What Drives Curriculum Implementation? The Case of Secondary Science Education Curriculum among Selected Teacher Education Institutions in the Philippines

GERLIE D. CUTAB

https://orcid.org/0009-0005-9728-9414

Camiguin Polytechnic State College, Balbagon, Mambajao, Camiguin, 9100 Philippines

Corresponding author: gerliedcutab@gmail.com

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ABSTRACT

Science majors in various teacher education institutions perform below the national passing rate despite the curriculum mandates by the Commission on Higher Education. The question lies in how these standards and guidelines are implemented across Teacher Education Institutions of the country. An investigation on how the curriculum of the Bachelor of Secondary Education (BSED) Science in selected Teacher Education Institutions (TEIs) in the Philippines was conducted utilizing a descriptive quantitative design to 10 selected private and public tertiary schools. It analyzed curriculum components such as course outlines, program of study, and curriculum maps while examining institutional factors like faculty qualifications, experience, and student-teacher ratios. It was found that there was

an extensive implementation of course outlines and evaluative measures, which indicates that schools had a strong focus on clear learning objectives and effective assessment practices, while limited implementation was noted in the aspect of OBTL course descriptions and learning plans. Multinomial logit regression analysis showed that institutional type, faculty qualifications, and teaching experience significantly determine the likelihood of achieving higher levels of curriculum implementation. Based on this finding, there must be a continuing professional development for teachers for better curriculum implementation. The government should extend subsidies to improve resource allocation, and a more vigorous system of curriculum support to enhance the quality of teacher education in the country.

INTRODUCTION

Education is a dynamic and ever-evolving process, shaped by the changing demands of the workforce and society (Kyvik, 2009). Globalization, internationalization, ASEAN integration, and curriculum reforms are among the changes faced today in most educational systems around the globe (Ziguras, 2016). Amidst these changes, Teacher Education Institutions, as primary producers of teachers worldwide, play a vital role in developing pre-service teachers and enhancing pre-service teachers' quality to sustain their primary goal of producing quality teachers. The Teacher Education Institution shall ensure that future teachers provide a quality education that will give learners the opportunities for effective participation in the societies and economies of the twenty-first century and meet the teaching industry's demands. Thus, the teacher education curriculum plays a pivotal role in producing quality pre-service teachers whose knowledge, skills, and expertise shall shape the minds and hearts of their students in the course of their teaching careers (Alahmad et al., 2021).

When Republic Act 10533, otherwise known as the "Enhanced Basic Education Act of 2013," was approved, remarkable changes happened in the new basic education curriculum. Among the changes are the inclusion of kindergarten in the basic education, the additional two years in high school, and a contextualized and global, inquiry-based, spiral progression, and localized and indigenized curricula. These changes have caused the total transformation of the landscape of the Philippine educational system because the two other Philippine educational agencies, namely: Technical Education and Skills Development Authority (TESDA) and Commission on Higher Education (CHED), should align their framework with the basic education curriculum. Therefore, they need to mandatorily advise schools under their supervision to revise their curricula in

all fields to harmonize or align with basic education needs.

For this reason, the Commission on Higher Education (CHED) issued CMO no. 75 s 2017 to all Higher Education Institutions (HEIs) in the country offering Bachelor of Secondary Education. This CHED memorandum order served as a guide for all teacher education institutions to revise their curriculum. This memorandum's policies, standards, and guidelines (PSG) implement the shift to competency-based standards/ outcome based education in response to the 21st Century Philippine Teacher Education Framework. Moreover, the PSG is also anchored on the salient features of K to 12 Enhanced Curriculum (new basic education curriculum), the Philippine Qualification Framework, and Philippine Professional Standards for Teachers as clearly stipulated in section 1 of CMO no.75 s 2017. Hence, Teacher Education Institutions in the country is expected to produce globally competitive graduates who are highly motivated and competent enough in their chosen field of specialization.

