustained, needs-based, and hands-on professional development, including mentoring, coaching, and teacher collaboration.
5. Architects of Educational Policy and DepEd Administrators, EDCOM II, and Policymakers and Curriculum Developers may assess teacher readiness and systemic challenges separately when monitoring curriculum implementation, since strong readiness does not necessarily indicate adequate systemic support.
6. School Administration may provide appropriate support for curriculum transition, workload demands, resource constraints, and changing curriculum expectations.
7. Future studies may include larger samples, additional factors affecting implementation, and longitudinal assessment of science teachers' readiness and systemic challenges.

REFERENCES

- Addai-Mununkum, R., & Setordzi, S. (2023). Implementing curriculum change in Ghana: Exploring teachers' experiences with enacting 21st-century pedagogies. *American Journal of Qualitative Research*, 7(4), 119–137. <https://doi.org/10.29333/ajqr/13660>
- Adeniyi, I. S., Hamad, N. M. A., Adewusi, O. E., Unachukwu, C. C., Osawaru, B., Onyebuchi, C. N., Omolawal, S. A., Aliu, A. O., & David, I. O. (2024). Educational reforms and their impact on student performance: A review in African countries. *World Journal of Advanced Research and Reviews*, 21(2), 750–761. <https://doi.org/10.30574/wjarr.2024.21.2.0490>
- Afshar, H. S., & Hafez, F. (2021). A mixed-methods investigation of TEFL graduate students' perspectives of qualitative research: Challenges and solutions in the spotlight. *The Qualitative Report*, 26(11), 3568–3593. <https://doi.org/10.46743/2160-3715/2021.4614>
- Agbofa, F. J. K., Mensah, D. K. D., Opoku-Amankwaah, K., Kyeremeh, S., & Adu-Boahen, A. O. (2023). Teachers' concerns on the implementation of the standards-based curriculum in Ghana: A case of New Juaben North Municipal. *Creative Education*, 14(5), 1076–1094. <https://doi.org/10.4236/ce.2023.145069>
- Ampofo, J. A., Abrefi, A. A., & Yao, N. F. (2020). Incorporating ICT into teaching and learning in junior high schools in Ajumako: Challenges for teachers and their support strategies. *International Journal of Management & Entrepreneurship Research*, 2(5), 365–381. <https://doi.org/10.51594/ijmer.v2i5.174>
- Anggraeni, V., Sephiana, R. S., Mauluddia, Y., & Agustin, M. (2024). Apakah guru PAUD mampu beradaptasi pada setiap perubahan kurikulum yang terjadi? *PAUDIA: Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, 13(1), 115–124. <https://doi.org/10.26877/paudia.v13i1.17459>
- Arban, J. C., Enad, F., & Pabalan, A. (2024). *The Senior High School Technical-Vocational-Livelihood track: Implementation and challenges*. SSRN. <https://doi.org/10.2139/ssrn.4975284>
- Aslam, P., Mushtaq, Q., Noor, F., Maqbool, S., Khan, N. Y., & Sarfraz, J. (2024). The literature review on curriculum implementation problems. *Journal of Health and Rehabilitation Research*, 4(2), 497–503. <https://doi.org/10.61919/jhrr.v4i2.844>
- Bacus, R. C., & Alda, R. C. (2022). Senior high school teaching: A phenomenological inquiry. *Malaysian Journal of Learning and Instruction*, 19(1), 241–268. <https://doi.org/10.32890/mjli2022.19.1.9>
- Bagnall, C., Stevenson, E., Cookson, D., Jones, F. R., & Garnett, N. J. (2024). A mixed-methods evaluation of a longitudinal primary–secondary school transitions support intervention. *Frontiers in Psychology*, 15, Article 1252851. <https://doi.org/10.3389/fpsyg.2024.1252851>
