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**PROFESSIONAL DEVELOPMENT NEEDS OF PUBLIC JUNIOR HIGH SCHOOL MATHEMATICS TEACHERS IN LEGAZPI CITY DIVISION: A FRAMEWORK FOR CRAFTING A DEVELOPMENT PLAN**

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**ABSTRACT**

Teachers' Professional Development (TPD) is extremely important because it improves teachers' knowledge and abilities, which in turn improves students' learning outcomes. Teachers should keep abreast of the newest teaching techniques and technological advancements through continuous learning. This study determined the professional development needs of mathematics teachers working in secondary public schools of Legazpi City Division. The professional development needs of the teachers were discussed under five major dimensions of professional development, namely, opportunity-in-field development (OFD), behavioral development (BD), instructional development (ID), discipline-based skills development (DSD), and organizational development (OD) or simply the OBIDO Professional Development Dimensions. It utilized a quantitative research design where total enumeration was adapted to determine the population. The findings showed that respondents need to be exposed to the following: training and seminars, innovation, proficient teaching practices, curriculum planning, and organizational structure. It was also found that the number of years in service of the respondents was significantly correlated to OBIDO Professional Development, which means that teachers gain professional development through experience. The findings call for strategic learning and development needs assessment, professional development planning, implementation, and monitoring and evaluation for teachers to benefit more. Consequently, it is advised to carry out a comparable study with a wider scope.

**KEYWORDS:** Professional development, opportunity-in-field development, behavioral development, instructional development, discipline-based skill development, and organizational development.

## INTRODUCTION

Teachers' Professional Development (PD) is extremely important because it improves their knowledge and abilities, which in turn improves students' learning outcomes. Teachers should keep abreast of the newest teaching techniques and technological advancements through continuous learning. Through continuous PD they can design stimulating and productive learning environments for their students. Furthermore, teacher collaboration is encouraged by professional development, which results in the sharing of ideas and best practices. Ultimately, funding professional development gives educators the tools they need to give students a high-quality education and have a positive influence on their lives.

According to Ozcan (2021), the family's educational level, the school's physical conditions, the school management, the school environment, and teachers' competence are factors affecting students' academic achievement, his study reveals that teachers' professional development should be prioritized. Similarly, teacher competence has a significant impact on student learning outcomes, and in developing teacher competencies professional development needs of the teachers should be taken into consideration when formulating professional development programs for teachers (Isticomah et al., 2019). The Philippines' performance in mathematics has been a topic of concern and debate. Despite efforts to improve the country's math education, the results have been disappointing.

According to Trends in International Mathematics and Science Society 2003 (TIMSS) Mullis et al., (2004) cited in Bonghanoy (2019), wherein the 290 Journal on Mathematics Education, Volume 10, No. 2, May 2019, pp. 289-302 Filipino students scored below average in all areas of Mathematics Achievement Test and ranked fifth from the last out of 45 participating countries. The data showed that student performance is correlated to teacher's competence. One way to raise teacher's competence is through emphasizing teachers' professional development (Evans, 2019 & Pipere, 2019). Professional development is not only a process that aids in the personal growth of teachers, but it also plays a significant role in raising the standard of instruction in classrooms (Ventista & Brown, 2023).

The International Council for Open and Distance Education has Massive Online Courses (MOOCs). The MOOCs are used as Teachers' Professional Development (TPD) platform, which aims to possess the technology and instructional design needed to provide high-quality education, provide a strong platform for learning and growth, support the professional development of teachers by enabling them to complete certified courses quickly and easily, develop specific academic, digital, and teaching skills, train a large number of inexperienced or undertrained teachers to become more professional in their practices and approaches, and offer professional development opportunities development with substitute credentials that employers accept (Misra, 2018).

ASEAN Countries include professional development as a strategic step in facing ASEAN Economic Community (AEC). Teachers' commitment is an important factor in their continuous professional development and later improves the quality of education which can produce superior and competitive teachers (Imron et al., 2020).

In the Philippines, it is noted the declining performance of Filipino learners in the National Achievement Test (NAT), (53.77 in 2014, 44.08% in 2017, and 44.59% in 2018) showed some inadequacy in mathematics education. The results are below the national passing rate of 75%, which indicates that students have poor academic performance in mathematics. Comparatively, the Mean Performance Level of students in the Schools Division of Legazpi City also ranges from 40% to 55%, which is consonant with the result of the National Achievement Test.

To address this problem and other learning gaps, the Department of Education launched its MATATAG Agenda in consonant with Basic Education Development Plan (BEDP), one of the objectives of MATATAG agenda of Secretary of Education is to give support for teachers to teach better. This advocacy is supported by DepEd Order No. 30, s. 2021 also known as Multi-Year Implementing Guidelines on the Allocation and Utilization of the HRD Fund for Teachers and School Leaders). Eligible activities and allowable expenses under the HRD fund cover the In-Service Training for Teachers (INSET), Program Support Funds (PSF), and Central Office-managed activities related to the professional development and training of teachers and school leaders.

Consistent with the MATATAG agenda of DepEd, the Schools Division of Legazpi City administered the Albay Numeracy Assessment Tool (ALNAT) for the school year 2022 – 2023. This assessment aims to assess and classify students' academic performance into five categories, namely: Needs Major Support, Anchoring, Emerging, Developing, and Transforming. The assessment marks a notable result; most of the students in Legazpi City Division are categorized under Needs Major Support. School-based activities were conducted such as School Learning Action Cell (SLAC), Focus Group Discussion (FGD), In-Service Training (INSET), and other intervention activities to combat this alarming situation. However, most training and seminars, according to math teachers, ignored their local work context, were routine, and were hardly applicable to their classroom environment, hence, by utilizing transformative professional development training, the teachers identified the classroom issues that had confronted them; restructured their useful pedagogical ideas and instructional plans and materials; implemented these in their classrooms; and shared their reflections on the new teaching experiences (Bonghanoy, 2019).

In addition, it is important to know the level of teachers' competence in a particular subject area. The level of teachers' competence will unveil teachers' professional development needs. It is an ongoing process of enhancing teachers' skills, knowledge, and expertise to improve teachers' teaching practices which ultimately benefit the students. It involves a range of activities, including workshops, conferences, seminars, educational programs, and collaborative opportunities with fellow educators. This ever-evolving field aims to equip teachers with the necessary tools to address the ever-changing educational landscape and to ensure they remain up-to-date with the latest research and teaching methodologies. Professional development also enables teachers to reflect on their own teaching practices, identify areas for growth, and discover innovative strategies to engage and inspire their students.

Furthermore, effective professional development activities depend on the existing needs of the teachers, and individual classroom needs, and teachers engage in professional development planning for them to connect with the subject matter and find the topics helpful and relevant (Raduan, 2020). Existing needs of teachers can be determined through observations, it should encompass the five major dimensions of professional development, opportunity-in-field, behavioral, instructional, discipline-based skills, and organizational.

The researcher believes that the result of this study can be a valuable help to the administrators and L & D providers in identifying the areas of strength and areas of improvement of the public secondary mathematics teachers. The recommendations of the study can be a basis for designing a professional development program to improve quality education services and be able to improve students' academic performance.

With the present student's numeracy performance in Legazpi City Division as evident in the National Achievement Test, Albay Numeracy Assessment, and Mean Performance Level results, this latter calls for studies that aim to fill the gaps of the previous related studies.

## **LITERATURE REVIEW**

Professional development plays a pivotal role in teachers' growth and development (Parsons et al., 2019). Accordingly, MakereviĚs&Ilisko (2019) professional development activities increase the commitment of teachers to motivation and the teaching-learning process. As the demand and meeting the requirements in job hiring specifically in the Department of Education, teachers opt to enroll in graduate studies for professional development. Teacher educators need to be involved in continuous professional development to ensure quality learning outcomes (Tyagi & Misra, 2021).

Given that student learning and achievement are so greatly impacted by the quality of teaching, a call for effective teacher development is important for any educational system to remain competitive in a global arena and meet the desired learning outcomes. Several countries showcased their best practices in providing professional development for teachers. According to Philipsen et al., (2019), there are five features of professional development being implemented in the United States, these are the content focus, active learning, opportunity, coherence, sustained duration, and collective participation.

Similarly, this research also focuses on the five dimensions of professional development namely Opportunity-in-Field Development (OFD), Behavioural Development (BD), Instructional Development (ID), Discipline-based Skills Development (DSD), and Organizational Development (OD). The researcher also included the respondents' demographic profiles such as educational backgrounds, teaching positions, teaching assignments, years in service, average class size handled, and training and seminars attended. The researcher believes that sub-indicators under respondents' demographic profiles have a direct impact on the professional development of a teacher. Accordingly, Ray (2020) believes that demographic profiles eliminate false positives, determine whether a sample is representative, and avoid a long and torrid history of consequences.

Lee & Lee (2020) believe that there is a greater chance of academic success and the development of critical thinking abilities in students who have studied under highly qualified teachers. These types of educators give their students a solid foundation for learning, fostering a love of learning and motivating them to realize their greatest potential. A teacher's area of specialization has an impact on student's performance; students under non-major subject teachers are more likely to perform less. Teachers teaching non-major subjects have difficulty with content knowledge and its application within and across the curriculum (S Mahalay, 2021). Subsequently, teachers' length of service is significantly correlated to their performance and work outcome (Nugroho & Haryanto, 2019).

### **Opportunity-in-Field Development (OFD).**

Teacher's Continuous Professional Development (CPD) is regarded as a structured and formally organized undertaking, such as professional development programs provided by accredited PD providers and continuous education (Njenga, 2023). However, professional development can also take place in informal setups like peer teaching, mentoring and coaching with colleagues, and collaborative activities or occur as part-and-parcel of a daily work routine (Sydorenko et. al. 2020). It's interesting to note that teachers learned a great deal from informal activities, those activities weren't institutionalized and didn't qualify as CPD for teachers (Abakah, 2023). Opportunity-in-Filed development dimension is categorized as informal professional development activities for teachers. Specifically, refers to technical assistance (TA), mentoring and coaching, and training and seminars usually job-embedded activities. The researcher included this dimension mainly to unveil the learning experiences of the teachers in their workplace or environment or to take into consideration the real-life experiences of the teachers.

