TEACHERS' PERCEPTIONS AND CLASSROOM PRACTICES ON REALISM-CONSTRUCTIVISM IN PUBLIC SECONDARY MATHEMATICS EDUCATION

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Abstract. The study aimed to examine the perception and classroom implementation of the realism-constructivism approach among public secondary mathematics teachers in the school's division of Nueva Vizcaya. Specifically, it sought to explore the teacher's perceptions of the approach, determine the extent to which they implement its principle in classroom instruction, and analyzed the relationship between their perceptions and level of implementation. A quantitative research approach was used, employing descriptive-correlational research design. Data were gathered through a researcher-made questionnaire, validated by three experts using the Content Validity Index and pilot tested among the secondary mathematics teachers yielding a high reliability coefficient. The main respondents were the sixty public secondary mathematics teachers in the division. Descriptive statistics such as mean and standard deviation were used to summarize the data, while Kendall's Tau Correlation Coefficient was used to test the relationship between teacher's perceptions and extent of implementation in the classroom instruction. Findings revealed that secondary mathematics teachers in the Schools Division of Nueva Vizcaya demonstrate a strong understanding and effective implementation of the realism-constructivism approach, using strategies like real-life applications, discovery learning, and collaboratively problem solving. Their practices align well with the learner-centered goals of the DepEd MATATAG curriculum. The positive correlation between their beliefs and classroom practices underscores the importance of aligning teacher perceptions with instructional methods. To further support this approach, continued professional development, targeted support for areas like inquiry and reflection, and initiatives that link beliefs to practice through reflective and collaborative activities are recommended. Overall, the integration of realism-constructivism strategies contributes to more meaningful and effective mathematics instruction.
Keywords: *classroom implementation, mathematics instruction, realism-constructivisim approach, teacher perception*

Introduction

Mathematics is a useful tool that helps people around the world understand each other and stay organized. It helps to make sense of the world and trains the minds to think clearly and orderly. It builds individual skills like logical thinking, critical and creative thinking, understanding shapes and space, solving problems and even communicating ideas well. Mathematics plays a key role in both daily life and various fields. It helps individuals develop logical reasoning, critical thinking, and problem-solving skills, which are useful in everyday activities like budgeting, cooking, planning, and organizing tasks. Math also aids in managing time efficiently and supports learning in subjects like science, technology, and the arts. In the wider world, mathematics is essential in areas such as engineering, finance, healthcare, and architecture, where it drives innovation and helps people make informed decisions. The importance of mathematics goes beyond academics; it is a vital life skill. It helps individuals function effectively by promoting mental discipline and clarity of thought. Mathematics is also embedded in nature, seen in patterns, shapes, and sequences, which shows its role in

understanding the environment. On a larger scale, it contributes to economic development and societal progress by supporting research, data analysis, and policymaking. Through all these, mathematics empowers both individuals and communities to adapt, grow, and thrive in an increasingly complex world.

In the K to 12 BEC, mathematics is seen as a subject that applies to all stages of life and real-world situations, not just in school. Its main goal is to develop critical thinking which involves analyzing and evaluating information to guide decisions and actions and problem solving which focuses on finding solutions to challenges. To achieve its goals, the curriculum emphasizes organized content, essential skills and processes, positive values, and the use of appropriate tools, all tailored to the varied context of Filipino learners. Teachers play a key role in the learning process by guiding learners through hands-on activities, providing classroom instruction, and fostering critical thinking and creativity. Through these challenges, learners are encouraged to reflect on their own ideas and take new challenges that support their growth, and as a result, essential skills and knowledge were developed that helped them succeed in life. However, the teacher's quality is a critical factor that affects instructional quality and students learning outcomes (Yang and Kaiser, 2022). In addition, effective teaching strategies should actively engage students to prevent boredom and enhance understanding. Moreover, aligning teaching methods with students' needs and ensuring active participation are crucial for improving academic outcomes in mathematics (Wambete, 2023). In the study of Khan (2021), he mentioned that teachers' beliefs, attitudes, and teaching practices have a significant influence in determining the classroom climate, the teaching-learning processes, and the overall psycho-academic development of students. On the article by Strauch and Alomar (2014) where they review various learning theories that explain how learning occurs and highlights the effectiveness of different teaching methods. It emphasizes the dynamic role of teachers, whose varying responsibilities contributes significantly to achieving learning outcomes. Moreover, Shrestha (2017) stated that the history of mathematics has been playing a key role in humanizing mathematics education conceiving of it as historical, social and cultural productions to help students understand the meaning of aims, values, concepts, methods, and proofs in different practices involving mathematics. He also added that the philosophy of mathematics is to account for nature of mathematics through its epistemology so as to address the issues on mathematical knowledge and claims and justification.

