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Effects of Professional Development on Science Teachers' Self-Efficacy and Motivation

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ABSTRACT

Despite the importance of teacher efficacy and motivation to teach, there has been little research on the effects of these two variables in secondary schools, particularly in science, with the goal of increasing it. As a result, this study looked into the role of Professional Development (PD) in improving teachers' confidence in their abilities to teach. The research is qualitative and correlational in design. The respondents are science teachers from several schools in San Miguel and San Ildefonso, Bulacan. Because of the pandemic, the study reveals that Professional Development is quite timely, and it has a beneficial impact on science teachers' self efficacy and motivation, both intrinsic and extrinsic.

Keywords: effects, motivation, professional development, science teachers, self-efficacy

I. INTRODUCTION

Efficacy of teachers is a type of self-efficacy that has been shown to be a strong contributor to the success of the teaching-learning process. Teachers must feel competent and secure in their capacity to educate and reach all learners, therefore their feeling of effectiveness is critical. In teaching, self-efficacy has emerged as a key paradigm for predicting and explaining teachers' beliefs and judgments that impact their decisions and behaviors in the classroom. Generality, magnitude, and strength are the three dimensions of self-efficacy that contribute to the achievement of a person. Generality means the extent to which the effectiveness expectation is extended or generalized to other scenarios. Magnitude is a term that describes the complexity of a work as well as its efficacy.

Individual expectations may include basic chores, some somewhat challenging activities, or a really demanding task. The term "strength" refers to both the power and the efficacy of anything. Poor effectiveness expectations can be readily discarded by a person, whilst great efficacy expectations may assist a person to succeed. a person who persists in completing a tough work in the face of difficulty. (deNoyelles et al., 2014)

Teachers' professional development allows teachers to deepen and improve their strategies to effective practice. During the Covid-19 epidemic, underlined the significant technological and access issues experienced by instructors as a result of the health catastrophe. In the realm of education, the planned emergency remote shift was intended to be brief. As the epidemic continues to disrupt the teaching and learning process, measures and strategies have been devised.(Hartshorne et al., 2020) As it emerges around a teacher's professional practice and personal issues, professional development for teachers as a growth and development mechanism demands serious consideration. As the educational system as a whole turns to emergency remote teaching, the demand for relevant and timely professional development programs has increased. Therefore, educators must be equipped to assist students in navigating the current hurdles posed by the epidemic. (Ancho & Arrieta, 2021)

A recent study showed that the work that teachers put into professional development has a beneficial impact on a teacher's self-efficacy. Furthermore, descriptive self-analyses of teacher efficacy revealed that acquiring new information is connected to the efficacy of the teacher. (Yoo, 2016). A teacher who has high self-efficacy is expected to be productive and show a positive attitude towards teaching.

There has been no study that looked into the effects of professional development on teachers' self efficacy and motivation in an online learning environment. This is relevant nowadays because most schools switched to distance learning. The purpose of this quantitative study is to examine if professional development has a significant effect in motivation and self-efficacy of highly proficient science teachers.

II. RELATED LITERATURE

2.1. Professional Development

Over the past decade, online and blended learning have become an integral part of the educational options at many institutions of higher education and many K-12 schools. Large-scale national surveys have shown the consistent growth of online education. The increase in student demand for education in online and blended modalities has created a need for instructors who can competently teach online. With unique competencies required by online instructors, skillfully planned professional development is needed as many instructors are teaching in the online classroom for the first time, while many others are veteran online teachers. By that the demand for online teachers growing, there is a need to better understand the competencies required for successful online teachers (Allen et al., 2015).

2.2 Self-efficacy of Science Teachers

Science teachers have a pivotal role in integrating new research and science education reforms into classroom practices. Their beliefs and perceptions about integrated science education (ISE) should be considered as the change agent in such situations. ISE is an effort to integrate science curriculum contents into a meaningful whole by a constructive and context-based approach that crosses subject boundaries and links learning to the real world . It is a current issue of focus among researchers due to the many promises it offers, such as giving pupils a more coherent understanding of complex everyday life phenomena, increasing conceptual understanding, developing students' 21st-century skills (e.g., critical thinking and problem-solving skills) and increasing students' interest in school and science subjects.