The first indicator under OFD is the technical assistance, TA which is given to teachers as part of their professional development. TA is usually done or given by a specific person who has demonstrated exemplary performance in a certain area. The main purpose of a TA is to guide and direct employees to accomplish their tasks efficiently and effectively. The instructional leaders as mandated to play as instructional supervisors, communicators, resource allocators, and technical assistance providers are tasked to share their knowledge about instruction by observing teachers and providing feedback on how they can improve their instructional and management skills (Gusano& Mendoza, 2021).

Another component of OFD is coaching and mentoring, it has a variety and changing definitions, and a hybrid version of coaching and mentoring is emerging in practice (Garvey et al., 2021). Many dimensions of coaching and mentoring need to be considered to establish its theoretical and operational definition. These include the purpose, the relationships of coach and coached or mentor and mentee, the timeframe, and the skills employed (Garvey et al., 2021). Establishing the definition of coaching and mentoring will contribute to the professional development of the employees as they gain insights, techniques, and knowledge from instructional leaders. In Korea and Japan, mentoring, peer observation, and coaching activities are regarded as effective forms of professional development. They rely on interactions and co-development of expertise between teachers and focus on teachers' individual needs to improve instructional practices (Kim & Lee 2020).

The training given by PD providers capacitates and equips workers by enhancing their skills, abilities, knowledge, and behavior so that work can be done more swiftly, effectively, and logically (Ichsan, 2020). In a limited sense, receiving training will enable employees to learn specific information and practice skills that they can use at work in the future (Adnyani& Dewi, 2019). In the study of Jumawan & Mora (2018), they outlined various dimensions and indicators in training. The training indicators cover the trainers, trainees, resources, and training goals. Training is a process that teaches employees things like skills, attitudes, and discipline while also equipping them with knowledge specific to the type of work they will be doing (Al-kharabsheh, 2023). All activities supporting teachers' professional growth and development in school lead to the creation of a professional learning community (PLC).

In Singapore, each school established professional learning communities with professional learning teams composed of teachers teaching the same discipline or grade level, (Postholm, 2018). This creates Singaporean teachers an educational community that collaborates to enhance their teaching methods and student outcomes. Teachers in a PLC collaborate to solve problems in their classrooms, share resources and tactics, and participate in continuous professional development. Teachers and students ultimately gain from this cooperative approach, which cultivates a culture of ongoing learning and development. PLCs have the power to revolutionize education and bring about constructive change in schools by encouraging cooperation, introspection, and shared accountability for students' success.

In the Philippines, In-Service Training for Teachers (INSET) of the Department of Education is one of the tools to help improve teaching and learning approaches and an essential part of teachers' professional development (Tupas & Noderama, 2020). It gives teachers the chance to advance their knowledge and abilities while keeping them abreast of the newest approaches to teaching. Teachers who complete this training will have the skills needed to provide their students with interesting and productive learning environments. Educational institutions show their dedication to student success and ongoing improvement by funding in-service training. In the end, this continuous professional development encourages a culture of lifelong learning within the educational system, which is advantageous to both teachers and students.

### **Behavioural Development (BD).**

In this dimension of professional development, it includes self-management, professional ethics, result focus, and innovation. Behavior significantly contributes to the learning outcome, and it is crucial to explore the behavior of the teachers, particularly this study unveiled the needs of mathematics teachers in behavioral aspects. Self-management of the teachers plays a significant role in understanding personal goals, directions, and values congruent with the organization's vision and mission. Self-management enables an individual to assess their shortcomings and work toward strengthening and enhancing them (Chokheli et al., 2023). Having self-management leads to emotional maturity and enthusiasm to achieve higher goals by prioritizing work tasks and schedules. Teacher's professional ethics are values and behavior enshrined in the norms and conduct and ethical standards under (RA 6713). The goals of teacher professional ethics are to: (1) preserve the dignity of the teaching profession; (2) protect the welfare of teachers; (3) increase teacher service; (4) enhance the profession's quality; and (5) enhance the caliber of teacher

organizations (Kusumaningrum et al., 2019). Result focus means achieving results with optimal use of time and resources, avoiding rework or mistakes, delivering error-free outputs, expressing a desire to do better, and making specific changes in the system. Innovation is the process of translating creative thinking into tangible changes and solutions to challenges by examining the root causes of the problems.

The European Journal of Education Studies said many people assume that innovation has something to do with technology and inventions, this is the old connotation, innovation can be as simple as finding solutions to a problem (Rahmat 2020). According to Eli (2021), emphasis should focus on the current innovative and interactive teaching methods, not on the traditional ones. Innovative and interactive teaching methods have revolutionized the education system, making learning more engaging and effective. However, Chou (2019) noted that instructional strategies improve further students' understanding through the use of technology, practical exercises, group discussions, and real-world examples. Teachers can create a dynamic learning environment that encourages creativity, problem-solving abilities, and critical thinking by implementing these strategies. When students take an active role in their learning, their academic performance and knowledge retention both improve. As it equips students with the challenges of the modern world, the creative and interactive teaching approach is a game-changer in education and the acceptance of technological innovation is significantly and positively related to innovative teaching using ICT (Chou et al., 2019). The utilization of technology in teaching is constantly rising; it has a positive effect on students' learning because it makes them more engaged and helps them remember information (Arifin, 2020).

According to Reddy et al., (2020). students agree with the assistance of digital learning in the subject of learning. Increased learning time for students using digital learning specifically improves academic performance. Twenty-five percent or 2 hours of teachers devoted to teaching materials preparations; it includes daily lesson plans, visual materials, activity sheets, test items, and the like. Students can use prior knowledge to solve mathematical problems that make the learning process more meaningful by using the material and problems that are present in the student book and worksheet, which were developed in accordance with the characteristics and environment of students (Ulandari, Amry, & Saragih, (2019).

In the study conducted by Sharoff (2019) at Hunter College – City of New York, with the aid of technology teachers become innovative and creative while students actively engage and motivated. The vast online applications present nowadays on the internet allow teachers and students to have an interesting and interactive discussion. These applications also lessen teacher's work because some of the lesson plans and materials are ready to use. The challenge for the teachers is to validate and make sure to suit it to the learning goals prescribed in the curriculum guide.

Alda et al., (2020) of Cebu Normal University, stated that innovative approaches in teaching with the aid of technology are no longer an option but a way of life; it has become a necessity for educational institutions to contribute to paving the road to Education 4.0. Being innovative is innate to teachers; however, we have to provide their needs and tools to reinforce their innovative ideas in

delivering the lessons. Educational administrators may provide training relative to enhancing teachers' innovative skills so that they will be equipped and ready to embrace educational change.

### **Instructional Development (ID).**

It refers to the teacher's content knowledge and pedagogy, learning environment, assessment and reporting, and curriculum planning. Effective teaching is largely influenced by the pedagogy and subject matter expertise of the teacher. According to Appova and Taylor (2020) pedagogical content knowledge have three components, knowledge of content and teaching, knowledge of content and curriculum, and knowledge of content and students. Knowledge of content and teaching is the ability of the mathematics teachers to use pictures, diagrams, and various problem-solving techniques, knowledge of content and curriculum is the ability of the teachers to integrate curriculum guides such as books and the understanding of teaching approaches, while knowledge of content and students is the ability of a mathematics teachers to develop student's critical thinking and problem-solving skills (Appova et al., 2020). Purwoko et al., (2019) included fluency, flexibility, elaboration, and originality as part of pedagogical content knowledge; he asserted that if those elements had developed creative thinking among students would be more optimal.

A teacher's profound comprehension of the subject matter they teach is referred to as content knowledge, and the methods and approaches employed to successfully present that content are referred to as pedagogy. A teacher who is well-versed in the subject matter can confidently respond to questions from students and give accurate information. However, pedagogy makes sure that this information is presented in a way that draws in students, encourages critical thinking, and cultivates a love of learning. In order to create the best possible learning environment where students can succeed academically, both components are essential.

The way that students learn is greatly influenced by their learning environment. Critical thinking, creativity, and involvement are all encouraged in a well-planned and encouraging environment. Creating a successful motivational teaching practice should start with raising awareness of the wide range of techniques available to teachers. Then, based on the unique requirements of a particular classroom learning environment, specific techniques should be chosen Dörnyei & Muir (2019). An ideal learning environment ought to offer plenty of resources, foster teamwork, and foster a feeling of community. Students are more empowered to explore their interests, take chances, and acquire lifelong skills in a positive learning environment. Teachers need to ensure to create a welcoming, engaging environment that fosters learning and growth among the learners.

Assessment and reporting are essential components of a student's academic journey. Assessment is a crucial part of any course of study (English & English, 2019). Assessment can be categorized as formative and summative assessment. A variety of formal and informal assessment techniques are used by teachers throughout the learning process to adjust their lessons and learning activities and raise student achievement, his process is known as formative assessment (Bhat & Bhat, 2019). Summative assessment is used to assign grades to students after completing a particular course (Tienso-Tseng, 2019). Information from summative assessments allows evaluations of learning in respect to the desired learning goals.



Both assessments offer insightful criticism of students' development, strong points, and areas in need of development. By evaluating the knowledge and abilities of their students, teachers can modify their pedagogical approaches to suit each student's needs. Students can set goals for future growth and gain an understanding of their performance through reporting. Additionally, assessment and reporting encourage responsibility and inspire students to pursue excellence.

Curriculum planning, which entails the creation of an organized learning program, is a crucial and potentially daunting component of education Rice & Mars (2023). It seeks to give educators a framework for successfully imparting knowledge, skills, and content. A carefully thought-out curriculum makes sure that students learn a wide range of subjects and develop critical thinking skills. Additionally, it enables teachers to match their pedagogical approaches to the intended learning objectives. All things considered, curriculum planning is essential to determining the nature of education and supporting the personal and academic development of students.