With this expectation, TEIs should ensure that their school's curriculum must be carefully planned, implemented, and evaluated. The study of Kojana (2019) revealed that teachers often lack theoretical knowledge and familiarity with principles about curricular change, and inadequate resources were among the most common challenges in implementing the curriculum. Therefore, in the process of curriculum development and reform, it is essential that stakeholders particularly teacher educators and administrators possess a deep understanding of the implemented curriculum to ensure effective delivery and meaningful learning outcomes (Matope, 2021). Understanding whether or not a program was implemented correctly allows implementers to more accurately interpret the relationship between the program and observed outcomes (Duerden & Witt, 2012) while Ohajionu (2021), stresses the importance of a robust monitoring and feedback system during implementation. Thus, developing and maintaining a good monitoring and feedback system is indispensable during implementation (Durlak, 2017). Therefore, whenever any program is being carried out, it is vital to monitor the level of implementation that has been achieved so its impact can be interpreted appropriately.

As stipulated in the Policies and Guidelines (PSG) of CMO 75 series of 2017, CHED should conduct regular monitoring and evaluation to ensure TEIs compliance with the new Secondary Teacher Education Curriculum. Furthermore, during the 48th National Convention and 9th International Convention of Philippine Association for Teachers and Educators (PAFTE) held in Davao City last Oct 17-19, 2019 participants' workshop, participants were asked to answer on "what are the challenges in the implementation of the new teacher education curriculum"? The consolidated answers drawn from the

participants were as follows: course outline and syllabi for new Professional Education subjects, Major subjects and some General Education subjects are not provided in the PSG, no unified course outline basis in crafting the PRC Board Examination, and scarcity or worst there is no available references in the market in most of the new subjects offered in the new teacher education curriculum.

A well-structured course outline plays a vital role in ensuring clarity in curriculum delivery. Studies by Strunk et al. (2016) and Chan et al. (2017) emphasize that a clear and detailed course outline benefits both instructors and students by setting clear expectations and aligning learning goals. These outlines are instrumental in maintaining consistency and quality in education, aligning with best practices in educational planning.

The broader concept of curriculum delivery, which includes various teaching methods and strategies, also plays a significant role in curriculum implementation. Wang and Wang (2012) highlights the importance of Outcome-Based Teaching and Learning (OBTL), which ensures that curriculum outcomes are measurable and aligned with student competencies.

OBTL focuses on aligning teaching methods and assessment with specific learning outcomes. Davis (2003) notes that clear course descriptions and learning plans are critical for guiding instructors and students in achieving these outcomes. This aligns with findings from various studies that emphasize the need for faculty development programs to improve curriculum planning and documentation skills (Wang & Wang, 2012).

The study by Mufanti et al. (2024) investigates the implementation of Outcomes-Based Education (OBE) in Indonesian higher education. It reports on teachers' understanding of OBE, the challenges they face, and the support available to them. The research highlights gaps in knowledge and preparation among educators and suggests that more professional development is needed to improve OBE implementation.

The program of study and curriculum mapping are essential for aligning the curriculum with institutional goals and ensuring coherence across courses. Kertesz (2015) argues that a well-defined program of study provides a logical progression for students, while a curriculum map helps ensure that learning outcomes are systematically addressed across courses. He also introduces U-Map, a design-focused tool that supports the constructive alignment of university courses, promoting data accumulation for course accreditation and facilitating continuous review of teaching practices. Caramaschi et al. (2022) similarly found that despite the growing importance of curriculum mapping, its implementation remains inconsistent across institutions. This inconsistency may be attributed to factors such as resource constraints and faculty expertise, which can hinder the

full development and utilization of these components.

Effective evaluative measures and grading systems are central to ensuring that student performance is accurately assessed in line with curriculum goals. Aithal and Maiya (2023) underscores that evaluation frameworks should prioritize fairness and reliability, which directly impact curriculum quality.

Several factors influence the level of curriculum implementation, including institution type, faculty qualifications, and teaching experience. The study of Susilo et al. (2021), noted that private schools often have more resources and institutional support, allowing for more comprehensive curriculum implementation.

Muhando et al. (2025) found that while teachers' academic qualifications impact student performance, they do not necessarily guarantee effective curriculum implementation. In contrast, Hadisaputra et al. (2024) argue that highly qualified teachers are better equipped to manage and implement curricula.

The finding of Nalbantoğlu and Bümen (2024) found that training significantly enhanced faculty competence in implementing competency-based education programs. This is consistent with Shawer (2017), who highlighted that preservice teacher training and teaching experience are important factors influencing curriculum development at the classroom level.