The MATATAG curriculum initiated by the DepEd in the Philippines represents a major shift in the education system aimed at enhancing quality through holistic development, essential skills, and modern learning methods. It emphasizes a learner-centered approach that addresses gaps in the old curriculum by promoting not only cognitive but also social, emotional, and physical growth. The curriculum aligns learning with current societal needs and global standards, integrates technology to foster digital literacy and ensures inclusivity by catering to the diverse needs of all students, regardless of their background. Despite the Department of Education's efforts to address gaps in the education system, challenges persist. Previous study highlight the disconnect between policy makers and classroom practices, which hinders educational progress. They stress the need for collaboration, open communication and direct engagement with schools. To effectively respond to future challenges, the education system should empower educators, support local decision-making and promote alignment across all levels. Mathematics realism holds that mathematical truths are objective and exist

independently of human thought, with mathematicians discovering rather than inventing them. A prominent version of this view is Platonism, which suggests that mathematics concerns a realm of independently existing abstract entities, though realism as a whole does not necessarily require belief in such objects. This perspective aligns naturally with ordinary mathematics discussion, which makes no reference to human beliefs or activities. However, antirealists argue that mathematical truths are entirely independent, it becomes unclear how humans can know them or how mathematical practices connect with such truths. Thus, the key challenge to realists is to demonstrate how standard mathematical methods, such as proof, can reliably inform us about objective mathematical facts (Blanchette, 1998). On the other hand, constructivism based on theories of Piaget and Vygotsky, a dynamic and evolutionary theory of learning, emphasizes that learners actively rebuild their cognitive structures to integrate new information. In mathematics education, the approach centers on the belief that knowledge is constructed through reflective abstraction and that cognitive developments adapts to new experiences in an organized manner. Although implementing pure constructivism in teaching is challenging, it remains a beneficial pedagogical approach that prioritizes student-centered learning over teacher-centered directed instruction (Faulkenberry and Faulkenberry, 2006).

Both history and philosophy of mathematics are the basis for mathematics education. In this regard, the researchers was challenged to explore the perceptions, views and implementation of teaching practices of secondary mathematics teachers along with the prevailing philosophy in mathematics education across the world. However, there is a lack of studies concerning realism-constructivism in mathematics education. Thus, this challenges the researcher to work on this type of study. To bridge the identified gaps in mathematics education in the secondary schools, the present study examines teachers' perceptions and implementations of realism-constructivism in secondary mathematics teaching within the division of Nueva Vizcaya. This research analyze current classroom instructional practices by examining how they practice and implement realistic-constructivist strategies within the learner-centered framework of the MATATAG curriculum. Moreover, it will identify the relationship that exists between and among the perceptions and implementation in adopting the realistic-constructivist approaches and strategies. This study is expected to contribute to improving the alignment between curriculum goals and classroom practices within the secondary mathematics education curriculum. It also aimed to inform the educational community about the current state of mathematics instruction by providing evidence-based recommendations to enhance teaching approaches. Ultimately, the study sought to improve student learning outcomes in secondary mathematics by examining the influence of the realism-constructivism approach on teaching practices.

This study aims to investigate the perceptions and implementation of realism-constructivism among the public school's secondary mathematics educators, specifically in the schools Division of Nueva Vizcaya. While the MATATAG Curriculum of the Department of Education strongly advocates for learner-centered and constructivist approaches, many classrooms may still be grounded in traditional, teacher-centered philosophies. The main focus of realism-constructivism in mathematics education is to bridge the gap between objective reality and learners'' subjective construction of knowledge. It blends the key ideas from realism and constructivism to support meaningful, grounded learning experiences. This research aims to explore and analyze the perceptions and implementations of public secondary

school mathematics teachers toward realism-constructivism approach in teaching. Specifically, the study seeks to answer the following: (1) What are the perceptions of public secondary school mathematics teachers towards realism-constructivism approach in teaching? (2) To what extent are realism-constructivism approach implemented in mathematics classroom practices in public secondary schools? (3) Is there a significant relationship between teachers' perceptions of realism-constructivism and their level of implementation in mathematics instruction in public secondary schools?