Kelly et al., (2020) through the Australian Journal of Teacher Education published a research study describing a model for teacher professional development as co-design for curriculum planning in which teachers with design and pedagogical expertise work for secondary school teachers. Co-design for curriculum planning has been developed as a design-based research study (Kelly et al., 2020). It has clearly stated the nature of the issue, which is that educators need professional development when dealing with new curricula. It has also outlined the particular circumstances in Australia, where educators need TPD in response to the new ACARA Digitech curriculum. Technology facilitates the development and evaluation of 21st Century Skills, indicating the significance of ICT as a tool for fostering an individual's 21st Century outlook and skill set (Paciente, 2022).

### **Discipline-based Skills Development (DSD).**

In the context of this research, discipline-based skills refer to enacting mathematics for teaching and learning and proficient teaching of mathematics. One of the most important parts of education is using mathematics in instruction and learning. It entails involving students in active participation in addition to imparting knowledge. Through the utilization of practical examples, interactive exercises, and problem-solving assignments, educators can establish an engaging learning atmosphere that stimulates critical thinking and profound comprehension. These scenarios provide a foundation for the early development of mathematical ideas, methods, and procedures. Later on, students can use these scenarios to apply their knowledge of mathematics, which has subsequently evolved into something more formal, all-encompassing, and less context-specific (Van den Heuvel-Panhuizen&Drijvers, 2020). With the help of this method, students can recognize the application of mathematics in their everyday lives, gain valuable skills for success in the future, develop 21st-century skills, and give cross-curricular experiences with real-world meaning to learners (Szabo et al., 2020). The art of implementing mathematics for learning and teaching empowers educators and learners alike as they pursue their educational goals.

Effective mathematics instruction is essential for students' academic achievement (Anthony &Walshaw, 2023). An expert math teacher is well-versed in the subject, adept at explaining difficult ideas, and cultivates a supportive learning environment. The use of a variety of teaching

techniques, like practical exercises and real-world applications, to get students interested and improve their comprehension. Proficient math teachers enable students to become self-assured mathematicians who can apply their knowledge outside of the classroom by encouraging critical thinking and problem-solving techniques.

The National Research Council of Qatar developed the concept of mathematical proficiency using five standards, conceptual understanding, procedural fluency, strategic competency, adaptive reasoning, and productive disposition (Barham, 2020). One intriguing finding from Barham's (2020) study is that teachers' perceived needs varied depending on how many years of experience they had; teachers with fewer years of experience felt they had fewer needs than their more experienced colleagues. It is advised to conduct additional research to determine whether the kind of undergraduate programs teachers have attended have an impact on this outcome. Focus should be placed on whether their undergraduate programs enabled them to acquire the knowledge and skills necessary to capture the SMP in line with new developments in mathematics education, or if they merely lack awareness of the need for professional development. However, according to Kaur et al., (2019), experienced teachers are more established in aligning instructional strategies to the intended learning objectives prescribed by the problem-solving framework.

Cabalo et al., (2019) conducted research at DepEd Leyte Division, Philippines titled “Mathematical Competencies and Character Traits Teachers in Relation to Pupils Academic Performance”, the study revealed that mathematics teachers who are competent and proficient in mathematics concepts and theories greatly improved students' academic performance. It is indeed evident that deep understanding of mathematical concepts allows teachers to explain complex ideas clearly and address students' misconception. It is crucial that this particular skill should emphasize in the professional development journey of the teachers. It enables them to design meaningful learning experiences that promote creative and critical thinking and problem-solving skills.

### **Organizational Development (OD).**

This dimension refers to teamwork, service orientation, and organizational structure. Teamwork is essential in an organization. It is said that any success in an organization is through teamwork. It increases productivity, encourages teamwork, and creates a happy workplace. People can accomplish amazing things when they band together and combine their knowledge and skills. Mutual respect, open communication, and common objectives are necessary for effective teamwork. Organizations can overcome obstacles and succeed in ways that would be impossible for them to do alone by cooperating toward a common goal. Service orientation is a way to articulate organizational directions, issues, and problems. It allows every member to improve the delivery of services within the organization. Organizational structure has a vital role in teachers' professional development. Sufficient knowledge of organizational structure and operations allows teachers to grasp enough information about school culture and schoolwork. Organizational structure has a big influence on how teachers develop professionally. Teachers can improve their skills and knowledge by receiving the support and resources they need from a well-designed structure. Additionally, it can encourage cooperation among teachers, which improves the learning environment for students.

One aspect of organizational development pertains to teachers' responsibilities, which include participating in improvement initiatives, understanding how the institution operates, and considering themselves as an integral part of it (Yenen et al., 2020). It is important to note that teachers' professional development includes understanding organizational structure so that teachers are directed and able to achieve organizational goals while the vision, mission, and goals are clear to them. In the study of Nellitawati (2019) where organizational development was included in both good and sufficient categories. The study revealed that organizational development has a 5.4% contribution to teachers' performance; this means that organizational development has a significant positive impact on teacher's performance (Nellitawati, 2019).

The aforementioned related studies are deemed significant in the conduct of this study because they serve as the foundation of this endeavour; thorough reading of related reviews provides the researcher with a comprehensive understanding of existing knowledge and identifies gaps that need to be filled. By reviewing previous studies, researcher built upon existing theories and methodologies, ensuring their work are grounded in established principles. Additionally, related reviews help to validate the significance of new research by demonstrating its relevance and potential contributions to the field.

### **THEORETICAL FRAMEWORK**

This study aims to determine which among the following dimensions of professional development of public secondary mathematics teachers in Legazpi City Division stand out, each dimension is supported by a specific theory.

The AMO proposition states that three distinct components namely ability, motivation, and opportunity of a work system have an impact on employee characteristics and contribute to a company's success. However, in this study, opportunity-in-field is the major concern. According to Marin-Alfalla (2019), the AMO model is a great, organized framework that aids in clarifying the connection between HRM and performance. In AMO theory opportunity elements refers to employee's participation in organizational activities which either in a circle or a team. Opportunity is an external factor compared to an individual's internal ability or motivation, meaning that it is a boundary condition of performance (Hauff et al., 2021).

According to the behavioral learning theory of John B. Watson (1878 – 1958), experience is the foundation of all learning. Humans use behavioral learning to teach and modify behaviors to obtain desired results, from potty training to performance-based incentives at work. For instance, parents have long taught young children through behavioral learning to eat their vegetables. A toddler who receives a sticker repeatedly will learn to associate the reward (sticker) with the vegetables and will not only expect but also work toward finishing their peas rather than throwing them to the ground. Making healthy eating a habit for life is made easier with positive reinforcement. When a particular behavior results in a consequence, operant conditioning is used to teach that behavior in this situation. Similar to this, when staff members are commended or even awarded a badge or self-satisfaction each time they perform admirably or surpass a predetermined quota, they are encouraged to continue the behavior in the hopes of receiving a reward. The 70:20:10 framework of learning, which states that 70% of learning comes from on-the-job experiences which should be

wholesome and challenging, 20% comes from peer interaction, and 10% comes from formal training, somewhat aligns with the basic tenet of behavioral learning. Since both psychology and learning and development (L&D) fields concur that behavior depends on observational learning, there is value in giving employees active learning opportunities that let them learn while doing their jobs.

A live discussion or teamwork with a peer can constitute active learning. Employees can improve their conceptual understanding, share their knowledge with peers, and collaborate on solving problems through group interaction. In fact, skill-sharing practices, like an employee-led workshop on top sales tactics, have a significant positive impact on the preservation of an organization's institutional knowledge. Additionally, in line with the stimulus-response theory, introduced by Edward Thorndike (1874 – 1949) of behavioral learning, these procedures can be linked to rewards and recognition to encourage staff members to impart their knowledge and skills. In this context, professional development providers should consider the behavioral aspects of teachers. They should create opportunities where teachers actively engage. Learning and development specialists can apply behavioral learning theory to the workplace to boost engagement, improve performance, and even pursue the behavior of less engaged employees.

Instructional Development (ID) is anchored on an instructional theory first introduced in 1956 by Benjamin Bloom. This theory offers an explicit framework for learning and development. It recommended the best possible combination of strategy elements for various circumstances (Reigeluth, 2018). In order to guarantee that students have successful and interesting learning experiences, the instructional development aspect of a teacher's job is essential. Teachers must always work to enhance their teaching strategies and adjust them to the ever-changing needs and skills of their pupils. This facet includes a broad range of abilities and methods, such as lesson planning, classroom management, methods for assessment, and the incorporation of technology into instruction. Lesson plans are created internally by teachers to help them feel more confident, learn the material more thoroughly, facilitate smoother lessons, and foresee issues before they arise (Farrell & Ashcraft, 2024). To improve their teaching skills, educators must be prepared to participate in continuing professional development opportunities. This could entail going to conferences and workshops or getting a graduate degree in teaching. Teachers can stay up to date with the latest developments in education and give their students the best instruction possible by consistently seeking out new information and methods.

In the context of this study, discipline-based skills, or the DSD dimension, are primarily concerned with the skills needed in teaching mathematics, these are problem-solving skills, mental arithmetic, constructing logical arguments, abstract reasoning, and visualization. This dimension is anchored to the Theory of Multiple Intelligence of Howard Garder (1983) because the teacher should possess particular intelligence to deliver the particular lessons. Mathematics teachers are expected to be good in logical-mathematical and spatial intelligence. Teaching Mathematics needs characterized teaching practice (logical-mathematical and spatial intelligence) within the subject area and encourages teachers to specialize, depth of content knowledge, and integrity to the conventions of their discipline (Hahn & Klein, 2022).

It is important that mathematics teachers exhibit problem-solving skills and comprehension to equip them with the ability to efficiently guide their students in navigating and investigating complex mathematical problems. Mental arithmetic is also an important skill in teaching mathematics; it develops the following sub-skills concentration, visual memory, creative thinking, listening and observation, imagination, logic, analytical thinking, and leadership ability (Temirovna, et. al. (2021). The discipline-based skills approach also states that focusing on discipline-specific skills, it enhances the necessary skills and expertise to make valuable contributions in the field of mathematics, while also equipping teachers with transferable skills that have broader applications beyond classroom settings.