The role of teacher preparation and continuous professional development cannot be overstated. Several studies emphasize that teachers' competence and their ability to implement curricula are influenced not only by academic qualifications but also by ongoing training.

Kwok (2014) highlights the importance of considering the contextual factors of schools, such as support structures, school culture, and external pressures, in shaping teachers' concerns and their ability to implement innovative curricula. LaChausse et al. (2014) stress the importance of ongoing professional development to maintain curriculum fidelity, emphasizing that initial teacher training must be supplemented with continuous support to ensure effective curriculum implementation.

Meanwhile, Si (2021) explores how curriculum reforms can exert unexpected pressure on households, influencing educational spending and student performance. This illustrates the broader socio-economic impact of curriculum changes and highlights the complex relationship between curriculum reforms, household educational investments, and student outcomes.

Bantwini (2010) examines how teachers in South Africa perceive curriculum reforms, noting challenges such as insufficient training, unclear communication, and resource limitations. Despite these barriers, teachers remain committed to improving their teaching practices, suggesting the importance of adequate

support during curriculum reforms.

Similarly, Bardoe et al. (2023) explore challenges in implementing STEM education in the Bono East Region of Ghana, identifying barriers such as inadequate teacher training, lack of resources, and insufficient community support. These challenges are echoed by Zafeer et al. (2024), who investigate the impact of internal school factors, such as teacher experience and school resources, on students' academic outcomes in science education. Both studies emphasize the need for a supportive environment to enhance curriculum implementation and student performance.

In this premise, the researcher pursues this study in response to the continued low passing rates in the Licensure Examination for Teachers (LET) in Science despite multiple curriculum issuances by CHED. It aims to evaluate how the new secondary teacher education curriculum major in Science is implemented across ten higher education institutions. The assessment focuses on curriculum outlines, sample programs of study, curriculum maps, modes of delivery, integration of Outcome-Based Teaching and Learning (OBTL), and evaluation systems.

Specifically, it (a) assesses the current level of implementation of the Bachelor of Secondary Education (BSEd) Major in Science Curriculum stipulated in CMO No. 75, s. 2017 in selected Teacher Education Institutions (TEIs) in the Philippines and (b) identify institutional factors such as faculty qualifications, experience, student teacher ratio, faculty load, trainings attended and type of institution that significantly influence the effective implementation of the BSEd Science curriculum. Understanding these factors help pinpoint areas of strength and areas needing improvement to ensure that TEIs produce well-prepared and competent future educators in the science field.

FRAMEWORK

The conceptual framework of this study is grounded on the understanding that the quality of program implementation is a critical factor influencing educational outcomes (Durlak, 2017). Effective monitoring of implementation is essential, regardless of the type of program, its goals, or its intended beneficiaries. As shown in Figure 1, the framework begins with the identification of legal and theoretical foundations that guide the study, specifically CHED Memorandum Order (CMO) No. 46, series of 2012; the Philippine Qualifications Framework (PQF); Outcome-Based Teaching and Learning (OBTL); Program Theory; and the Theory of Knowledge. These foundations provide the basis for evaluating how Teacher Education Institutions (TEIs) implement the BSEd Science curriculum under CMO No. 75, series of 2017. The study examines the curriculum

components such as curriculum outlines, sample programs of study, curriculum maps, delivery methods, use of OBTL, and evaluation systems. It also identifies the opportunities and challenges experienced by the TEIs in implementing the curriculum. The results of this assessment are used to define existing gaps in implementation. These identified gaps will serve as the basis for designing a proposed Curriculum Implementation Model aimed at enhancing the delivery and quality of the BSEd Science program across TEIs.