Literature review

The framework of the study is anchored on Realism-constructivism, a philosophical approach that combines the key ideas from both realism and constructivism often used in fields like education, international relations, and philosophy. Realism is a belief that there is a reality that exists independently of our thoughts, perceptions, or beliefs, while constructivism is the view that we construct knowledge and meaning through experiences, interactions and interpretations. Realism-constructivism accepts that an objective reality exists (realism) but also recognizes that our understanding of that reality is shaped by human interpretation and social or cognitive processes (constructivism). In other words, while the world exists independently, our knowledge about it is built through learning, context, and perspective (Cupchik, 2001). In Mathematics education, the philosophy of realism-constructivism recognizes that while objective mathematical reality exists independently of human thought (realism), learners construct their understanding of this reality through experiences, social interactions, and cultural contexts (constructivism). Ernest (1998) argues from a social constructivist perspective that knowledge in mathematics is constructed through social processes, challenging the notion of mathematics as a fixed absolute entity. Quale (2012) expands this examining how developments in mathematical epistemology , such as non-Euclidean geometry, highlight mathematics as a human construct rather than undeniable truth. Radford (2000) highlights that students make sense of math by using signs, gestures, and tools, and they understand these better when they think about the culture and history around them.

Similarly, Yackel and Cobb (1996) describe the role of sociomathematical norms which is a socially constructed classroom norms that influence mathematical reasoning and communication, highlighting the collective aspect of knowledge construction. Bakker et al. (2017) propose inferentialism as a framework that situates mathematical understanding within language use and reasoning, emphasizing participation in mathematical discourse. A study aligns with constructivist ideas, stressing the importance of active engagement and personal experience in learning mathematics. DeVries and Zan (1994) incorporate developmental perspectives, advocating for educational environments that supports learners' active exploration and meaning making. Lesh and Doerr (2003) introduce the Models and Modelling Perspective, where students develop mathematical understanding by creating and refining models that connect mathematical concepts to real-world situations, reflecting both realist and constructivist elements. More recently, Upu and Bustang (2021) address the balance between constructivist approaches and cognitive load theory, suggesting instructional strategies that respect the active construction of knowledge while managing learners' cognitive resources.

The realism-constructivism philosophy aligns well with the goals and principles of the DepEd MATATAG curriculum in mathematics education. Realism in this context

affirms that mathematical concepts and truths exist independently, where mathematics is grounded in an objective reality that learners need to understand (Lesh and Doer, 2003; Ernest, 1998). Constructivism complements this by emphasizing that students actively build mathematical knowledge through experiences, problem solving, and social interaction (Radford, 2000; Yackel and Cobb, 1996). This dual perspective supports the MATATAG curriculum's aim to develop learners who are not only knowledgeable but also capable of applying mathematical concepts critically and creatively in real-world contexts. The MATATAG curriculum stresses learner-centered, competency-based approaches that foster critical thinking, problem-solving and adaptability, which include qualities that nurtured students when they are engage constructively with mathematical ideas rather than passively receiving facts. By encouraging students to construct meaning from their interactions with problems and peers, the curriculum promotes deeper understanding and retention of mathematical knowledge, which mirrors the constructivist emphasis on active learning (DeVries and Zhan, 1994). Meanwhile, the curriculum focus on mastery and standards reflects that the realist notion of an objective body of mathematical knowledge to be attained (Ernest, 1998).

In addition, MATATAG curriculum's emphasis on resilience and lifelong learning resonates with constructivism's view that knowledge is continuously developed and refined through new experiences and reflections (Quale, 2012). This philosophical grounding ensures that learners are prepared to adapt mathematical understanding to evolving situations, an essential skill in today's dynamic world. In short, the realism-constructivism philosophy gives a strong support to the DepEd MATATAG curriculum by combining two ideas: that some math truths are always true, and that students learns best when they actively make sense of these truths in real-life situations. This approach helps students become skilled, thoughtful and flexible in using math, which matches the goals of the MATATAG program. The study explored on two main things: how teachers view realism-constructivism (independent variable), and how they use its strategies in the class (dependent variable). It also analyzed if teachers' belief matches their teaching practices. This helps show whether their methods are based on their beliefs or just habits, even with new curriculum changes.