Implementing more integrated approaches to science education, especially approaches that push beyond traditional science subjects, presents teachers with multiple barriers to overcome. The challenges include, for example, pedagogical, curriculum and structural challenges; concerns about students and assessment; a lack of teacher support; as well as challenges related to the broad range of ways of defining and implementing integration, for example as Science, Technology, Engineering and Mathematics (STEM) education or Science, Technology, Society, and Environment (STSE) education (Aksela et al., 2021).

2.3 Motivation to Teach of Science Teachers

The past decade has witnessed an increase in research on teacher motivation which has been proved a crucial factor closely related to a number of variables in education such as student motivation, educational reform, teaching practice and teachers' psychological fulfillment and well-being. Social-cognitive theories of motivation, such as achievement goal theory and expectancy-value theory, have been applied to pre-service teacher motivation studies.

Many investigated the stability and changes in pre-service teachers' achievement goal orientations in a four-year longitudinal study with a sample of Finland-Swedish student teachers. Using individual growth models, they discovered a general increase in achievement goal orientations over time with a peak during the third year of their studies, and the increase in mastery goal orientation was larger than that in performance goal orientation. Their further exploration of associations with academic-related factors indicated that secondary school achievement was a predictor for performance-approach goal orientation and graded performance trajectories, and reflective thinking, intrinsic motivation, and control-expectancy belief were associated with mastery goal orientation increases. However, task-irrelevant behaviour was related to low graded performance and the increase in performance goal orientation (Malmberg 2016).

2.4 Professional Development for Teachers During the Pandemic

Professional development for teachers can be an effective option, but research shows that in order for them to engage, schools must provide support. Educators have had to take on a number of new tasks in the last year. The scope of instruction continues to increase, whether it's trying to teach remotely during a pandemic or navigating debates about the momentous civil rights events of 2020.

Teachers have adapted to the technical demands of distance learning, from video conferencing to online feedback. Due to a lack of training, many people had to learn on the job. Even if they are accustomed to it, technology can be problematic for those who work with the most vulnerable pupils. Many school districts say that they will continue to offer some type of remote learning even after the pandemic has passed. Ongoing professional development may resolve pain spots, expose teachers to more efficient tools, and turn technology into an asset rather than a barrier to overcome in the classroom (Soika, 2021).

III. RESEARCH METHOD

Correlational design through survey questionnaires was used to conduct this study. Correlational research is a research that is non experimental and facilitates explanation of the relationship between variables. Moreover, researchers use a correlational research design to measure whether two or more variables are related. This study aims to determine the Effects of Professional Development on Science Teachers' Self-Efficacy and Motivation for the last two years or the start of pandemic.

The study will adapt the Academic Motivation Scale (AMS) to measure the intrinsic and extrinsic motivation of teachers toward education. Teacher Sense of Efficacy Scale (TSES) will also be used to determine the efficacy of the science teacher and to gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. A long form with 24 items include three teacher efficacy subscales: instructional strategies, classroom management, and student engagement.

The respondents for the survey were chosen using a purposive sampling technique. Purposive sampling, also known as subjective sampling, is a non-probability sampling approach that is an acceptable type of sampling, according to Bernard (2002) for unique circumstances. It either selects examples based on the researcher's assessment or cases with a specific objective in mind. When a difficult-to-reach population needs to be measured, the most common method is to use purposeful sampling.

IV. FINDINGS AND TABLES

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4.1 Demographic

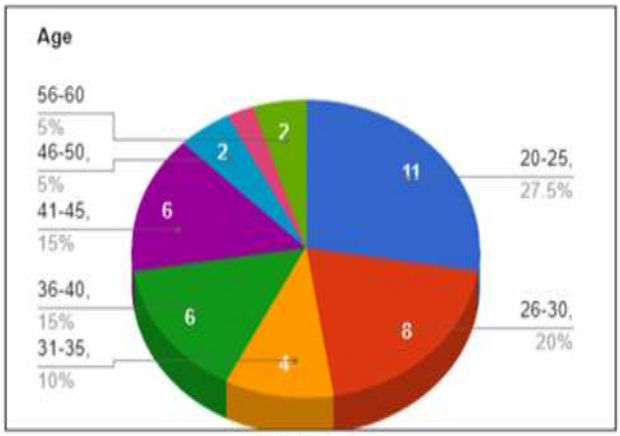

Figure 1.1

The age of science teachers from different secondary school from San Miguel and San Ildefonso Bulacan vary and range as: 20-25 years old with 27.5% of the sample; 26-30 years old with 20%; 31-35 years old 10%; 36-40 years old with 15%; 41-45 years old with 15 %, 46-50 years old with 5%; and lastly 56-60 years old with 5%.