Figure 1
Schematic diagram showing the flow of the study
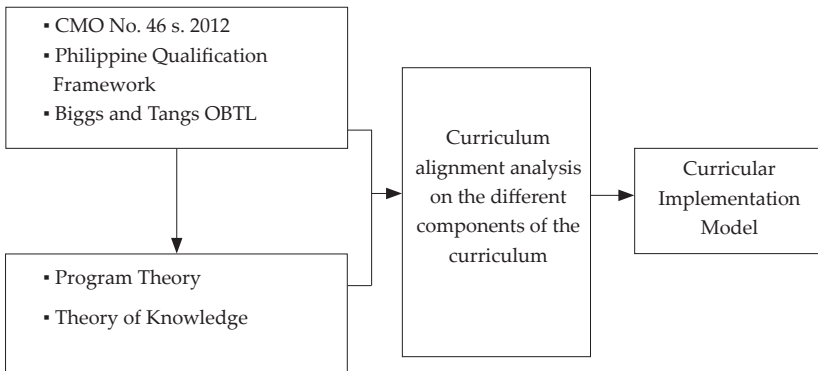
METHODOLOGY

Research Design

A descriptive quantitative research design was utilized in this study to assess the implementation level of the Bachelor of Secondary Education (BSED) Science curriculum in selected Teacher Education Institutions (TEIs). It was chosen to provide a systematic assessment of curriculum implementation by examining measurable indicators and identifying patterns and trends among institutions.

The study focused on analyzing the implementation level based on key components of the curriculum, such as curriculum outline, sample program of study, curriculum map, means of curriculum delivery, outcomes-based teaching and learning (OBTL), and the system of evaluation. This approach relied solely on collecting objective data from institution's records and other sources documents to ensure it is accurate and reliable.

The study aimed to quantify the relationships between curriculum implementation levels and institutional factors such as faculty qualifications,

faculty experience, student-teacher ratio, faculty workload, trainings attended by faculty, and institution type being private or public.

Study Sample and Recruitment

There were 10 respondent- teachers who hold permanent positions in various selected state universities and private colleges and universities across the Philippines that were interviewed. They were chosen to ensure that the sample represented the diversity of Teacher Education Institutions (TEIs) in terms of regional distribution and institutional type.

The criteria for inclusion of respondents required that they occupy permanent teaching positions within their respective institutions, as this status ensures their direct involvement and familiarity with the implementation of the Bachelor of Secondary Education (BSED) Science curriculum. The aim of this criterion is to reflect the perspective of experienced educators having substantial knowledge and involvement in the delivery of curriculum and management. Participants were determined and recruited through collaboration from respective human resource and administrative offices. From the list of teachers from their offices, they were invited to participate through a letter and sent out in their respective offices. Participation in the study were insured to be anonymous and voluntary.

Data Collection

Generally, a documentary analysis was done in respective schools-respondents. This was done by scrutinizing institutional records and curriculum-related documents. These documents were gathered from the administrative offices of the selected institutions, with the help of faculty in-charge of the program or program chairpersons.

To ensure consistency and completeness of data analysis, the collection process was structured thoroughly to align with the study's goal.

Teacher -respondents handling subjects in the program were also interviewed to gain insights into how curriculum is implemented and to picture out the curriculum implementation efforts of the respective school-respondents.

Validity and Reliability of Instrument

The study utilized a self-made questionnaire and interview checklist. Its reliability and validity were ascertained by submitting for review and scrutiny by various experts in the field of education including an Education Program supervisor, Dean of the institute of teacher education, a secondary school principal. After which their comments and suggestions were integrated the instrument also gone through pilot testing and reliability test from a non-respondent state

university, which offers a BSEd-Science curriculum. Fifteen respondents, all faculty members of an HEI, were selected to do the pilot testing and simulation activity in documentary analysis process using the pretested checklist. Statistical analysis of the instrument through Cronbach alpha revealed to have 0.985 alpha value which deemed the checklist to be valid and reliable.

Data Analysis

The documentary analysis was conducted to achieve the main goal of the study which is to determine the level of implementation of the Bachelor of Secondary Education (BSED) Science curriculum. The implementation level was quantified using a scale ranging from 1 to 3, with a continuous classification as follows: *3 (Extensive): 2.35 – 3.00, 2 (Moderate Extensive): 1.68 – 2.34, 1 (Limited): 1.00 – 1.67, 0 (Missing): No data available.* Scores were computed for each curriculum component based on relevance, completeness and that the study is in line with the standards set.

The independent variables of the study were classified into theoretical domains, and each variable represents key factors potentially influencing the level of curriculum implementation:

Educational Attainment. It is a categorical variable with levels indicating the highest educational qualification attained by the faculty member (1 - Bachelor's, 2- Master's, 3-Doctorate). This helps assess how the level of education influences the extent of curriculum implementation.