Materials and Methods

This study employed a quantitative approach using a descriptive-correlational research design to examine the public secondary school teachers' perceptions and implementation of the realism-constructivism in mathematics instruction within the Schools Division of Nueva Vizcaya. The descriptive component aimed to systematically collect data on teachers' perceptions and their actual classroom practices related to the realism-constructivism approach. Meanwhile, the correlational component sought to determine the significant relationship between teachers' perceptions and their implementation of the mentioned principles. The design was considered appropriate as it enabled the researcher to both describe current instructional practices and assess the extent to which perceptions align with actual classroom implementation. By integrating these elements, the study provided a comprehensive understanding of how realism-constructivism approaches are perceived and applied in the context of the MATATAG curriculum framework. The study was conducted in the Schools Division of Nueva Vizcaya, where secondary mathematics teachers actively deliver instruction aligned

with the Department of Education's MATATAG Curriculum. This location was purposely selected as it represents a typical public secondary education setting where realism-constructivism is practice and implemented, making it an appropriate context for examining how its principles are perceived and applied in actual classroom settings. The study was carried out from January to May 2025, encompassing the phases of instrument validation, pilot testing, administration of the final survey questionnaire, and data collection.

The respondents of the study consisted of sixty public secondary mathematics teachers from the school's division of Nueva Vizcaya. These teachers were selected since they are directly involved in the planning, delivery and evaluation of mathematics instruction at the secondary level, making them the most suitable samples for examining perceptions and implementation of realism-constructivism teaching approaches within the context of MATATAG curriculum. A purposive sampling technique was employed, focusing on teachers from public secondary schools within the division. However, not all mathematics teachers were included, particularly those in remote areas or hard-to reach areas due to accessibility constraints. Despite this limitation, the selected sample was ensured to be a reliable representation of the target population, thereby enhancing the validity and reliability of the findings within the context of public secondary schools in Nueva Vizcaya. The data-gathering process of the study was conducted in phases. In the first phase, was the generation of statements defining a focus which involved the identification of key statements that reflect the core principles of realism-constructivism in mathematics instruction. This phase was informed by a comprehensive review of existing literature on the philosophy of realism-constructivism and its impact on students learning outcomes. Additionally, an analysis of the MATATAG curriculum was carried out to identify areas of alignment or potential conflict with realism-constructivism strategies.

To ensure that the statements were aligned with the objectives of the study, the following guide questions were explored through an expert panel discussion: (1) What are the teacher's perspectives on the importance of realism-constructivism approaches in mathematics education? (2) What classroom practices demonstrate the application of realism-constructivism methods in mathematics instruction? (3) How do educators integrate realism-constructivism strategies with the learner-centered approaches promoted by the MATATAG curriculum? Responses and insights gathered from the expert panel discussions were transformed into Likert-scale items to align with the study's quantitative research design. The resulting statements addressed key dimensions such as teacher perceptions and the implementation of realism-constructivism approach, specifically in terms of instructional strategies, assessments methods, and the perceived influenced of realism-constructivism practices on student learning. The draft statements were subjected to content validation by a panel of experts, which included three PhD holders-two specialized in Mathematics and one in Languages. The experts assessed each statement for clarity, relevance, and consistency with study's objectives. A Content Validity Index (CVI) was used to evaluate the items. Statements receiving a CVI score below 0.7 were eliminated to ensure that only valid, reliable and meaningful items were retained in the final instruments.