- Baluyos, G., Toring, A. R. M., Gahut, M. J. C., Tagaan, D. J. P., Quiap, K. G. P., & Maliao, H. A. (2020). The level of readiness of Misamis University in the implementation of the new curricula. *Indonesian Journal of Curriculum and Educational Technology Studies*, 8(1), 1–8. <https://doi.org/10.15294/ijcets.v8i1.37105>
- Bildik, C., & Altun, S. (2022). Uygulamadaki boşluğa, öğretim programı penceresinden bir bakış: 2018 ilköğretim ve ortaokul İngilizce öğretim programının incelenmesi. *Batı Anadolu Eğitim Bilimleri Dergisi*, 13(2), 1196–1221. <https://doi.org/10.51460/baebd.1196707>

- Bravo, C. V., Kenigs, O. A., & Zamora, M. P. T. (2025). Examining the role of curriculum evaluation in schools: A challenge for pedagogical leadership. *International Electronic Journal of Elementary Education*, 17(3), 413–425. <https://doi.org/10.26822/iejee.2025.413>
- Buabeng, I., & Amo-Darko, B. (2025). Curriculum reforms without foundation: The effects of inadequate preparation in curriculum reforms on Ghanaian teachers and the education system. *Curriculum Perspectives*, 45(2), 133–145. <https://doi.org/10.1007/s41297-025-00309-7>
- Chandrakumar, S., & Vivek, R. (2023). A critical review of the mixed method application and its criticism. *Social Work and Education*, 10(2), 242–255. <https://doi.org/10.25128/2520-6230.23.2.8>
- Christensen, A. S. (2024). *Knowledge, capabilities, or problems? 3 curricular principles and their consequences using social studies as example*. Research Portal Denmark.
- Çöğmen, S., & Öznelçi, S. Y. (2024). Teachers as implementers: A systematic review of curriculum literacy. *Bati Anadolu Eğitim Bilimleri Dergisi*, 15(2), 1538–1560. <https://doi.org/10.51460/baebd.1508308>
- Colebra, J., & Luna, E. D. (2025). An exploratory analysis of Support, Engagement, and Commitment (SEC) of school administrators to teacher research programs. *International Journal of Management and Administration*, 9(18), 98–112. <https://doi.org/10.29064/ijma.1761633>
- Costa, J. (2024). Mixed methods in educational large-scale studies: Integrating qualitative perspectives into secondary data analysis. *Education Sciences*, 14(12), Article 1347. <https://doi.org/10.3390/educsci14121347>
- Demate, D. R. B., Aclis, M. S., Catbagan, F. C. P., Molina, G. F., Ramos, N. U., & Patacsil, F. F. (2025). Teacher perspectives on MATATAG curriculum: Challenges and collaborative solutions. *Multidisciplinary Reviews*, 8(11), Article 2025351. <https://doi.org/10.31893/multirev.2025351>
- Demir, M. (2024). *A review of literature on mathematics curricula in use at primary school level*. Research Square. <https://doi.org/10.21203/rs.3.rs-4407272/v1>
- Díaz, A. O. (2024). Assessment of Senior High School program delivery towards quality assurance: Evidence from the Philippines. *Education Sustainability & Society*, 7(2), 74–83. <https://doi.org/10.26480/ess.02.2024.74.83>
- Diem, H. T. T., Thinh, M. P., & Lam, V. (2024). Exploring practical pedagogy in high school biology education: A qualitative study of pre-service biology teachers' experiences in Vietnam. *European Journal of Educational Research*, 13(2), 557–570. <https://doi.org/10.12973/eu-jer.13.2.557>
- Fuentes, M. (2025). Teacher experiences, challenges, and support needs in the implementation of the Philippine MATATAG curriculum: An integrative literature review. *Journal of Interdisciplinary Perspectives*, 3(12), 167–180. <https://doi.org/10.69569/jip.2025.716>