Organizational skills are the ability to effectively manage and coordinate resources, time, and tasks to achieve desirable objectives and maximize efficiency. In teaching mathematics, resources, time, and tasks should be put in order, so that effective teaching and learning take place. For instance, teachers should manipulate, utilize, and familiarize available resources in school. The aid of technology in teaching is now required rather than a trend. According to Barakaev et al., (2020), the rapid technological advancement in the global community is the need for next-generation teachers to be able to manage modern technology in teaching. Employees should have a generalized perception of how much their employer values their contributions and is concerned about their welfare, according to the Social Exchange Theory (SET) (Kurtessis et al., 2017). Social Exchange Theory provides an analytic approach to social interaction resulting in the exchange of resources, services, and acceptable behavior for mutual values (Cook et al., 2021). If mutual values are properly established between employee and employer there will be equilibrium in an organization (Maurya et al., 2021).

### **CONCEPTUAL FRAMEWORK**

This research relies heavily on the CIPP (Context, Input, Process, Product) model introduced by Stufflebeam in 1965. It offers a thorough framework for analyzing and determining the efficacy of professional development opportunities provided by educational institutions. Through the CIPP model researcher will be able to know the strengths and weaknesses of professional development opportunities by looking at their context, input, process, and output. This model makes sure that research is done methodically and permits education-related decisions to be based on evidence.

Context evaluation is used to establish the priorities and goals of the program and to confirm that the objectives are focused on addressing issues and needs (Ebtesam& Foster, 2019). In the context phase, it is important to assess the current professional development needs of mathematics teachers. This includes analyzing teacher's facets of opportunities present in the field, their behavioral aspect, instructional skills, discipline-based skills, and how organization affects their performance. These dimensions of the professional development needs of mathematics teachers will enable them to create a tailored plan for their professional development.

Input evaluation is thought of as a way to set up procedural designs, support systems, and solution strategies for the program's future implementation. It also helps determine what modifications are necessary for a program to function properly (Ebtesam& Foster, 2019). The input coming from the respondents through a survey questionnaire will help the researcher uncover the real problems and

needs of the respondents. The professional development needs from the respondents is the focus of the statistical analysis of this study. It is important that the professional development needs to be drawn from the respondents is valid and reliable to come up with a professional development plan suited to their needs and situations.

Process evaluation is used to evaluate how well a program is implemented; offer input on how much the program was used as planned and expected, and investigate whether the program's potentially subpar results were caused by a poorly thought-out strategy or by the strategy's inadequate application (Ebtessam & Foster, 2019). During the process, ethical consideration in conducting research is upheld. It involves the responsible and transparent gathering of information while respecting individuals' privacy and ensuring their consent. Ethical considerations include protecting sensitive data, maintaining confidentiality, and avoiding bias. Adhering to ethical principles not only upholds the integrity of research but also safeguards the rights and well-being of respondents. Statistical tools and scientific analysis will be utilized to validate responses, considering that every response is valid and to foster trust in the scientific processes.

Finally, the product phase focuses on the recommendation of this study, it includes the most needed dimension to focus on in crafting development plan of Junior High School mathematics teachers. Overall, by using CIPP to guide professional development initiatives for math teachers, schools can ensure continuous improvement in teaching practices and ultimately enhance student learning outcomes.

## **METHODOLOGY**

This section explains the methodologies that were used in gathering data and analyzing the data. The research design, instrument, data gathering procedure, respondents of the study, sampling technique, ethical considerations, and statistical analysis were included in this section.

### **Research Design**

This study utilized the correlational-quantitative method of research as respondents' demographic profile correlated to dimensions of professional development. The research mainly focused on the professional development needs of mathematics teachers in the Legazpi City Division. Specifically, the research focused on the five professional development dimensions. These dimensions are considered to examine the professional development needs of mathematics teachers in 5 major perspectives.

### **Research Instrument**

The study used the researcher-made questionnaire focused on the participant's demographic profile, professional development needs, correlation between respondent's demographic profile and OBIDO professional development dimensions, and recommendations. The researcher adapted DepEd Order No. 43 s. 2017, DepEd Order No. 35, s. 2016, SERG Version 12, DepEd Order No. 2, 2015, and study of Senk et.al. 2008. The issuances and study helped the researcher conceptualized the research instrument. The questionnaire was further reviewed and evaluated by 3 experts from the Division of Legazpi City, the three evaluators were chosen considering their line of expertise and educational background. During the evaluation some of the suggestions were made to improve the

questionnaire. In the first part of the questionnaire the evaluators convened to adjust the presentation of seminars attended into simpler templates, a check box was the preferred format. In the second part of the questionnaire, the evaluators suggested to have similar tone in each indicator for easy interpretation and to avoid confusion among the respondents, and the last one, indicators under discipline-base skills development were suggested to change because the crafted indicators seemed irrelevant to the objectives of the study. After incorporating all the suggestions, the researcher sent a copy of the questionnaire to the panel of evaluators for final checking. Upon thorough review and evaluation of the questionnaire, the panel of evaluators convened and approved the questionnaire.

The researcher-made questionnaire utilized a 4-point Likert scale to gather the needed data. The 4-point Likert scale is a popular tool for gauging attitudes and opinions in research studies. There are four possible answers on this scale, ranging from strongly agree to strongly disagree. Researchers employ this scale for several reasons. The 4-point Likert scale strikes a balance between being too general and being too detailed. Participants can easily understand and navigate the scale without feeling overwhelmed because there are only four response options. The scale also permits some degree of response differentiation, allowing for the capture of subtle differences in attitudes and opinions and it facilitates data analysis by providing a clear structure for scoring and interpretation.

#### *Scale Interval Range*

<b>Point</b>	<b>Interval</b>	<b>Adjectival Interpretation</b>
<b>4</b>	3.50 – 4.49	Strongly Agree (SA)
<b>3</b>	2.50 – 3.49	Agree (A)
<b>2</b>	1.50 – 2.49	Disagree (D)
<b>1</b>	1.00 – 1.49	Strongly Disagree (SD)

#### **Data Gathering Procedure**

The researcher personally administered the questionnaires to the respondents. The researcher asked permission from the Legazpi City Division to get the necessary information to public Junior High School mathematics teachers. Indorsement letter was cascaded to 12 public secondary schools of Legazpi City Division through the district supervisor. Upon the approval of the district supervisors of District 9A and 9B, the researcher personally distributed the hard copy of the questionnaire to the respondents having a ratio of 1:1 (questionnaire: respondent). The researcher preferred to have a hard copy than the electronic copy this is to promote a more authentic and reliable response. After gathering the data a simple token were given to the respondent as an appreciation for their effort and time during the accomplishment of the questionnaires. The survey questionnaire retrieval rate or participation rate reached 87% or 66 respondents out of 76 expected respondents.

#### **Respondents of the Study**

The participants of this study are the 76 public junior high school mathematics teachers in the Schools Division of Legazpi City.

### **Sampling Technique**

In selecting the respondents for this study, the researcher used total enumeration. Total enumeration referred to as census, is a research technique in which data are gathered from the entire population as opposed to a sample. This strategy has several benefits. Firstly, every member of the population is included, and the results are accurate and trustworthy. Secondly, it facilitates in-depth examination and research of diverse subpopulations. Lastly, total enumeration ensures fairness and equality by giving every member of the population an equal opportunity to participate. Furthermore, the researcher believes that this careful selection process promotes meaningful and reliable results and enhances the validity and credibility of the research.

### **Ethical Considerations**

Research ethics were strictly observed in the execution of the design. All the participants were asked for their consent to their voluntary participation and ensured the confidentiality of their responses. All survey questionnaires were safely kept and identifying respondent's information was excluded in the results section of this study.

### **Statistical Analysis**

Pearson Product Correlation with t-test was used in the analysis of data. Pearson's correlation coefficient is a statistical tool that measures the linear relationship's strength and direction between two quantities. Late in the 19<sup>th</sup> century, Karl Pearson developed this statistical tool which ranges from -1 to +1, with a value of 0 indicating no correlation. The Pearson Product Correlation with T-test is a statistical tool used to determine the strength and significance of the relationship between two variables. It combines the Pearson correlation coefficient, which measures the linear association between variables, with the t-test, which assesses if this association is statistically significant. This method allows researchers to not only quantify the relationship between variables but also determine if it is due to chance or has real meaning. The Pearson Product Correlation with T-test is widely used in various fields such as psychology, economics, and social sciences for its ability to provide valuable insights into data analysis.

## **RESULTS AND DISCUSSIONS**

The results and discussions in this section are mainly based on the gathered data using the researcher-made questionnaire. The questionnaire focused on the five dimensions of the professional development of public school secondary mathematics teachers in the Schools Division of Legazpi City. Opportunity-in-Field Development (OFD), Behavioral Development (BD), Instructional Development (ID), Discipline-based Skills Development (DSD), and Organizational Development (OD), or simply the OBIDO professional development dimensions are the main concerns of the discussion. The survey questionnaires were administered to public junior high school (JHS) mathematics teachers in the Legazpi City Division. There are 12 participating schools in this study and among those 12 schools, there are 76 total respondents and only 66 respondents participated in answering the questionnaire which gave an 87% retrieval rate.

In the context of this study, 4-point Likert scale was used not just because it is a widely used tool in research but because it offers numerous benefits. First of all, it offers a clear-cut way for participants to share their thoughts or feelings about a particular subject. Second, because the scale



provides distinct categories ranging from strongly agree to strongly disagree, it makes it simple for this study to analyze and interpret data. Furthermore, by eliminating neutral choices and pressuring respondents to adopt a position, the 4-point Likert scale lessens response bias. Finally, this scale is easily customizable and adaptable to various research contexts and objectives. All things considered; the 4-point Likert scale is quite helpful in obtaining insightful data for this study.