In rephrasing and refinement of the statements, it was based on expert feedback. The statements were revised to improve clarity, coherence and neutrality. The refinement process simplified language and guarantee uniformity in tone and structure. Furthermore, the statements were closely aligned with the full dimensions of the study,

particularly emphasizing perceptions and implementation associated with realism-constructivism in teaching secondary mathematics. Statements that are redundant or unnecessary complicated was streamlined, and those with similar meanings were merged. This process is designed to create a refined and targeted tool that accurately reflects the goals of the study. Finally, the refined statements were pilot tested with a group of twelve secondary mathematics teachers from Bayombong district, selected for their demographic and educational similarity to the study's target population. The pilot test was conducted to evaluate the clarity and comprehensibility of each item, ensuring that respondents could easily understand and accurately interpret the statements. To determine the instrument's reliability, Cronbach's Alpha was computed, yielding an overall reliability coefficient of 0.905 for the combined questionnaires. This indicates excellent consistency and suggests that are measuring the same underlying construct (Bujang et al 2018). This procedure ensured that the final set of statements was both reliable and valid, making them suitable for full-scale data collection.

The study followed a systematic and ethical process of data collection. Initially, the researcher secured formal approval from the research adviser to proceed with the data gathering phase. Following this, a letter of permission was prepared and submitted to the principals of the participating schools, seeking authorization to conduct the study among public secondary school mathematics teachers in their respective schools. Upon securing approval from school administrators, the researcher distributed informed consent forms to all identified teacher-respondents. The forms provided essential information, including the purpose of the study, the voluntary nature of participation, assurances of confidentiality, and a statement affirming that no harm or risk was involved. Only those teachers who gave their informed consent proceeded to complete the survey. After the consent has secured, the validated survey questionnaire was administered via Google Forms. The use of an online platform was intended to enhance convenience and accessibility for respondents while enabling efficient data collection and monitoring. After the data collection period, the responses were downloaded, organized through tables and subjected to the appropriate statistical tools and analysis in accordance with the study's objectives, forming the basis for interpretation and presentation of results. For the data treatment and statistical analysis, the result of problem 1 and problem 2 were analyzed using mean and standard deviation to assess teachers' perceptions of and implementation practices related to realism-constructivism in secondary mathematics education. For problem 3, which aimed to examine the relationship between teachers' perceptions and their actual implementation of realism-constructivism approaches, the Kendall's Tau correlation coefficient was employed.

Results and Discussion

Section 1: Perception on realism-constructivism in secondary Mathematics

The *Table 1* presents the perceptions of secondary mathematics teachers in the Schools Division of Nueva Vizcaya on the use of the realism-constructivism approach as a guiding framework in mathematics education. The results indicate that the teachers hold a highly favorable perception of the realism-constructivism approach, as reflected in the overall mean score of 3.55 (strongly agree). This perception aligns with the foundational philosophy of realism-constructivism which acknowledges the existence of an objective reality (realism) while recognizing that our understanding of that reality is constructed through experience, context, and interaction (constructivism) (Cupchik,

2001). Teachers strongly believe that the approach makes mathematical learning more meaningful by connecting concepts to real-life contexts (Item 1), a key idea supported by Lesh and Doerr (2003), who highlight the importance of linking mathematical models to practical situations. This finding also confirms Radford (2000) claim that students grasp concepts better when engage with contextual signs, tools and historical backgrounds. Additionally, teachers acknowledged the approach ability to promote critical thinking, collaboration, and communication (Items 2,7,16), which is consistent with the views of Yackel and Cobb (1996) on sociomathematical norms and Bakker et al. (2017) on mathematical discourse as essential to learning.

Table 1. *Perception of teachers on realism-constructivism as a guiding framework in secondary Mathematics.*