- Ghamoushi, M., Mohamadi, Z., & Hashamdar, M. (2022). Development and validation of a potential assessment inventory for assessing EFL teachers' ecological agency. *Language Testing in Asia*, 12(1), Article 19. <https://doi.org/10.1186/s40468-022-00190-5>
- Gierus, B., Du, T., Maduforo, A. N., Gilbert, B. G., & Koh, K. (2025). Prevalence and quality of mixed methods research in educational subdisciplines: A systematic review. *SAGE Open*, 15(2), 1–18. <https://doi.org/10.1177/21582440251335171>
- Haile, T. M., & Mekonnen, E. A. (2024). Impacts of stakeholder engagement on curriculum implementation in Ethiopian Defense University. *Pedagogical Research*, 9(2), Article em0192. <https://doi.org/10.29333/pr/14369>
- Hambabi, K. T., Tileni, N. L. L., & Chirimbana, M. (2024). Exploring teachers' perspectives and challenges in implementing the revised biology education curriculum: A case study of the Ompundja circuit. *Creative Education*, 15(5), 838–855. <https://doi.org/10.4236/ce.2024.155051>
- Jatmiko, A., Asyhari, A., Irwandani, I., & Soeharto, S. (2023). The role of self-concept in modulating the effectiveness of nature-based science instruction. *Jurnal Pendidikan IPA Indonesia*, 12(4), 552–563. <https://doi.org/10.15294/jpii.v12i4.48287>
- Johannesen, H. J., Malich-Bohlig, N., Petersen, L., & Dam-Christensen, E. (2024). *Interdisciplinary collaboration in videographic teaching observation (InCoViTO)*. Research Portal Denmark.
- Johnson, H. L., McClintock, E., & Leech, N. L. (2022). *A multifocal lens on qualitative data analysis: An affordance of networking theoretical approaches*. HAL Open Science. <https://hal.archives-ouvertes.fr/hal-03749217>

- Kadırhan, Z., & Şat, M. (2025). A review of studies on the Türkiye Century Maarif Model. *Temel Eğitim*, 7(1), 173–188. <https://dergipark.org.tr/en/pub/temelegitim/issue/86975/1730094>
- Kajfez, R., Lee, D., Ehlert, K., Faber, C., Benson, L., & Kennedy, M. (2021). A mixed method approach to understanding researcher identity. *Studies in Engineering Education*, 2(1), 1–19. <https://doi.org/10.21061/see.24>
- Law, M. A. (2024). Human Dignity Curriculum: Teachers' comfort, commitment, and perceived support teaching a new socioemotional learning curriculum. *Frontiers in Education*, 9, Article 1427079. <https://doi.org/10.3389/feduc.2024.1427079>
- Limiansi, K., Aw, S., Paidi, P., & Setiawan, C. (2023). Biology teachers' perspective on change of curriculum policy: A case for implementation of "Independent" curriculum. *The Qualitative Report*, 28(12), 3521–3540. <https://doi.org/10.46743/2160-3715/2023.6204>
- Lubis, S. H., Fauziati, E., & Rochsantiningsih, D. (2023). Merdeka Belajar Curriculum: A study on EFL teachers' varying expressions of agency. *Voices of English Language Education Society*, 7(2), 335–348. <https://doi.org/10.29408/veles.v7i2.22517>
- Malinao, A. J., & Miano, J. J. (2025). Implementing the MATATAG curriculum: A qualitative study on teachers' challenges, adaptation strategies, and support needs. *Journal of Interdisciplinary Perspectives*, 3(5), 133–145. <https://doi.org/10.69569/jip.2025.133>
- Markham, Z. J. (2025). Illuminating teacher lived experiences in the new revised curriculum. *Psychology and Education: A Multidisciplinary Journal*, 43(5), 609–620. <https://doi.org/10.70838/pemj.430506>
- McChesney, K. (2021). Extending understandings. *The New Zealand Annual Review of Education*, 26, 96–112. <https://doi.org/10.26686/nzaroe.v26.6898>