Years of Teaching Experience. A continuous variable capturing the number of years a faculty member has been teaching. This variable explores how experience may affect curriculum delivery and implementation.

Student-Teacher Ratio. A continuous variable representing the number of students per faculty member. This will help explore whether a higher student-teacher ratio affects curriculum implementation.

Faculty Load. A continuous variable indicating the number of courses or credit units a faculty member handle. This can influence the capacity for effective curriculum delivery.

Training on Curriculum. A binary categorical variable indicating whether the faculty member attended any training related to the curriculum (1 for Yes, 0 for No). This variable examines whether specialized training enhances curriculum implementation.

Institution Type. A categorical variable distinguishing between state universities and private colleges/universities (1 for State Universities, 0 for Private Institutions). This variable investigates whether institutional type impacts curriculum implementation.

In identifying the factors that contribute to the level of implementation of curriculum, a multinomial logit regression analysis was used. The analysis allowed for the modeling of categorical outcomes and provide assessment on how the identified factors contributed to the likelihood of achieving another levels of implementation.

The model is specified as follows:

Equation 1

$$P(Y_i = j \mid X) = exp(X_i\beta_j) / \Sigma_j(exp(X_i\beta_K))$$

where:

$P(Y_i = j \mid X)$ is the probability of outcome j for respondent i, given predictor variables X.

X_i represents the independent variables (*faculty qualifications, experience, student-teacher ratio, faculty load, trainings attended, type of institution*).

β_j represents the coefficients estimated for category j.

k represents the number of possible categories in the dependent variable (0 to 3 in this case).

Ethical Research Protocol

A strict compliance on ethical standards were observed by the researcher from insuring anonymity and confidentiality of the data and respondent's identity to safeguarding of the data being gathered during the conduct of the study. Necessary approval and consent were sought from the ethical review board of the university before the study was implemented.

RESULTS AND DISCUSSION

Level of Implementation of BSED curriculum

The findings reveal a varying level of implementation across the curriculum delivery indicators. Course outline as an indicator of curriculum delivery implementation got a mean of 3.0 and a standard deviation of 0.85 indicating an extensive implementation. A well-structured course outline ensures clarity in the delivery of content and expectations, which benefits both faculty and students by providing a clear framework for achieving learning objectives. Its high implementation level reflects the institution's commitment to maintaining

consistency and quality in curriculum delivery, aligning with best practices in educational planning (Strunk et al., 2016). The findings align with the study of Chan et al. (2017), who emphasized that well-structured course outlines are essential for providing clarity and coherence in curriculum delivery. Their study suggests that a clear outline ensures that both instructors and students are aligned in their expectations and goals for the course.

In contrast, the program of study (M = 2.33, SD = 0.05) and curriculum map (M = 2.22, SD = 0.74) show only moderate levels of implementation. These components are crucial for aligning the curriculum with institutional goals and ensuring coherence across courses. A well-defined program of study provides a roadmap for students, enabling them to progress logically through their academic journey, while a curriculum map ensures that learning outcomes are systematically addressed (Kertesz, 2015). The moderate implementation levels in this study suggest that there may be gaps in how these components are developed or integrated into the curriculum. This could be indicative of a broader challenge in higher education systems, where curriculum mapping is not always fully developed or utilized. This aligns with the findings of Caramaschi (2022), who found that despite the increasing importance of curriculum mapping for aligning learning outcomes with teaching practices, its implementation remains inconsistent across institutions.

Similarly, the means of curriculum delivery with (M = 2.67, SD = 0.56) which means an extensive implementation underscores the institution's effort to provide diverse and effective teaching strategies. These methods play a critical role in fostering student engagement and accommodating various learning styles. The alignment of OBTL (Outcome-Based Teaching and Learning) course outcomes (M = 2.67, SD = 0.99) with extensive implementation further demonstrates the institution's focus on designing courses that emphasize measurable learning outcomes. Such alignment is essential for ensuring that students acquire the skills and competencies required in their respective fields, ultimately enhancing employability and preparedness for global challenges (Wang & Wang, 2012).