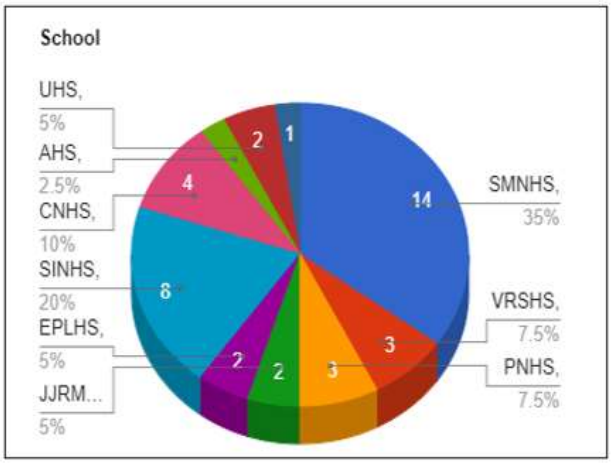

Figure 1.2

Respondents from different secondary schools from San Miguel and San Ildefonso are describe by the percentage as: San Miguel National High School (SMNHS) gathered 35% of the population; Vedasto R. Santiago High School gathered 7.5% of the population; Partida National High School(PNHS) gathered 7.5% of the population; John J Russell Memorial High School(JJRMHS) gathered 5% of the population; Emilia Perez Ligon High

School(EPLHS) with 5%; San Ildefonso National High School (SINHS) with 20%; Calawitan National High School with 10%; Akle High School (AHS) with 2.5% and from Upig high School (UHS) with 5% of the population.

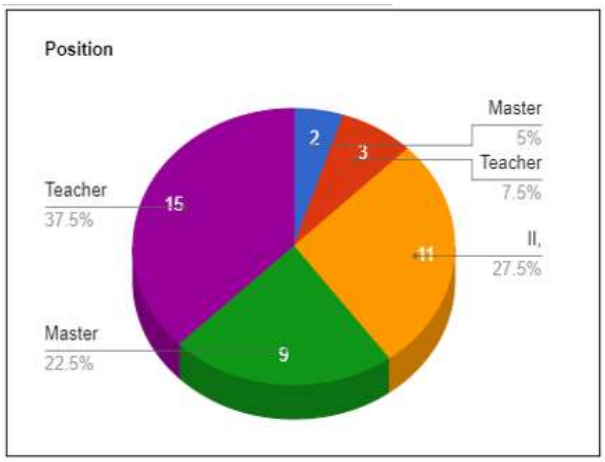

Figure 1.3

In terms of the position of the teachers in their respective schools, Master Teacher II showed 5 % of the population; Master Teacher I with 7.5% of the population; Teacher III with 27%; Teacher II gathered 22.5% and Teacher I as 37.5% of the population.

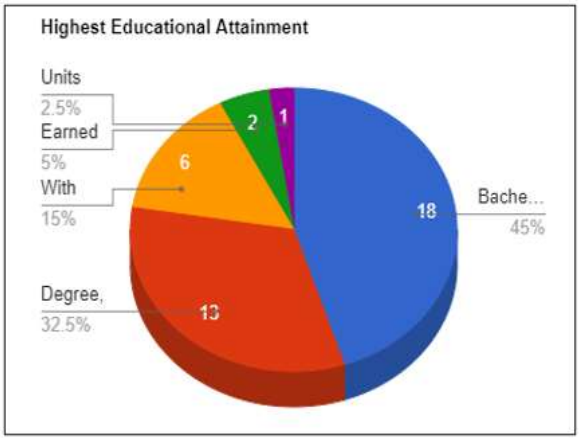

Figure 1.4

Highest educational attainment of the teachers result from 40 respondents are the following: Bachelors Degree with 45%; with earned units in masters degree, 32.5%; graduate of masters degree with 15%; with earned units in doctorate degree 5% and teachers graduate of doctorate degree 2.5%.