Indicators	Mean	SD	Interpretation
The realism-constructivism approach helps students relate mathematical concepts to real-life situations, making learning more meaningful.	3.53	.503	Strongly Agree
It promotes critical thinking, problem solving and active participation among learners.	3.60	.494	Strongly Agree
The approach is student centered and encouraged independent learning, but some students still need scaffolding or direct instruction.	3.47	.503	Agree
Applying realism-constructivism increases engagement and motivation by showing the practical uses of mathematics.	3.60	.494	Strongly Agree
The approach is challenging to implement due to large class sizes, limited instructional time and heavy curriculum demands.	3.40	.616	Agree
The realism-constructivism approach is helpful for making abstract concepts, more understandable by connecting them to real-life contexts.	3.60	.494	Strongly Agree
It fosters collaboration and communication skills, which are essential for 21st century learning.	3.60	.494	Strongly Agree
Constructivist strategies require more creative planning, preparation, and teacher training to be used effectively.	3.67	.475	Agree
A balanced between traditional teaching and constructivist methods is necessary to meet diverse student needs .	3.73	.446	Strongly Agree
Using realistic or context-based activities, enhances student's retention and conceptual understanding.	3.67	.475	Strongly Agree
The approach is particularly relevant in Business Math, and Statistics where real-life application is evident .	3.53	.503	Strongly Agree
Encouraging student to construct their own meaning supports long-term understanding and prepares them for more advance studies.	3.53	.503	Strongly Agree
Assessment under this approach is sometimes difficult, as traditional tests may not capture the full extent of student learning .	3.40	.494	Agree
Realism-constructivism enhances students' ability to apply mathematical concepts in solving real-life problems.	3.53	.503	Strongly Agree
Integrating real-world contexts in teaching mathematics makes the lesson more engaging for students.	3.53	.503	Strongly Agree
The approach encourages students to work collaboratively and learn from one another .	3.60	.494	Strongly Agree
I feel confident in using realism-constructivism approach in my classroom.	3.47	.503	Agree
More professional development or training is needed for me to effectively use this approach,	3.60	.494	Strongly Agree
Students demonstrate deeper understanding of math concepts when they are actively involved in constructing their knowledge.	3.40	.494	Agree
The realism-constructivism approach aligns well with the learning competencies of secondary mathematics curriculum.	3.47	.503	Strongly Agree
Overall mean	3.5467	.37708	Strongly Agree

Note: 1.00-1.49 Strongly Disagree; 1.50-2.49 Disagree; 2.50-3.49 Agree; 3.50-4.0 Strongly Agree.

The data further show that teachers view realism-constructivism as beneficial in enhancing motivation and conceptual understanding (Items 4, 10, 14, 15), aligning with Wheatley (1991) emphasis on active engagement and Devries and Zan (1994) support for learner exploration and meaning-making. Moreover, teachers agreed that the approach is particularly relevant in subjects involving real-life applications, such as

Business Math, and Statistics (Item 11), reinforcing the idea that mathematics, while grounded in objective truths (realism), must be understood and applied through human interpretation and social context (Quale, 2012; Ernest, 1998). However, results revealed practical challenges in implementing the approach. Difficulties acknowledge by teachers such as large class sizes, time constraints, and curriculum pressures (Item 5), as well as the need for more planning and training (Item 8). These concerns are consistent with the findings of Upu and Bustang (2021), who emphasize the importance of managing cognitive load while applying constructivist strategies. The need for ongoing professional development (Item 18) further supports Ernest (1998) view that mathematics contains both fixed truths and socially constructed knowledge. Teachers' belief that realism-constructivism aligns well with the DepEd MATATAG curriculum (Item 20) is also significant. The curriculum promotes learner-centered, competency-based education that values critical thinking, creativity and lifelong learning, reflecting both constructivists learning processes and realist goals of content mastery.

Overall, the findings show strong alignment between perceptions and the philosophical principles of realism-constructivism. Teachers appreciate the relevance and effectiveness of this approach in enhancing meaningful, active and contextualized learning in mathematics. At the same time, teachers highlight the need for support and professional development to address challenges in practical implementation. This confirms that the realism-constructivism framework provides a solid foundation for mathematics instruction and aligns well with the goals of the DepEd MATATAG curriculum, thereby supporting both academic rigor and meaningful learning experiences for students.

Section 2: Implementation of realism-constructivism in secondary Mathematics

The overall implementation of realism-constructivism principles in teaching methodologies and classroom practices among the secondary mathematics teachers in the Schools Division in Nueva Vizcaya was described as highly implemented as shown on the overall mean rating of 3.50 (*Table 2*). This indicates that teachers are not only aware of the philosophical principles of realism-constructivism, but they are also actively applying them in their classroom instruction. This supports the study's goal of examining whether teachers' belief are reflected in their actual teaching strategies. There are several indicators consisting of high mean scores such as using real-life situations (Item1, 3.73), discovery-based learning (Item 2, 3.60), and technology integration for exploration (Item 7, 3.73), which directly reflect the constructivist emphasis on learning through experience and context (Cupchik, 2001). These strategies allow students to construct knowledge meaningfully, echoing Wheatley (1991) and DeVries and Zan (1994) stress on active learning and student-centered instruction. The high implementation of guiding students to construct their own understanding (Item 5, 3.67) and encouraging them to explain their reasoning (Item 9, 3.53) aligns with Radford (2000) theory that learning occurs when students engage in meaning-making through semiotic tools, and Bakker et al. (2017) who emphasize reasoning through discourse. These practices also mirror the DepEd MATATAG curriculum's learner-centered approach, which values not just correct answers, but conceptual understanding, communication, and reasoning.