However, areas such as OBTL course descriptions (M = 1.33, SD = 1.60) and OBTL learning plans (M = 2.06, SD = 1.01) reveal limited implementation levels, signaling the need for targeted interventions. Clear and comprehensive course descriptions are critical for communicating the purpose and expectations of a course to students, while well-prepared learning plans help instructors align their teaching strategies with intended outcomes. The gaps in these indicators suggest a need for faculty development programs aimed at improving skills in curriculum planning and documentation. Addressing these gaps can enhance the overall quality of curriculum delivery, ensuring alignment with the principles of

outcome-based education (Davis, 2003).

Evaluative measures or grading systems with (M = 3.0, SD = 0.45) interpreted to have an extensive implementation indicates that institutions prioritize fair and reliable assessment practices. Effective evaluation is a cornerstone of quality education, as it ensures that students' performance is accurately measured and learning objectives are met. The strong focus on assessment frameworks reflects the institution's commitment to accountability and continuous improvement, aligning with quality assurance standards in higher education (Aithal, 2023).

Table 1

Summary of curriculum implementation level among higher education institution in the Philippines

Indicator	Mean	SD	Implementation Level
1. Course Outline	3.0	0.85	Extensive
2. Program of Study	2.33	0.05	Moderately Extensive
3. Curriculum Map	2.22	0.74	Moderately Extensive
4. Means of Curriculum Delivery	2.67	0.56	Extensive
5. OBTL- Course Description	1.33	1.60	Limited
6. OBTL- Course Outcomes	2.67	0.99	Extensive
7. OBTL- Learning Plan	2.06	1.01	Moderately Extensive
8. OBTL- Evaluative Measure/ Grading System	3.0	0.45	Extensive
General Implementation Level	2.14	0.78	Moderately Extensive

In general, the implementation level of the BSED curriculum among Teacher Education Institutions (TEIs) in the Philippines is moderately extensive, evident by its mean score of 2.14. High implementation levels, such as in course outlines and evaluative measures, serve as benchmarks for good practices and demonstrate institutional readiness for quality assurance and accreditation. Conversely, areas with moderate or limited implementation reveal opportunities for targeted interventions, such as faculty training or resource allocation, to improve curriculum alignment and delivery.

One possible explanation for this moderate level of implementation could be attributed to challenges faced by these institutions, such as resource limitations, varying levels of faculty expertise, and the need for continuous professional development. Many TEIs may face difficulties in ensuring uniformity in the delivery of the curriculum, given the disparities in access to resources, infrastructure, and training programs. Moreover, while certain curriculum components may be

well-implemented in some institutions, others, especially those related to newer teaching methodologies or updated curriculum frameworks, may not yet be fully integrated or practiced across all institutions.

Despite improvements in certain areas, the Philippines continues to rank low in international assessments such as the Programme for International Student Assessment (PISA), which evaluates reading, mathematics, and science literacy among 15-year-old students. While PISA assesses basic education outcomes, these performance gaps may reflect, in part, the quality of teacher preparation at the tertiary level. The findings of this study reveal varying levels of implementation of the BSEd Science curriculum across TEIs, suggesting that inconsistencies in curriculum delivery and training approaches may contribute to inadequately prepared science teachers. This highlights the urgent need to strengthen curriculum implementation in TEIs to ensure that future science educators are equipped with the competencies necessary to improve student learning outcomes nationwide.

Factors Affecting the Level of Curriculum Implementation

In this study, the focus was placed on comparing the base outcome (Category 2 - moderately extensive implementation) with Category 3 (high implementation) to better understand the factors that influence higher levels of curriculum implementation.

Results from the regression analysis suggest a varied direction and statistical significance. In table 2, institution type has a coefficient of -2.068 with a p-value of 0.057, which is slightly above the conventional significance level of 0.05 but still close enough to suggest that public institutions tend to be in Category 2 (moderately extensive) compared to Category 3 (high implementation). This further indicates that public institutions are less likely to have high levels of curriculum implementation compared to private institutions.

This finding aligns with broader observations from the NCES study in 1997, which highlights differences in curriculum implementation between public and private schools. Private institutions often benefit from greater autonomy, more tailored curricula, and better resource allocation, enabling more extensive curriculum implementation. Conversely, public institutions face constraints due to state-mandated standards, funding limitations, and accountability measures, which may restrict their ability to achieve high levels of curriculum implementation.