The data gathered from the respondents were used solely for this study. In the collection of data, the researcher exhausted all means to make the data available, valid, and reliable. Varied responses are notable and the 87% survey questionnaire retrieval rate was enough to reflect the professional development needs of junior high school mathematics teachers in the Schools Division of Legazpi City.

The use of tables and narratives was considered in presenting the results of the study. This is to provide a clear and concise understanding of the data and findings. Table 1 represents the respondent's demographic profile, Table 2 represents the OBIDO Professional Development Dimensions, and Table 3 represents the relationships of demographic profile to OBIDO Professional Development Dimensions. The professional development needs of mathematics teachers were clearly identified in this study, under the Opportunity-in-Field Development Dimension it is clear that respondents need instructional-related training and seminars, in the Behavioral Development Dimension skills on developing instructional-related innovation, in the Instructional Development Dimension there is a call for effective and efficient curriculum planning, for Discipline-based Skills Development proficient teaching of mathematics is needed to be prioritized, and lastly for organizational development understanding organizational structure is a basic requirement for teachers professional development journey serving as scaffold to teacher's continuous professional development. A deep understanding of the results and findings was discussed thoroughly in the succeeding section.

**Table 1: Respondent's Demographic Profile**

<b>1.a. Educational Background</b>	<b>Frequency</b>	<b>Rank</b>
With Units in Graduate School	41	1
College Degree Major in Mathematics	11	2
With Doctoral Units	4	4
College Degree Minor in Mathematics	1	5.5
Graduate with master's degree	1	5.5
Others	6	6
Graduate with Doctoral Degree	0	-
<b>1.b. Teaching Position</b>	<b>Frequency</b>	<b>Rank</b>
Teacher III	33	1
Teacher I	24	2
Master Teacher I	5	3
Teacher II	2	4.5
Master Teacher II	2	4.5
Others	0	-
<b>1.c. Teaching Assignment</b>	<b>Frequency</b>	<b>Rank</b>
Teaching Purely Mathematics	53	1

Teaching Mathematics and Other Subject Areas	13	2		
<b>1.d. Years in Service</b>	<b>Frequency</b>	<b>Rank</b>		
10 Years and Above	26	1		
4 – 6 Years	20	2		
7 – 9 Years	7	3		
1 Year Below	6	4		
1 – 3 Years	5	5		
<b>1.f. Training and Seminars Attended</b>	<b>Instructional Related</b>	<b>Non-Instructional Related</b>		
	Frequency	Rank	Frequency	Rank
School	55	1	18	1
District	25	3	8	2
Division	38	2	6	3.5
Regional	22	4.5	6	3.5
National	22	4.5	4	5
International	7	6	2	6

Table 1 represents the demographic profile of the respondents. The table shows 6 indicators, educational background, teaching position, teaching assignment, years in service, average class size, and training and seminars.

It is noted that most of the respondents have units in graduate school. It suggested that, with the present situation teachers are likely to enroll in graduate school for promotion and professional development. It was supported by the ideas of Tyagi and Misra (2021) that teachers should delve into continuing professional education. Congruently, most of the respondents are Teacher III, meaning the respondents' effort to enroll in graduate school matches the position they have right now. Supported by the teaching position assignment they have; respondents continuously seek professional growth in the field of mathematics. It is a good indicator that teachers are emphasizing their continuing education. However, the data revealed that there is only 1 master's degree graduate among the respondents. One of the reasons perhaps is the promotion scheme in the department. It has a slim chance of being promoted to master teacher even though graduated with a master's degree. It is because of the number of teachers in a particular school, which is the basic requirement for promotion to master teacher, this reason somewhat discourages them from finishing their master's degree.

It is good to note that 80% of the teacher respondents teaching purely mathematics. This indicator was considered mainly because it has a significant effect on teachers' personal development especially in their field of specialization. Most of the teachers exerted effort in another subject they handled; they lost their focus in their subject area. If teachers had the chance to teach their specialized subject it would have a greater chance to master the instructional-related activities such as preparation of the lesson, preparation of teaching materials, delivery of the lesson, and giving the right assessment to their students. In terms of content knowledge and its application both within and across curriculum areas, the respondents' teaching performance has been found to be correlated with their area of specialization (S Mahalay, 2021).

Further, the table also revealed that most of the respondents are 10 years and above in service. About 41% of the respondents are experienced teachers and about 9% are new in the service. It denotes that most of the mathematics teachers in the Legazpi City division adopted the culture of the Department of Education. These experienced teachers were adept in using pedagogical approaches and teaching strategies in delivering the lesson and achieving the lesson's objectives. However, some experienced teachers need to revert or unlearn obsolete notions, especially in pedagogical content knowledge such as lesson preparation, lesson delivery, and assessment. This idea is seconded by Karlberg & Bezzina (2022) in their study titled "Lesson Study: Professional Development (PD) for Experienced and Beginning Teachers". Beginning teachers should adopt the culture and system of the public secondary schools in the Philippines. Given the challenges, Filipino students are very far from other countries in terms of mathematics achievement. This reality might not yet be internalized by newly hired teachers, they have to investigate and dig deeper into the root cause of this declining performance in mathematics.

All respondents have training and seminars attended, however, most of the training and seminars are school level both instructional and non-instructional related. The data revealed that schools need to allocate a budget for teachers to attend international training. Teachers need to meet competent and expert PD providers for their continuous professional development. DepEd also should utilize accredited NEAP facilitators and trainers to provide the necessary training for teachers. In order to advance novel and innovative ideas, it pushes us to think more broadly about advancements made in the field of professional development on a regional, national, and worldwide scale (Karlberg & Bezzina, 2022).

Making teacher training and seminars a priority is essential to guarantee the caliber of education that students receive. Teachers can stay up to date on the newest teaching techniques, educational trends, and technologies with the help of these professional development opportunities. It is also noted in the study conducted by Chou (2019), asserted that instructional strategies improve further students' understanding through the use of technology. Teachers can better meet the diverse needs of their students and foster a more engaging learning environment by regularly updating their knowledge and skills.

Additionally, teachers can work together with peers; exchange best practices, and get feedback on their pedagogical approaches through training and seminars. In addition to fostering a culture of continuous improvement within schools, this collaboration fosters a sense of community among educators. Teachers are better able to motivate and inspire their students to realize their full potential when they have the resources and information at their disposal.

**Table 2: OBIDO Professional Development Dimensions**

<b>2.a. Opportunity-in-Field Development</b>	<b>Weighted Mean</b>	<b>Adjectival Interpretation</b>
Mentoring and Coaching	3.25	Agree
Training and Seminars Attended	3.56	Strongly Agree
Technical Assistance	3.28	Agree
<b>GWA</b>	<b>3.36</b>	<b>Agree</b>
<b>2.b. Behavioral Development</b>	<b>Weighted</b>	<b>Adjectival</b>

	Mean	Interpretation
Self-Management	3.53	Strongly Agree
Professional Ethics	3.60	Strongly Agree
Result Focus	3.35	Agree
Innovation	3.30	Agree
<b>GWA</b>	<b>3.36</b>	<b>Agree</b>
<b>2.c. Instructional Development</b>	<b>Weighted Mean</b>	<b>Adjectival Interpretation</b>
Content Knowledge and Pedagogy	3.16	Agree
Curriculum Planning	3.36	Agree
Learning Environment	3.10	Agree
Assessment and Reporting	3.15	Agree
<b>GWA</b>	<b>3.19</b>	<b>Agree</b>
<b>2.d. Discipline-Based Skills Development</b>	<b>Weighted Mean</b>	<b>Adjectival Interpretation</b>
Proficient Teaching of Mathematics	3.44	Agree
Enacting Mathematics for Teaching and Learning	3.55	Strongly Agree
<b>GWA</b>	<b>3.50</b>	<b>Strongly Agree</b>
<b>2.e. Organizational Development</b>	<b>Weighted Mean</b>	<b>Adjectival Interpretation</b>
Teamwork	3.62	Strongly Agree
Organizational Structure	2.30	Disagree
<b>Service Orientation</b>	3.39	Agree
<b>GWA</b>	<b>3.10</b>	<b>Agree</b>

3.50 – 4.49	2.50 – 3.49	1.50 – 2.49	1.00 – 1.49
Strongly Agree (SA)	Agree (A)	Disagree (D)	Strongly Disagree (SD)

Table 2 shows the OBIDO Professional Development Dimensions. The first column represents the 5 dimensions of professional development of teachers, opportunity-in-field development, behavioral development, instructional development, discipline-based skills development, and organizational development. Each dimension is composed of indicators with corresponding weighted mean and adjectival interpretation as shown in columns 2 and 3 respectively.

### Opportunity-in-Field Development (OFD)

Under this dimension, it is notable that training and seminars gained the highest mean of 3.56 with an adjectival rating of strongly agree. It is also noted that teacher respondents have training and seminars attended at both school, district, division, regional, national, and international levels.

This indicates that training and seminars attended significantly contributed to their professional development compared to coaching, mentoring, and technical assistance. Further, the result suggests that training and seminars have a direct and indirect impact on teachers' professional development and learning outcome. It is supported by the study of Ichsan (2020) in which training and seminars capacitate and equip workers by enhancing their skills, abilities, knowledge, and behavior. Similarly, Saputa (2017), Adnyani and Dewi (2019), and Al-kharabsheh (2023) supported

the idea of Ichsan (2020), they emphasized that receiving training enables employees to learn specific information and skills.

Opportunities present in the field, especially training and seminars promote professional development communities. Teachers who experience structured and non-structured training and seminars create teachers an educational community that collaborates to enhance their teaching methods and student outcomes as supported by the study conducted by Postholm (2018). Accordingly, Tupas and Noderama (2020), support the idea of PLC as evident during the conduct of In-Service Training for Teachers. In-Service Training, SLAC, and other similar activities to strengthen and continue so that teachers could have the opportunities to grow while they are in the field.