- Mekheimer, M. A. (2025). Effective technology integration in higher education: A mixed-methods study of professional development. *Education and Information Technologies*, 30(1), 1205–1230. <https://doi.org/10.1007/s10639-025-13750-y>
- Minadzi, V. M., Davis, E. K., & Ababio, B. T. (2022). Exploring headteachers, teachers and learners' perceptions of instructional effectiveness of distance trained teachers. *International Journal of Learning, Teaching and Educational Research*, 21(8), 58–78. <https://doi.org/10.26803/ijlter.21.8.4>
- Minnaert, A. (2023). An epistemological shift forward. In *Routledge eBooks* (p. 274). Routledge. <https://doi.org/10.4324/9781003303473-20>
- Montoya, G., Díaz, F. J. G., & Usquiano, M. M. (2025). Beyond educational policies: Intercultural bilingual education teachers and the use of multimedia content in indigenous languages. *Journal of Language Teaching and Research*, 16(5), 1445–1456. <https://doi.org/10.17507/jltr.1605.01>
- Mordzeh-Ekpampo, I. M., Ernest, D. A., Holu, E. M., & Kadiri, M. (2025). Teachers perception towards the Basic (1-6) Standards-Based Curriculum in Ghana: A study at North Gonja District. *International Journal of Research and Innovation in Social Science*, 9(3), 7029–7042. <https://doi.org/10.47772/ijriss.2025.903sedu0520>
- Motsi, L., & Makgato-Khunou, P. (2024). Influential factors for successful adoption of future school curriculum. *African Journal of Teacher Education and Development*, 3(1), Article 35. <https://doi.org/10.4102/ajoted.v3i1.35>
- Musandu, C., Jita, L. C., & Bada, A. A. (2023). Teachers' opinion and experiences of the application of instructional leadership: Evidence from history teachers. *International Journal of Leadership in Education*, 1–19. <https://doi.org/10.1080/13603124.2023.2274362>
- Nikoçeviq-Kurti, E., Saqipi, B., & Kaçaniku, F. (2025). Navigating change: Exploring the interplay between teachers' understanding of curriculum reform and their self-efficacy. *Curriculum Perspectives*, 45(2), 117–130. <https://doi.org/10.1007/s41297-025-00308-8>
- Niu, H., & Niranjan, M. (2025). Teacher digital competence in New Zealand primary schools: A qualitative study of integration practices, challenges, and cultural considerations. *The Australian Educational Researcher*, 52(1), 115–138. <https://doi.org/10.1007/s13384-025-00912-7>
- Ntumi, S., Agbenyo, S., Tetteh, A., Yalley, C. E., Yeboah, A., & Nimo, D. G. (2023). Teacher preparedness and implementation of the National Pre-Tertiary Education Curriculum Framework in Ghana. *Journal of Educational Research and Practice*, 13(1), Article 18. <https://doi.org/10.5590/jerap.2023.13.1.18>
- Oranga, J. (2025). Mixed methods research: Merits, applications and challenges. *International Journal of Social Science*, 5(2), 233–245. <https://doi.org/10.53625/ijss.v5i2.11034>

- Oranga, J., Matere, A., & Njurai, E. W. (2025). The mixed methods research approach: An overview. *Postmodernism Problems*, 15(1), 84–99. <https://doi.org/10.46324/pmp2501084>
- O’Sullivan, P., Kuper, A., & Cleland, J. (2024). Avoiding common pitfalls in mixed methods research? *Advances in Health Sciences Education*, 29(4), 1071–1085. <https://doi.org/10.1007/s10459-024-10362-y>
- Pak, K., Polikoff, M. S., Desimone, L. M., & García, E. S. (2020). The adaptive challenges of curriculum implementation: Insights for educational leaders driving standards-based reform. *AERA Open*, 6(2), 1–15. <https://doi.org/10.1177/2332858420932828>