In their study, Susilo et al. (2021) explore the implementation of the *Adiwiyata* curriculum in public and private schools in Bantul Regency, Yogyakarta, Indonesia. While both types of schools meet the essential components

of the curriculum objectives, content, methods, and evaluation, the extent of implementation varies based on the unique characteristics and resources of each school. Private schools have superior resources or institutional support, allowing them to implement the curriculum more comprehensively than their public counterparts.

Faculty qualifications significantly influence the less likelihood of achieving high levels of curriculum implementation. The negative coefficient of -2.016, with a highly significant p-value of 0.001, indicates that institutions with faculty holding advanced qualifications (PhD degrees) are less likely to fall into Category 3 compared to the base outcome. This result implies that institutions with less-qualified faculty (e.g., holding a Bachelor's degree or Master's degree) are more likely to achieve high curriculum implementation, which is counterintuitive and warrants further exploration.

One possible explanation for this result is that highly qualified faculty may prioritize research or other academic responsibilities over curriculum implementation, thereby limiting their focus on this area. Additionally, faculty with advanced degrees might face institutional barriers, such as rigid administrative processes or resource constraints that hinder the translation of their expertise into effective curriculum implementation.

An article by Muhando et al. (2025) examines the relationship between teachers' academic qualifications and the implementation of the History and Government curriculum in secondary schools in Kenya. It finds that teachers' academic qualifications, though they account for some variation in student performance, did not have a statistically significant impact on curriculum implementation. The p-value of 0.115 suggests that the academic qualifications alone are not strong predictors of effective curriculum implementation.

On the other hand, Hadisaputra et al. (2024) stressed the importance of teacher qualifications in curriculum implementation, suggesting that highly qualified teachers are better able to manage and implement curricula effectively. Teachers' academic background, training, and professional development are seen as crucial for overcoming challenges in curriculum management. Teachers' qualifications are linked to better understanding of curriculum content, effective teaching methods, and the ability to adapt to curriculum changes.

The number of trainings attended by faculty members does not appear to significantly impact the likelihood of an institution being in Category 3 (High Implementation). With a coefficient of 0.298 and a p-value of 0.291, the variable is not statistically significant, suggesting that attending more training sessions does not necessarily result in more extensive curriculum implementation. This finding challenges the assumption that continuous professional development

automatically translates into better curriculum implementation.

This negates the study of Nalbantoğlu and Bümen (2024) which found that providing comprehensive training and support to faculty members significantly enhances their perceived competence in developing and implementing competency-based education programs. The study found correlations between the types of training received and the faculty members' levels of competence.

Teaching experience have a marginal effect on the likelihood of being in Category 3. The coefficient of 0.092 with a p-value of 0.061 is marginally significant, implying that experienced faculty members may have a slight advantage in implementing the curriculum at a higher level. The positive coefficient suggests that as faculty experience increases, so does the likelihood of achieving high implementation of the curriculum but this finding is not statistically significant. In the study of Shawer (2017) specifically found that preservice teacher training and teaching experience are significant factors influencing classroom-level curriculum development. Teachers' content knowledge, teaching styles, and soft skills also play crucial roles in shaping the curriculum they implement.

The lack of appropriate pre-service and in-service training for teachers hindered their ability to effectively implement new methods, emphasizing the need for continuous, developmental training as mentioned by Kırkgöz (2008). This mirrors the importance of aligning training with teachers' existing beliefs and practices to facilitate successful curriculum implementation.

Moreover, teaching load has a coefficient of -0.104, with a p-value of 0.205, indicates that higher teaching loads are not associated with a higher likelihood of achieving high implementation (Category 3) compared to moderate implementation (Category 2). The negative coefficient suggests that as teaching loads increase, the likelihood of high implementation decreases. However, this relationship is not statistically significant, indicating that teaching load alone may not be a decisive factor in determining curriculum implementation levels.

This result implies that faculty members with lighter teaching loads could have more time and energy to dedicate to curriculum development and implementation efforts, while those with heavier workloads might struggle to balance their responsibilities, potentially compromising the quality of curriculum delivery. These findings are consistent with Wahab et al. (2024), who highlighted the critical role of workload balance in maintaining teacher morale and effectiveness in curriculum delivery. Thus, maintaining a balanced workload is crucial for sustaining teacher morale and enhancing their effectiveness in curriculum delivery.