Effectiveness in teaching and motivating students is greatly influenced by the learning opportunities that are offered in the workplace. Schools may guarantee that teachers have the information and abilities needed to design interesting and meaningful learning experiences for their students by giving them access to resources, mentorship, and continual professional development.

Teachers' workplaces can also be excellent resources for learning opportunities on their own. Teachers can grow and develop through working together, interacting with a variety of student populations, and being exposed to new teaching techniques. Schools can empower teachers to stay up to date with best practices in education and adjust to the ever-changing needs of their students by establishing a culture of continuous learning within the workplace.

The learning opportunities that teachers have at work have far-reaching and wide-ranging effects. Through funding the professional development of educators, schools can eventually improve the standard of instruction given to students and assist them in realizing their full potential.

### **Behavioral Development (BD)**

This dimension of professional development is composed of 4 indicators namely, self-management with a weighted mean of 3.53 with an adjectival rating of strongly agree, professional ethics with a weighted mean of 3.60 with an adjectival rating of strongly agree, result focus with a weighted mean of 3.35 with an adjectival rating of agree, and innovation with a weighted mean of 3.30 with an adjectival rating of agree. The behavioral development dimension earned a 3.36 general weighted mean with a corresponding adjectival rating of agree.

The data revealed that indicator innovation has the lowest weighted mean of 3.30 which falls under the adjectival rating of agree. It means teacher respondents though they have attended several training and seminars, however, not on innovation. According to the results, teacher respondents need to be equipped with the following specific skills: the capacity to identify the underlying causes of issues and offer workable solutions; the capacity to think creatively and consistently concentrate on enhancing one's own productivity to produce higher-quality work and outcomes; the capacity to foster a creative environment and motivate colleagues to come up with novel ideas or solutions; and the capacity to convert creative thinking into concrete adjustments and solutions that enhance the work unit and organization.

It implies that students may suffer significantly from a lack of creativity in addressing learning gaps. Teachers' capacity to successfully close learning gaps is hampered when they don't modify their pedagogical approaches to match the varied needs of their students. Teachers might find it difficult to pinpoint and address the precise areas in which students are struggling if they don't use creative approaches. This may impede overall academic progress and cause the achievement gap to widen. Additionally, using traditional teaching methods may not be able to engage students or accommodate their varied learning styles, which could lead to a lack of interest in and engagement with the learning process. Technological developments provide a wealth of tools and resources that can improve teaching and learning in the quickly changing world of today. Instructors who do not adopt these innovations lose out on important chances to enhance student engagement and interaction in the classroom as supported by Chou (2019) and Arifin (2020).

### **Instructional Development (ID)**

The four indicators that make up this professional development dimension are content knowledge, which has a weighted mean of 3.16 and an adjectival rating of agree; curriculum planning, which has a weighted mean of 3.36 and an adjectival rating of agree; learning environment, which has a weighted mean of 3.10 and an adjectival rating of agree; and assessment and reporting, which has a weighted mean of 3.15 and an adjectival rating of agree. In summary, this dimension earned a 3.19 general weighted mean with an agree adjectival rating.

The data revealed that curriculum planning earned the highest weighted mean of 3.36 with an adjectival rating of 3.36. It means respondents need activities relative to curriculum planning and implementation. It needs to delve into planning and managing teaching and learning, providing learning outcomes aligned with learning competencies, becoming relevant and responsive to learning programs, and improving professional collaboration to enrich professional practice.

It infers that planning a curriculum effectively and efficiently is crucial to guaranteeing that students learn in a way that is beneficial to them. In order to meet educational goals and objectives, it entails carefully choosing and organizing the content, instructional strategies, and assessment techniques. Determining the unique needs and skills of each student is a necessary step in developing an effective curriculum. This makes it possible for teachers to modify their lesson plans to accommodate different learning preferences, guaranteeing that every student can participate in the learning process. Teachers can promote deeper understanding and build upon preexisting foundations by taking into account the prior knowledge and experiences of their students. Furthermore, a well-designed curriculum guarantees that classroom time is spent productively. While removing pointless material, educators must give priority to fundamental ideas and abilities. As a result, more opportunities for student engagement and instruction are more targeted. Additionally, to accommodate various learning styles, an effective curriculum plan also includes a range of instructional strategies. Teachers can accommodate different learning styles and encourage student participation by using a variety of teaching methods, including lectures, discussions, group projects, hands-on activities, and technology-based resources. Educators must stay up to date on the latest curriculum for them to plan lessons that emphasize learning competencies and particular subject matter, as indicated by the research conducted by Kelly et al. (2020).

### **Discipline-based Skills Development (DSD)**

Discipline-based Skills development dimension of professional development includes two indicators namely, proficient teaching of mathematics and enacting mathematics for teaching and learning. Proficient teaching of mathematics has a weighted mean of 3.44 with an adjectival interpretation of agree while enacting mathematics for teaching and learning has a 3.55 weighted mean with adjectival interpretation of strongly agree.

Between the two indicators under DSD, proficient teaching of mathematics turned out to be more in need of mathematics teachers. Teacher respondents should concentrate on developing a conceptual understanding of the fundamental knowledge needed to effectively teach mathematics, being fluent in carrying out fundamental instructional routines, having strategic competence in problem-solving and effective lesson planning, using adaptive reasoning to support and explain their instructional practices, and reflect on them, and having a positive attitude toward learning, teaching, and improving their methods supported by the study of Barham (2020). The result of the respondents' demographic profile supported this claim; percentage of the proficient teachers is about 89% while there are 11% of highly proficient teachers. This means 89% of the respondents are developing into proficient teachers. In addition, several years in service constitute to teacher's development into a proficient teacher as supported by Barham (2020) and Kaur et. al (2019).

It denotes that being a proficient teacher significantly affects students' learning outcomes in mathematics. Mathematics is culturally often considered a challenging subject for many students, and having a proficient teacher can make all the difference in their understanding of mathematical concepts. Proficient educators possess a profound comprehension of the subject matter. They can simplify difficult mathematical ideas so that students can understand them. This makes it easier for pupils to understand new concepts and contributes to the development of a solid knowledge base. Effective teachers can also accommodate their students' varied learning styles by providing explanations of mathematical concepts from various perspectives. Furthermore, proficient teachers know how to design a dynamic and captivating classroom. They employ a variety of instructional techniques, including practical exercises, group projects, and real-world applications, to help students relate to and find mathematics more engaging. Their motivation is increased, and it also fosters critical thinking, active engagement, and a deep understanding of the mathematical concept similar to the study conducted by Cabalo et. al. (2019).

### **Organizational Development (OD)**

This dimension of professional development is composed of 3 indicators namely, teamwork with a weighted mean of 3.62 with an adjectival rating of strongly agree, organizational structure with a weighted mean of 2.30 with an adjectival rating of disagree, and service orientation with a weighted mean of 3.39 with an adjectival rating of agree. The organizational development dimension earned a 3.10 general weighted mean with a corresponding adjectival rating of agree.

The data revealed that most of the respondents have insufficient knowledge about organizational structure and its importance to their professional development. It also showed that respondents are lack of knowledge about school culture and schoolwork. It is noted that teacher respondents are not capacitated on how to manifest shared responsibilities and ownership towards school programs and

projects, they should know that they are part of the organization. However, the result revealed that teacher respondents don't feel that they are part of the organization. Yenen et. al (2020) stated that should considered an integral part of the organization to develop a sense of responsibility and accountability. Similarly, Nellitawati (2019) organizational development greatly contributes to teachers' professional development.

For teachers to advance professionally, they must comprehend organizational structure. An educational institution's structure establishes the channels of communication, decision-making procedures, and individual roles and responsibilities within the organization. Teachers can more successfully navigate the system if they are aware of its structure. Knowing the organizational structure makes it easier for teachers to pinpoint their role within the institution. With this understanding, they can better execute their jobs by understanding their tasks and responsibilities. It also helps them understand who they answer to and who they can consult for advice when necessary. Furthermore, organizational leaders can determine which channels are best for exchanging information or asking administrators or other colleagues for help. This guarantees that crucial messages are communicated precisely and promptly. In addition, it is essential to understand the organizational structure because it makes the roles and responsibilities clear, fosters better staff communication, and permits active participation in decision-making. Teachers with this knowledge are better able to contribute to their professional development and move through educational institutions with greater ease.

### Hypothesis

H<sub>0</sub>: There is no significant relationship between the respondents' demographic profile and the 5 professional development dimensions.

**Table 3:** Relationships of Demographic Profile to OBIDO Professional Development Dimensions

Indicators	Computed t - value	Tabulated t – value at 5% level	Decision
Educational Attainment and Dimensions	1.19	1.96	H <sub>0</sub> Accepted
Teaching Position and Dimension	0.71	1.96	H <sub>0</sub> Accepted
Years in Service and Dimension	28.24	1.96	H <sub>0</sub> Rejected
Average Class Size and Dimension	0.05	1.96	H <sub>0</sub> Accepted
Training and Seminars (Instructional Related) and Dimension	2.37	1.96	H <sub>0</sub> Rejected
Training and Seminars (Non-Instructional Related) and Dimension	1.31	1.96	H <sub>0</sub> Accepted

The table represents the relationships between respondents' demographic profiles and OBIDO professional development dimensions. The use of Pearson Product Correlation with a t-test helped the researcher to unveil the relationship between of two variables. It strongly determines the



strength and significance of the relationship between respondents' demographic profiles and the OBIDO Professional Development Dimension.

It shows that years in service, and instructional-related training and seminars have a significant relationship with the OBIDO professional development dimensions. It indicates that years in service and training and seminars contribute to the professional development of the teachers. It is also revealed that educational attainment, teaching position, average class size, and non-instructional training and seminars were deemed not significant to the OBIDO professional development dimensions. It indicates that those indicators have no direct impact on the professional development of the teachers.

A teacher's professional development is significantly impacted by the length of time they have been employed. Teachers with a great deal of experience often have a wealth of information and skills that are very beneficial to their students. They've had the chance to hone their instructional methods, create efficient classroom management plans, and acquire in-depth knowledge of the subject matter covered in the curriculum.