- Peters, M., & Fàbregues, S. (2023). Missed opportunities in mixed methods EdTech research? Visual joint display development as an analytical strategy for achieving integration in mixed methods studies. *Educational Technology Research and Development*, 72(5), 2477–2501. <https://doi.org/10.1007/s11423-023-10234-z>
- Pregoner, J. D. (2025). *Research approaches in education: A comparison of quantitative, qualitative and mixed methods*. SSRN. <https://doi.org/10.2139/ssrn.5111007>
- Rana, K., & Chimoriya, R. (2025). A guide to a mixed-methods approach to healthcare research. *Encyclopedia*, 5(2), 51–64. <https://doi.org/10.3390/encyclopedia5020051>
- Sharma, L. R., Bidari, S., Bidari, D., Neupane, S., & Sapkota, R. (2023). Exploring the mixed methods research design: Types, purposes, strengths, challenges, and criticisms. *Global Academic Journal of Linguistics and Literature*, 5(1), 3–12. <https://doi.org/10.36348/gajll.2023.v05i01.002>
- Taylor, N., Mazariago, C., Baffsky, R., Liang, S., Wolfenden, L., Pesseau, J., Fontaine, G., Carland, J. E., Shiner, C. T., Wise, S., Debono, D., McKay, S., Best, S., & Morrow, A. (2025). Advancing the speed and science of implementation using mixed-methods process mapping – Best practice recommendations. *International Journal of Qualitative Methods*, 24, 1–16. <https://doi.org/10.1177/16094069251340908>
- Teacher education for transformative agency: Critical perspectives on design, content and pedagogy*. (2020). African Sun Media. <https://doi.org/10.18820/9781928480938>
- Tholchah, M. (2025). A light from Finland: Uncovering teachers’ role in evaluating students’ learning through parent-teacher conferences. *Journal of Integrated Elementary Education*, 5(1), 45–58. <https://doi.org/10.21580/jieed.v5i1.22753>
- Versfeld, J., Graham, M. A., & Ebersöhn, L. (2022). Time to flock: Time together strengthens relationships and enhances trust to teach despite challenges. *Teachers and Teaching*, 29(1), 70–89. <https://doi.org/10.1080/13540602.2022.2145279>
- Wawire, B. A., Kiambati, F., Muhia, N., Gathoni, G., & Abuya, B. (2025). Competence-based curriculum implementation in Africa: A scoping review of pedagogical and assessment practices. *Journal of Curriculum Studies*, 57(1), 1–18. <https://doi.org/10.1080/00220272.2025.2523429>
- Xiao-hong, D., Sha, S., & Xiao-yan, D. (2025). Designing structured curricula to enhance teaching competencies: Integrating teaching methods course clusters in pre-service teacher education. *Pedagogy and Psychology of Sport*, 23, Article 61660. <https://doi.org/10.12775/paps.2025.23.61660>
- Yamota, N. Y. B. (2025). Challenges in the adoption process of the revised K to 10 curriculum: A qualitative descriptive study using Rogers’ Diffusion of Innovation Theory. *International Journal of Research and Scientific Innovation*, 12(5), 33–47. <https://doi.org/10.51244/ijrsi.2025.12050006>
- Yulin, N., & Danso, S. D. (2025). *Assessing pedagogical readiness for digital innovation: A mixed-methods study*. arXiv. <https://doi.org/10.48550/arxiv.2502.15781>
- Zhang, X., Rahman, M. N. A., Wahab, H. B. A., & Li, Q. (2025). How mentor teachers and emotions influence professional identity and career decisions of preservice preschool teachers. *Frontiers in Education*, 10, Article 1569062. <https://doi.org/10.3389/feduc.2025.1569062>
- Zhou, Y., Zhou, Y., Machtmes, K., Zhou, Y., & Machtmes, K. (2023). Mixed methods integration strategies used in education: A systematic review. *Methodological Innovations*, 17(1), 41–55. <https://doi.org/10.1177/20597991231217937>