4.2 Webinar Training

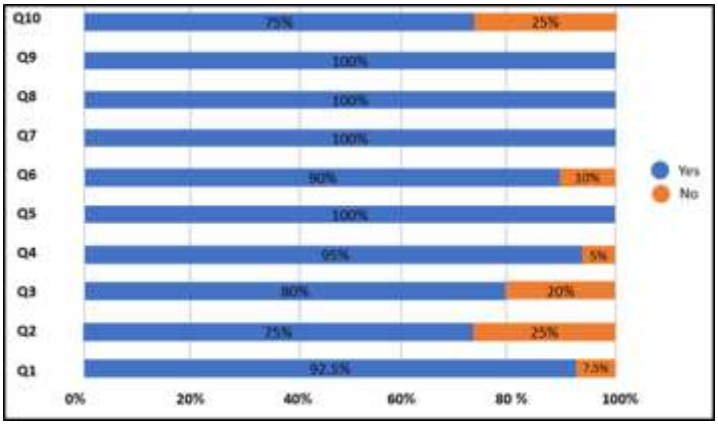

Figure 2

1. Questions related to webinar trainings of the teachers which is answerable by "yes" or "no" were summarized in the table above. Teachers are asked if they had participated in any of the following webinars during the last 12 months of their profession, First question is webinar for developing learning materials teacher who answer yes earned 92.5% and teachers who answer no with 7.5%. Second question is Audio-Video tool for teaching distance learning 75% yes, and 25% no. Next is for online instruction tools for remote teaching and learning (Digital Learning Objects) 80% yes and 20% no. Fourth item is Webinar for Multimedia-based Distance Learning (include watching a PowerPoint presentation/Canva) 95% yes, and 5% no. Then Webinar for educational online platforms of Distance Learning, 100% yes. Webinar-based training for Microsoft Office, result to 95%yes and 5% no. Webinars that obtained certifications for educational technology tools, webinar for physical and mental health readiness, and webinars that enhance their virtual teaching strategies in the absence of face-to-face seminars three items result to gain the percentage of 100% yes. Last item is about webinars on dealing with the challenging health and well-being of learners with 75% yes and 25% no.

2. 4.3 Student Engagement

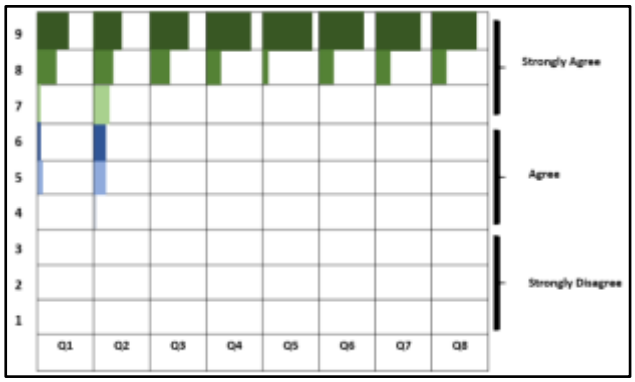

Figure 3

In this part of questionnaire, it seeks to understand the teachers' ability and capability for their students to be more engage in learning. Forty respondents answers 8 item with 9-point likert scale describe as strongly agree (range 7-9), agree (range 4-6), and strongly disagree (range 1-3). Colored bars indicates number of respondents. First item "How much can you do to help your students think critically in an online class?" four teachers answered agree and 36 teachers answered strongly agree. Second item "How much can you do to get through to disengaged students in an online class? (e.g. passive learners who might lurk online, but fail to actively contribute to their own learning.)" ten teachers answered agree and 30 teachers answered strongly agree. Number three question is "How much can you do to motivate students who show low interest in online work?" 40 of them answered strongly agree. Next item is "How much can you do to get students to believe that they can do well in an online class?" 40 respondents answered strongly agree. Then the item "How much can you do to help online students' value learning 40 answered strongly agree. Sixth item is "How much can you do to foster individual student creativity in an online course?", 45 teachers said they strongly agree to this statement. Lastly, the items "How much can you do to adjust your online lessons for different learning styles?" and "How well can you structure an online course that facilitates collaborative learning?" seven respondents agree to this both items and 33 respondents strongly agree.