***Table 2**. Extent of implementation of realism-constructivism principles in teachers teaching methodologies and classroom practices.*

Indicators	Mean	SD	Interpretation
I use real-life situations or problems to introduce or explain mathematical concepts.	3.73	.446	Highly Implemented
Allow students to explore mathematical ideas through hand-on or discovery activities.	3.60	.494	Highly Implemented
I integrate group work or collaborative problem-solving in my lessons.	3.53	.623	Highly Implemented
I used project-based tasks that require application of math in real word contexts.	3.07	.578	Implemented
I guide students in constructing their own understanding rather than giving direct answers.	3.67	.475	Highly Implemented
I use realistic examples such as budgeting, measurements, or statistics in my teaching.	3.47	.503	Implemented
I use technology, visual aids, or simulation to support student exploration of math concepts.	3.73	.446	Highly Implemented
I adjust my strategies to balance between constructivist activities and direct instruction.	3.53	.503	Highly Implemented
I encourage students to explain their reasoning and learn from one another.	3.53	.503	Highly Implemented
I use real data (e.g., surveys, statistics) for math investigations and analysis.	3.33	.705	Implemented
I provide opportunities for student-led inquiry or problem-solving.	3.40	.494	Implemented
I design assessments that evaluate understanding through application, not just correct answers.	3.53	.503	Highly Implemented
I integrate constructivist principles across different topics, including abstract ones (e.g., algebra, functions).	3.47	.503	Implemented
I allocate time in my lessons for students to reflect on what they have learned.	3.27	.446	Implemented
I regularly plan lessons that connects math topics for students' real-life experiences .	3.60	.494	Highly Implemented
Overall mean/SD	3.50	.369	Highly Implemented

Note: 1.00-1.49 Not Implemented; 1.50-2.49 Slightly Implemented; 2.50-3.49 Implemented; 3.50-4.00 Highly Implemented.

The frequent integration of group work and collaborative problem solving (Item 3, 3.53) corresponds with Yackel and Cobb (1996) concept of sociomathematical norms, classroom environments where social interaction fosters mathematical reasoning. Similarly, the use of project-based tasks (Item 4, 3.07) and real data (Item 10, 3.33) shows that teachers are embedding realistic contexts, which is fundamental in Lesh and Doerr (2003) Models and Modelling Perspective, linking abstract mathematics to practical applications, a key feature of the realist side of the framework. Although some indicators fall under the "Implemented" category rather than "Highly Implemented" such as project-based tasks, student-led inquiry, and reflection time, these results still show a moderate to high level of constructivist practice. This partial gap may point to practical challenges similar to those highlighted in *Table 1*, such as time constraints or lack of training which are also discussed in Upu and Bustang (2021) in relation to cognitive load and teacher readiness. Remarkably, the high mean for balancing constructivist and traditional strategies (Item 8, 3.53) reflects Ernest (1998) argument for combining both realist and constructivist elements in mathematics education. This balance ensures that while students are encouraged to actively explore, teachers also maintain clarity in delivering essential, standard deep understanding content, which is a core expectation of the DepEd MATATAG curriculum.

Moreover, the implementation of assessments that measure application and understanding (Item 12, 3.53) supports the claim that realism-constructivism fosters deep understanding over rote memorization, as advocated by Quale (2012) and Radford (2000). The application of constructivist strategies even in abstract topics like algebra (Item 13, 3.47) shows that teachers are trying to make all areas of mathematics meaningful and relatable, as called for in the MATATAG curriculum's goal of relevant, contextualized, and lifelong learning. Lastly, the findings affirm that the principles of

realism-constructivism are not only philosophically accepted by teachers but are also substantially practiced in their classroom. The strategies they employ promotes real-world relevance, collaborative learning, reasoning, exploration, and conceptual understanding. Despite minor limitations in areas that the philosophical foundations of realism-constructivism are being effectively translated in classroom realities, aligning both academic research and the DepEd MATATAG curriculum's vision.