With a coefficient of -0.0329122 and a p-value of 0.403, the analysis indicates that the ratio of students to teachers does not significantly affect

whether an institution achieves high (Category 3) or moderate (Category 2) levels of curriculum implementation. While the negative coefficient suggests that a higher student-teacher ratio is associated with a lower likelihood of achieving high implementation, this finding is not statistically significant. This result aligns with some studies that have found no clear link between student-teacher ratios and curriculum outcomes, while it contrasts with others that argue smaller class sizes improve educational quality and implementation.

Table 2

Multinomial Logit Regression Result Comparing Factors Influencing Curriculum Implementation: Category 2 (Moderately Extensive) vs. Category 3 (High Implementation)

Variables	Coefficient	Standard Error	Marginal Effect (%)	z	p-value
Constant	5.66	2.430		2.33	0.020
School Type	-2.068	1.087	0.76	-1.90	0.057
Faculty Qualification	-2.016	0.630	-0.15	-3.20	0.001
Number of trainings attended	0.028	0.023	0.003	1.06	0.291
Teaching Experience	0.092	0.049	-0.001	1.88	0.061
Faculty Teaching Load	-0.104	0.822	0.017	-1.27	0.205
Student-Teacher Ratio	-0.033	0.039	-0.00008	-0.84	0.403

Likelihood Ratio Test: LR chi2(12) = 82.09, p-value = 0.0000
Log-Likelihood = -53.341971
Pseudo R^2 = 0.4349
AIC = 134.68

CONCLUSION

The study reveals that the level of implementation of the BSED Science curriculum among Teacher Education Institutions (TEIs) is generally "moderately extensive," with notable variations across specific curriculum delivery indicators. High levels of implementation were observed in areas such as course outlines and evaluative measures, underscoring the institutions' strengths in maintaining quality and consistency. However, areas like curriculum maps, program of study, and OBTL components (course descriptions and learning plans) were found to have moderate to limited implementation, indicating gaps that need to be addressed to achieve a more holistic and effective curriculum delivery.

Factors influencing the level of implementation include institution

type, faculty qualifications, and teaching experience. Public institutions are less likely to achieve high levels of curriculum implementation compared to private institutions, likely due to resource and policy constraints. Surprisingly, institutions with highly qualified faculty (e.g., PhDs) are less likely to reach high implementation levels, possibly due to competing academic responsibilities or institutional barriers. The study also highlights that while faculty training and teaching experience marginally influence implementation, they are not statistically significant predictors of higher curriculum implementation levels.

RECOMMENDATION

The significant disparity in curriculum implementation levels between private and public teacher education institutions (TEIs), calls for a strong partnership between these institutions. Policy makers should also consider at increasing subsidy to public higher education institutions to level up the playing fields in as much as curriculum implementation and quality is concern. This could give public TEIs the autonomy needed in improving curriculum delivery and an equitable standard in education.

Exploring additional factors such as administrative support, student engagement, and institutional leadership is implicitly recommended for further study such as longitudinal studies to track changes over time and evaluate the impact of educational reforms on licensure examinations. Strengthening curriculum mapping and develop well-defined programs of study to align with institutional goals and provide students with clearer academic progression, fostering collaboration between curriculum planners and faculty should also be looked into.

Institutions should consider redistribution of faculty workloads to allow sufficient time for curriculum planning, mentoring, and professional development. Enhancing faculty development programs also is essential which focus on improving skills in curriculum planning, mapping, and outcomes-based teaching and learning (OBTL) principles. Reasonable workshops and training sessions can empower faculty to address challenges and may improve curriculum implementation effectively.

TRANSLATIONAL RESEARCH

The results can be translated into a policy and implementation guide. Such guide will outline key factors influencing curriculum execution, including institutional support, teacher preparedness, resource availability, and contextual

challenges. It will serve as a framework for teachers, implementers, and curriculum developers to enhance science education delivery. Furthermore, the guide can be evaluated by stakeholders for its relevance, applicability, and impact on improving curriculum implementation in teacher education institutions to improve the performance of teacher education in the country as a whole

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