Additionally, seasoned educators are more likely to have solid working relationships with parents, administrators, and other educators. These connections can offer priceless resources and assistance for career advancement. Furthermore, more opportunities for professional development, such as advanced training programs or leadership positions within their school or district were experienced by seasoned teachers.

Conversely, more recent educators might bring novel viewpoints and creative ideas to the classroom. They might be more willing to experiment with cutting-edge teaching strategies and tools that improve student learning.

In summary, instructors of all experience levels contribute distinct advantages to the field. Understanding how a teacher's years of service affect their professional development can help schools build a nurturing environment where all teachers can continue to grow and improve.

## CONCLUSIONS

From the data gathered, analyzed, and interpreted, the researcher concluded that:

1. The diverse respondents' demographic profiles have an impact on their professional development. Respondents were grouped by demographic profile variables and have both similarities and differences in their responses along professional development. The data revealed that most of the respondents have units in graduate school. It suggests that, with the present situation teachers are likely to enroll in graduate school for promotion and professional development. Congruently, most of the respondents are Teacher III, meaning the respondents' effort to enroll in graduate school matches the position they have right now. Supported by the teaching position assignment they have; respondents continuously seek professional growth in the field of mathematics. It is a good indicator that teachers are emphasizing their continuing education. However, there is only 1 master's degree because of the promotion scheme in the department. It has a slim chance of being promoted to master's teacher though graduated with a

master's degree. It is because of the number of teachers in a particular school, which is the basic requirement for promotion to master teacher.

2. It is revealed that training and seminars, innovative skills, curriculum planning, proficient teaching of mathematics and organizational structure are the most needed indicators along with OBIDO Professional Development Dimension. The conduct of School Learning Action Cell (SLAC), In-service Training (INSET), and other related activities are deemed significant in the continuous professional development of mathematics teachers. Further, mathematics teachers need to be capacitated on the following underlying skills under innovation, the skill to examine root causes and able to suggest solutions to problems, the ability to think beyond the box, promote a creative climate to inspire co-workers, and translate creative thinking into tangible changes and solutions to the problems. Furthermore, the respondents need to prioritize curriculum planning, which involves providing learning outcomes aligned with learning competencies. Additionally, mathematics teachers need a conceptual understanding of the core knowledge required in the practice of teaching mathematics, fluency in carrying out basic instructional routines, competence in planning effective instruction and solving problems that arise during instruction, adaptive reasoning ability in justifying and explaining one instructional practices and in reflecting on those practices, and lastly possess productive disposition towards mathematics, teaching, learning, and the improvement of practice.
3. Years in service and instructional-related training and seminars have a significant relationship with the OBIDO professional development dimensions. It indicates that years in service and training and seminars contribute to the professional development of the teachers.
4. A professional development plan is essential for teachers to stay motivated, engaged, and effective in their roles. OBIDO Professional Development Plan offers a holistic approach to teachers in their professional development endeavours. It provides five dimensions of professional development for teachers, allowing them to experience and explore these essential areas of professional development contribute to their professional development.

## **RECOMMENDATIONS**

From the drawn conclusions, the following recommendations are hereby considered:

1. It is recommended that as teachers get older in service there should be constant support for their professional development. Training and seminars are essential forms of support for teachers in their professional development. These opportunities provide them with new skills, knowledge, and strategies to enhance their teaching practices. Investing in teachers' development ultimately benefits students by improving the quality of education they receive.
2. There's a need for the professional development providers, the school head, the district supervisors, mathematics supervisor to provide training and seminars on innovation, curriculum planning, teaching mathematics proficiently, and understanding organizational structure as part of teachers' professional development.

3. It is recommended that educational leaders conduct a gradual monitoring and evaluation of the training and seminars attended by mathematics teachers and assess the impact of these training and seminars on teachers' professional development.
4. It is highly recommended to use the OBIDO Professional Development Plan to guide teachers on their professional development journey for them to have a holistic approach to their professional development and it helps teachers set achievable and specific goals, identify areas for improvement, and develop strategies to achieve them.

## REFERENCES

- [1] Abakah, E. (2023). Teacher learning from continuing professional development (CPD) participation: A sociocultural perspective. *International Journal of Educational Research Open*, 4, 100242.
- [2] Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., &Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers?. *Professional development in education*, 47(4), 684-698.
- [3] Adnyani, N. L. P. R., & Dewi, A. A. S. K. (2019a). PengaruhPengalamanKerja, PrestasiKerja Dan PelatihanTerhadapPengembangan Karier Karyawan. *E-JurnalManajemen Universitas Udayana*, 8(7), 4073.
- [4] Ainurrohmah, F., &Handayani, R. (2020). The influence of motivation, learning discipline, teacher competence and parental support on academic achievement of students (study on gamaenglish course sukoharjo). *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 4(4).
- [5] Al-kharabsheh, S., Attiany, M., Alshawabkeh, R., Hamadneh, S., &Alshurideh, M. (2023). The impact of digital HRM on employee performance through employee motivation. *International Journal of Data and Network Science*, 7(1), 275-282.
- [6] Anthony, G., &Walshaw, M. (2023). Characteristics of effective teaching of mathematics: A view from the West. *Journal of Mathematics Education*, 147-164.
- [7] Arifin, Z., Nurtanto, M., Priatna, A., Kholifah, N., & Fawaid, M. (2020). Technology Andragogy Work Content Knowledge Model as a New Framework in Vocational Education: Revised Technology Pedagogy Content Knowledge Model. *Online Submission*, 9(2), 786-791.
- [8] Barakaev, M., Shamshiyev, A., O'rinov, X., Abduraxmonov, D., &Ismatov, N. (2020). Problems of Teaching Mathematics in Modernization. *International Journal of Progressive Sciences and Technologies*, 19(2), 201-203.
- [9] Barham, A. I. (2020). Exploring in-service mathematics teachers' perceived professional development needs related to the strands of mathematical proficiency (SMP). *Eurasia Journal of Mathematics, Science and Technology Education*, 16(10), em1882.
- [10] Bhat, B. A., & Bhat, G. J. (2019). Formative and summative evaluation techniques for improvement of learning process. *European Journal of Business & Social Sciences*, 7(5), 776-785.
- [11] Bonghanoy, G. B., Sagpang, A. P., Alejan Jr, R. A., &Rellon, L. R. (2019). Transformative Professional Development for Mathematics Teachers. *Journal on Mathematics Education*, 10(2), 289-302.

- [12] Boyle, S., Rizzo, K. L., & Taylor, J. C. (2020). Reducing language barriers in science for students with special educational needs. *Asia-Pacific Science Education*, 6(2), 364-387.
- [13] Cabalo, J., & Cabalo, M. (2019). Mathematical Competencies and Character Traits Teachers in Relation to Pupils Academic Performance. *International Journal of Science and Management Studies (IJSMS)*, 2(2), 139-154.
- [14] Chokheli, E., Kharkheli, M., & Makasarashvili, M. (2023). UNDERSTANDING THE THEORETICAL AND PRACTICAL ASPECTS OF SELF-MANAGEMENT. *Ecoforum Journal*, 12(3).
- [15] Chou, C. M., Shen, C. H., Hsiao, H. C., & Shen, T. C. (2019). Factors influencing teachers' innovative teaching behaviour with information and communication technology (ICT): The mediator role of organisational innovation climate. *Educational Psychology*, 39(1), 65-85.
- [16] Cook, K. S., Hahn, M., Abrutyn, S., & McCaffree, K. (2021). Social exchange theory: current status and future directions. *Theoretical sociology: The future of a disciplinary foundation*, 179-205.
- [17] Dörnyei, Z., & Muir, C. (2019). Creating a motivating classroom environment. *Second handbook of English language teaching*, 719-736.
- [18] Ebtesam, E., & Foster, S. (2019). Implementation of CIPP model for quality evaluation at Zawia University. *International Journal of Applied Linguistics and English Literature*, 8(5).
- [19] English, J., & English, T. (2019). Combining Summative and Formative Evaluation Using Automated Assessment. *Issues in Informing Science & Information Technology*, 16.
- [20] Eli, T. (2021). Students perspectives on the use of innovative and interactive teaching methods at the University of Nouakchott Al Aasriya, Mauritania: English department as a case study. *International Journal of Technology, Innovation and Management (IJTIM)*, 1(2), 90-104.
- [21] Evans, L. (2019). Implicit and informal professional development: What it looks like, how it occurs, and why we need to research it. *Professional Development in Education*, 45(1), 3ñ16. doi: 10.1080/19415257.2018.1441172.
- [22] Farrell, T. S., & Ashcraft, N. (2024). *Lesson planning*. TESOL Press.
- [23] Francisco, C. D. C., & Celon, L. C. (2020). Teachers' Instructional Practices and Its Effects on Students' Academic Performance. *Online Submission*, 6(7), 64-71.
- [24] Garcia, H., & Vargas, D. (2021). Management Level of Special Education Teachers (SPET) on handling Learners with Special Needs (LSEN). Available at SSRN 3800742.
- [25] Garvey, B., Garvey, R., & Stokes, P. (2021). *Coaching and mentoring: Theory and practice*. Sage.
- [26] Gusano, R. C., Cantos, L., & Mendoza, H. N. (2021). District-School Standing: Basis for Supervisory and Technical Assistance Plan of the District Supervisors. *International Journal of Research in Engineering, Science and Management*, 4(7), 438-441.
- [27] Hahn, L., & Klein, P. (2022). Eye tracking in physics education research: A systematic literature review. *Physical Review Physics Education Research*, 18(1), 013102.
- [28] Hauff, S., Guerci, M., Dul, J., & van Rhee, H. (2021). Exploring necessary conditions in HRM research: Fundamental issues and methodological implications. *Human Resource Management Journal*, 31(1), 18-36.
- [29] Ichsan, R. N. (2020). Pengaruh Pelatihan terhadap Prestasi Kerja Karyawan pada PDAM Tirtanadi Cabang Padang Bulan Medan. *Jurnal Ilmiah METADATA*, 2(1), 71-77.