4.4. Instructional Materials

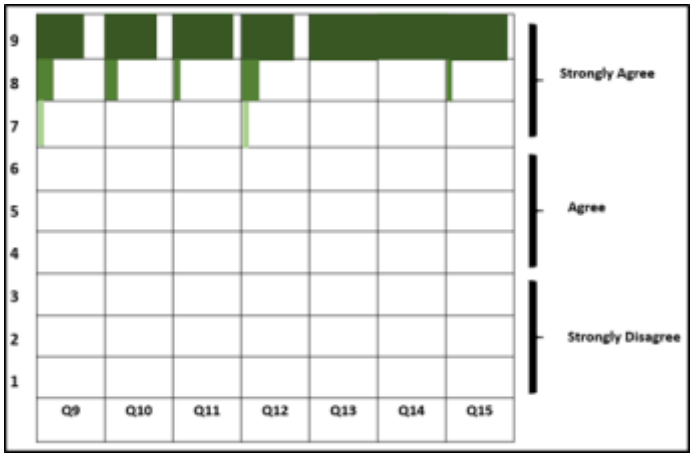

Figure 4

Using the instructional strategies by the teacher to improve the teaching learning process can be determine in this part of questionnaire. Continued by the question number 9-15, "How well can you respond to difficult questions from online students?", "How much can you gauge student comprehension of

what you have taught in an online course?", "How well can you craft questions or assignments that require students to think by relating ideas to previous knowledge and experience?", "How much can you do to adjust your online lessons for different learning styles?", "How much can you do to use a variety of assessment strategies for an online course?", "To what extent can you provide an alternative explanation or example when students in an online class seem to be confused?", "How well can you structure an online course that provides good learning experiences for students?" all of the respondents answered strongly agree but varies in the level.

4.5 Classroom Management

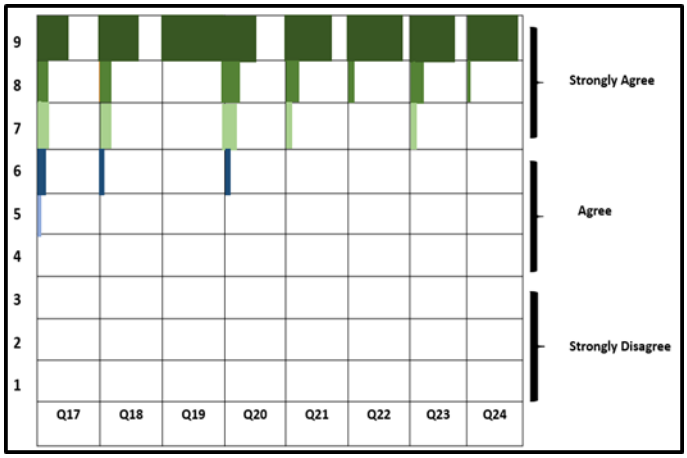

Figure 5

Items in questions 17-24 focused on classroom management. The questions 19, 21, 22, 23, and 24: "How well can you establish routines (e.g. facilitate or moderate student participation) in coursework to keep online activities running smoothly?)", "How much can you do to control students dominating online discussions?", "How well can you establish an online course (e.g. convey expectations; standards; course rules) with each group of students?", "How well can you develop an online course that facilitates student responsibility for online learning?", and "How well can you respond to defiant students in an online setting?" teachers answered 100% strongly argree and items 17, 18, 20; "How much can you do to control disruptive behavior (e.g. disrespectful posting or failure to adhere to outline policies for posting) in an online environment?)", "To what extent can you make your expectations clear about student behavior in an online class?" and "How much can you do to get students to follow the established rules for assignments and deadlines during an online class?" 8% of them answered agree and 92% answered strongly agree.