Section 3: Relationship between teachers' perception of realism-constructivism and their actual classroom implementation in secondary Mathematics education

The relationship between teachers' perceptions of realism-constructivism and their actual classroom implementation in secondary mathematics education can be seen on *Table 3*. It shows that there is a moderate to strong positive correlation between teachers' perceptions of realism-constructivism and their actual classroom implementation as supported by the computed correlation and probability values (Kendall Tau=0.619, p=0.000). This indicates further that teachers who value realism-constructivism principles are more likely to apply related strategies, such as using real-life problems, collaborative learning, and student inquiry. This finding supports DeVries and Zan (1994) as well as Wheatley (1991), who emphasized that teachers'' beliefs shape their instructional practices. Similarly, Lesh and Doerr (2003) as well as Radford (2000) argued that understanding develops meaningful, real-world contexts, an approach where teachers in this study implement when their perceptions are aligned. The result also aligns with the DepEd MATATAG curriculum, which emphasizes learner-centered, competency-based instruction. Teachers who believe in the value of realism-constructivism are better positioned to meet MATATAG's goals, integrating both realism and (objective content) and constructivism (active learning), as described by Cupchik (2001). In summary, the strong correlation confirms that teachers' philosophical beliefs directly influence their teaching methods, validating the importance of aligning perceptions with educational reforms like MATATAG curriculum.

Table 3*. Correlation between teachers' perception of realism-constructivism and their actual classroom implementation in secondary mathematics education.*

Groups	Kendall Tan correlation	N	Sig. (2-tailed)
(1) Educators Perception of Realism-Constructivism (2) Implementation in Secondary Mathematics Education	.619**	60	.000

*Note: **=Correlation is significant at the 0.01 level (2-tailed).*

Conclusion

Based on the findings of the study, the following conclusions were drawn: (1) The secondary mathematics teachers at the Schools Division of Nueva Vizcaya hold a highly favorable perception of the realism-constructivism approach, recognizing its effectiveness in making mathematical learning meaningful, contextual and student-centered. This emphasizes the balance between objective mathematical truths and the learners' active construction of knowledge. Despite the challenges in the implementation, the approach is aligned with the goals of the DepEd MATATAG curriculum, suggesting its strong potential to support both academic mastery and real-life application in mathematics education. (2) The secondary mathematics teachers are effectively implementing realism-constructivism principles in their teaching practices as

supported by the high implementation rating. Teachers actively apply strategies such as real-life applications, discovery learning, collaborative problem solving and reflecting the philosophical blend of objective knowledge and learner-centered understanding. This strong alignment with MATATAG curriculum highlights a meaningful integration of theory into practice, despite minor challenges in areas like inquiry and reflection. (3) There is a strong positive correlation between teachers' perceptions of realism-constructivism and their classroom implementation, indicating that teachers who value this approach are likely to apply its strategies. This supports the idea that beliefs shape teaching practices (DeVries and Zan, 1994; Wheatley 1991) and aligns with the learner-centered goals of the DepEd MATATAG curriculum. This highlights the importance of aligning teachers' perceptions with instructional methods to effectively realize educational reforms.

Derived from the conclusion of the study the following recommendations were made: (1) Continue to strengthen teachers' understanding of realism-constructivism through professional development training, emphasizing strategies to overcome implementation challenges and deepen alignment with the MATATAG curriculum. (2) Encourage ongoing support and resources to enhance areas with moderate implementation, such as inquiry-based learning and reflection, ensuring a more comprehensive application of realism-constructivism principles in classrooms. (3) Promote initiatives that align teachers' beliefs and perceptions with effective teaching practices, such as reflective workshops, learning action cell and collaborative learning sessions, to sustain and enhance the positive link between philosophy and classroom implementation.

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Conflict of interest

There is no conflict of interest in the study, as there is no situation in which financial or other personal considerations could compromise the researcher's judgment in conducting, analyzing, or reporting this research.

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