- [30] Ilie, M. D., Maricuțoiu, L. P., Iancu, D. E., Smarandache, I. G., Mladenovici, V., Stoia, D. C., & Toth, S. A. (2020). Reviewing the research on instructional development programs for academics. Trying to tell a different story: A meta-analysis. *Educational Research Review*, 30, 100331.
- [31] Imron, A., Wiyono, B. B., Hadi, S., Gunawan, I., Abbas, A., Saputra, B. R., & Perdana, D. B. (2020, November). Teacher professional development to increase teacher commitment in the era of the Asean Economic Community. In *2nd Early Childhood and Primary Childhood Education (ECPE 2020)* (pp. 339-343). Atlantis Press.
- [32] Istimamah, A., Suyatno, & Maryani, I. (2019, December). The Effects of Teacher Competencies on Student Achievement in Vocational High School. *International Journal of Education*, ISSN 1948 – 5476. Vol. 11, No. 4
- [33] Jumawan, J., & Mora, M. T. (2018). Pengaruh Pelatihan Dan Pengembangan Karier Terhadap Kinerja Karyawan Perusahaan Korporasi. *Jurnal Riset Manajemen Dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, 3(3), 343–352.
- [34] Karlberg, M., & Bezzina, C. (2022). The professional development needs of beginning and experienced teachers in four municipalities in Sweden. *Professional Development in Education*, 48(4), 624-641.
- [35] Khajavy, G. H., MacIntyre, P. D., & Barabadi, E. (2018). Role of the emotions and classroom environment in willingness to communicate: Applying doubly latent multilevel analysis in second language acquisition research. *Studies in Second Language Acquisition*, 40(3), 605-624.
- [36] Kelly, N., Wright, N., Dawes, L., Kerr, J., & Robertson, A. (2019). Co-design for curriculum planning: A model for professional development for high school teachers. *Australian Journal of Teacher Education (Online)*, 44(7), 84-107.
- [37] Kim, T., & Lee, Y. (2020). Principal instructional leadership for teacher participation in professional development: evidence from Japan, Singapore, and South Korea. *Asia Pacific Education Review*, 21, 261-278.
- [38] Kurtessis, J. N., Eisenberger, R., Ford, M. T., Buffardi, L. C., Stewart, K. A., & Adis, C. S. (2017). Perceived organizational support: A meta-analytic evaluation of organizational support theory. *Journal of management*, 43(6), 1854-1884.
- [39] Kusumaningrum, D. E., Sumarsono, R. B., & Gunawan, I. (2019). Professional ethics and teacher teaching performance: Measurement of teacher empowerment with a soft system methodology approach. *International Journal of Innovation, Creativity and Change*, 5(4), 611-624.
- [40] Lee, S. W., & Lee, E. A. (2020). Teacher qualification matters: The association between cumulative teacher qualification and students' educational attainment. *International Journal of Educational Development*, 77, 102218.
- [41] MakereviĚs, V., & Iliĥko, Dz. (2019). Governance of informal learning as a pathway for the development of young adults' agency for sustainability. In Calvo de Mora, J., & Kennedy, J. K. (Eds.), *Schools and informal learning in a knowledgebased world*. London: Routledge.
- [42] Marin-Garcia, J., & Alfalla-Luque, R. (2019). Key issues on Partial Least Squares (PLS) in operations management research: A guide to submissions. *Journal of Industrial Engineering and Management*, 12(2), 219-240.

- [43]Maurya, K. K., Agarwal, M., & Srivastava, D. K. (2021). Perceived work–life balance and organizational talent management: mediating role of employer branding. *International Journal of Organization Theory & Behavior*, 24(1), 41-59.
- [44]Merriam, S. B., & Baumgartner, L. M. (2020). *Learning in adulthood: A comprehensive guide*. John Wiley & Sons.
- [45]Misra, P. (2018). MOOCs for teacher professional development: reflections and suggested actions. *Open Praxis*, 10(1), 67-77.
- [46]Nellitawati, N. (2019). The International Journal of Counselling and Education. Vol. 4. No. 4. 2019, pp. 157 – 162.
- [47]Njenga, M. (2023). How do vocational teachers learn? Formal and informal learning by vocational teachers in Kenya. *International journal for research in vocational education and training*, 10(1), 24-45.
- [48]Nugroho, A. P., & Haryanto, A. T. (2019). The role of job characteristics and professional commitment to tenure and performance (study of teachers in public high schools in solo raya). *Journal of Indonesian Science Economic Research*, 1(1), 26-31.
- [49]Ozcan, M. (2021). Factors Affecting Students’ Academic Achievement according to the Teachers’ Opinion. *Education Reform Journal*, 6(1), 1-18.
- [50]Özreçberoğlu, N., &Çağanağa, Ç. K. (2018). Making it count: Strategies for improving problem-solving skills in mathematics for students and teachers’ classroom management. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(4), 1253-1261.
- [51]Paciente, J. (2022). Information and communication technology (ICT) knowledge, skills, and attitude: Basis for DEPED support system. *Psychology and Education: A Multidisciplinary Journal*, 3(2), 125-137.
- [52]Parsons, S. A., Hutchison, A. C., Hall, L. A., Parsons, A. W., Ives, S. T., & Leggett, A. B. (2019). US teachers’ perceptions of online professional development. *Teaching and Teacher Education*, 82(1), 33-42.
- [53]Philipsen, B., Tondeur, J., Pareja Roblin, N., Vanslambrouck, S., & Zhu, C. (2019). Improving teacher professional development for online and blended learning: A systematic meta-aggregative review. *Educational Technology Research and Development*, 67, 1145-1174.
- [54]Pipere, A. (2019). Journal of Teacher Education for Sustainability after the UN Decade of Education for Sustainable Development: Exploring for the future. *Journal of Teacher Education for Sustainability*, 21(1), 5ñ34.
- [55]Postholm, M. B. (2018). Teachers’ professional development in school: A review study. *Cogent education*, 5(1), 1522781.
- [56]Purwoko, R. Y., Nugraheni, P., &Instanti, D. (2019, November). Implementation of pedagogical content knowledge model in mathematics learning for high school. In *Journal of Physics: Conference Series* (Vol. 1254, No. 1, p. 012079). IOP Publishing.
- [57]Raduan, N. A., & Na, S. I. (2020). An integrative review of the models for teacher expertise and career development. *European Journal of Teacher Education*, 43(3), 428-451.
- [58]Rahmat, N. H. (2020). Innovation in education: Barriers and facilitating factors. *European Journal of Education Studies*.
- [59]Ray, R. (2020). Enhancing patent diversity for America's innovators, The importance of collecting demographic data.

- [60] Reddy, P., Sharma, B., & Chaudhary, K. (2020). Digital literacy: A review of literature. *International Journal of Technoethics (IJT)*, 11(2), 65-94.
- [61] Reigeluth, C. M. (Ed.). (2018). *Instructional theories in action: Lessons illustrating selected theories and models*. Routledge.
- [62] Rice, A. H., & Mars, M. (2023). Planning for Effective Instruction. *The Art and Science of Teaching Agriculture: Four Keys to Dynamic Learning*.
- [63] Seo, K., Dodson, S., Harandi, N. M., Roberson, N., Fels, S., & Roll, I. (2021). Active learning with online video: The impact of learning context on engagement. *Computers & Education*, 165, 104132.
- [64] Sharoff, L. (2019). Creative and innovative online teaching strategies: Facilitation for active participation. *Journal of Educators Online*, 16(2), n2.
- [65] S Malahay, R. (2021). Area of Specialization and Teaching Performance of the Secondary Science Teachers in Negros Oriental, Philippines. *Journal of Scientific Research and Reports*, 27(11), 97-103.
- [66] Sydorenko, V., Shorobura, I., Ponomarenko, A., Dei, M., & Dzhus, O. (2020). Application of technologies of formal and non-formal education for continuous professional development of the modern specialist. *Revista Tempos e Espaços em Educação*, 13(32), 103.
- [67] Szabo, Z. K., Körtesi, P., Guncaga, J., Szabo, D., & Neag, R. (2020). Examples of problem-solving strategies in mathematics education supporting the sustainability of 21st-century skills. *Sustainability*, 12(23), 10113.
- [68] Temirovna, O. L., & Choriyevena, R. L. (2021). Mental Arithmetic is a Non-Traditional way to Teach Preschoolers Verbal Arithmetic. *International Journal of Culture and Modernity*, 11, 205-208.
- [69] Tienson-Tseng, H. L. (2019). Best Practices in Summative Assessment. In *Biochemistry Education: From Theory to Practice* (pp. 219-243). American Chemical Society.
- [70] Tupas, F., & Noderama, R. (2020). Looking into In-Service Training for Teachers in the Philippines: Are They Gearing towards Education 4.0?. *Universal Journal of Educational Research*, 8(10), 4651-4660.
- [71] Tyagi, C., & Misra, P. K. (2021). Continuing Professional Development of Teacher Educators: Challenges and Initiatives. *Shanlax International Journal of Education*, 9(2), 117-126.
- [72] Ulandari, L., Amry, Z., & Saragih, S. (2019). Development of Learning Materials Based on Realistic Mathematics Education Approach to Improve Students' Mathematical Problem Solving Ability and Self-Efficacy. *International Electronic Journal of Mathematics Education*, 14(2), 375-383.
- [73] Van den Heuvel-Panhuizen, M., & Drijvers, P. (2020). Realistic mathematics education. *Encyclopedia of mathematics education*, 713-717.
- [74] Ventista, O. M., & Brown, C. (2023). Teachers' professional learning and its impact on students' learning outcomes: Findings from a systematic review. *Social Sciences & Humanities Open*, 8(1), 100565.
- [75] Yenen, E. T., & Yöntem, M. K. (2020). Teachers' professional development needs: AQ method analysis. *Discourse and Communication for Sustainable Education*, 11(2), 159-176.

## Author Profile



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