4.6 Extrinsic Motivation

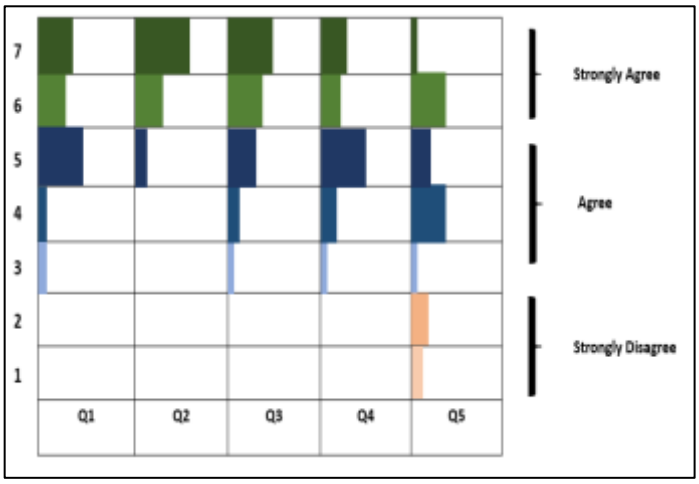

Figure 6

2. The questions in the last part are divided into two as extrinsic and intrinsic motivation. 7- point Likert scale has been utilized in this part. Number one item stated that "I pursue professional development as well as teaching so I can easily meet and achieve all my physiological needs which is beneficial during quarantine period." In the total of 40respondents 19 respondents agree and 21 respondents strongly agree. Second item "Continuous professional development provides job security at the institution where I work." Three teachers agree and 27 teachers strongly agree. Next is " The institution where I work contributes to my recognition" 12 respondents said that they agree and 28 respondents strongly agree. Then the item "Teaching gives me freedom and power", 25 teachers agree and 15 teachers said that they strongly agree. Last item for extrinsic motivation is The people in my institution know me

as a successful teacher even in times of pandemic “, six teachers strongly disagree to this statement, 21 teachers agree and 13 science teachers strongly agree.

4.7 Intrinsic Motivation

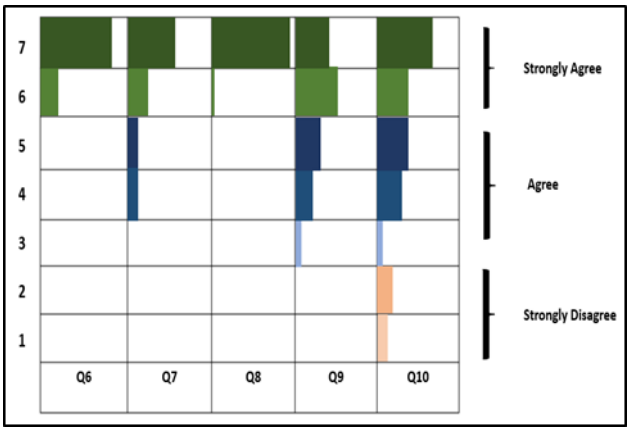

Figure 7

Last part of the questionnaire is about the intrinsic motivation of the teachers teaching online distance learning. First item stated that “Attending seminars and workshops is important so I can help my co-teachers to prepare forms and develop new strategies and methods in teaching especially in new normal” 40 respondents strongly agree. Next item is “I feel at home and confident in the workplace because I am well equipped” four respondents agree to this and 36 respondents strongly agree. Then the statement “I adapt new ideas and creative strategies that I can apply in online distance learning” all respondents strongly agree. “The institution where I work provides me with sufficient resources to do my job better”, ten teachers agree and 30 students strongly agree. Last item is” I have opportunities to broaden my professional knowledge” 16 teachers agree and 24 teachers disagree.

In general, findings of this study can be summarized by the following statement.

1. Based on the demographic profile of the science teachers it can be said that almost half of them are Bachelors Degree and not pursuing any units for masters degree.
2. Because of pandemic and new ways and means of teaching, science teachers are more engaged in seminar and webinars to improve their strategies and methods of teaching.
3. Science teachers integrates new ways on how they can able to teach science subject in online distance learning set up.
4. Instructional materials can be utilized in different online websites and other new resources for online learning.
5. Classroom management also part of their task even in online classes, controlling students behavior is a problem, but according to the interview, with the help of the parents they can able to monitor the students performance.
6. Both intrinsic and extrinsic motivation can affect the teachers’ performance.

IV. CONCLUSION

The findings can be explained in terms of the sources of self-efficacy and motivation, the most important of which is mastery experience, which is said to be the essential part in supporting successful teacher performance. Teaching is a tough job by nature, and teachers face significant challenges in terms of material understanding, pedagogical skills and tactics, student management, and so on. As a result, teachers should be well-prepared to address these problems. Teachers can gain mastery in material knowledge, instructional practices, and student and classroom management through professional development activities. PD activities are important vehicles for providing instructors with a wide range of knowledge that is connected with their pedagogical needs.

More research with larger sample sizes, different groups, different settings, and a longitudinal approach is needed, as professional development, teacher self-efficacy, and motivation all support one another and contribute to a teacher's overall professional strength by reinforcing valuable concepts in various educational contexts.

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