Professional Development for High School Math Vietnamese Educators in the Assessment of Math Results

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Abstract

Professional development has long been acknowledged as an important facet of career advancement, particularly in the teaching profession. Teachers must participate in professional development activities that allow them to review and improve their knowledge and skills to remain competent and up to speed with the newest practices. Nonetheless, despite increased attention to professional development programs in Vietnam, the value of these programs for Math teachers remains debatable. The goal of this research is to investigate the content, method, and form of professional development activities for math teachers in Vietnam. Despite dings indicate that, despite the varied contents, methods, or forms employed in professional development programs, their effectiveness, as judged by instructors, is quite low. This suggests that program developers should assess the inefficiencies of these programs and make relevant adjustments or replacements to maximize their efficacy. Teachers must engage in professional development activities that give them the knowledge and skills they need to fulfill the changing demands of their job. Effective professional development programs can help students succeed by allowing instructors to enhance their instructional practices, stay current with new teaching methods and technologies. This study, however, emphasizes the importance of continuing to evaluate and enhance professional development programs for math instructors in Vietnam to ensure that they are effective in fulfilling the requirements of teachers and, ultimately, their students.

Keywords: educator, develop, professional development, teacher, math

1. Introduction

Professional development has a long history of study and application. It entails attaining or maintaining professional credentials, which can range from formal university degrees to attending conferences or informal learning experiences in one's field of activity. Professional development should ideally be both intensive and collaborative, including an evaluation component (Speck & Knipe, 2005). Coaching, mentorship, reflective supervision, technical help, consultation, communities of practice, and lesson study are all approaches to professional development (National Professional Development Center on Inclusion, 2008).

Professional development might mean different things to different people. At its core, it is developing a strategy that provides possibilities for both professional and personal growth among staff members. According to DeCoster and Brown (1991), constant professional development is essential for both personal and professional education. As a result, the ultimate goal of professional development is to promote individuals' continual learning and development.

Professional development, according to Beeler (1977), generally refers to in-service continuing education or staff training that strives to improve an individual's competences, skills, and knowledge, allowing them to provide better services to their clients. He observes that whereas progressive organizations have continuing staff development programs, many student affairs divisions fail to emphasize the construction of viable pathways for staff development. Miller's (1975) research backs up this assumption, demonstrating that just one in every five institutions at the time had a specific policy statement on in-service staff development. Despite widespread support for professional development programs, Preston (1993) observes that many institutions have yet to systematically implement them.

According to Canon (1981), professional development programs should provide opportunities for general professional growth, skill refinement, and the acquisition of new abilities to satisfy changing needs. These programs

use active learning to broaden perspectives, promote creativity, and improve management and leadership skills (McDade, 1987). Such programs, according to Bryan and Mullendore (1990), can promote professional competency, knowledge, credibility, creativity, motivation, dedication, job satisfaction, and performance. According to Merkle and Artman (1983), professional development is a planned experience designed to change behavior and lead to professional and/or personal growth, ultimately improving organizational effectiveness.

Professional development refers to the process of gaining new skills and knowledge through continuing education and career training, which occurs after an individual enters the workforce. It encompasses various activities such as attending classes, workshops, professional or industry conferences, or earning certifications to expand one's knowledge and expertise in a chosen field. Professional development plays a vital role in opening doors for career advancement, such as securing promotions, honing existing skills, and learning new ones. Additionally, completing professional development programs or obtaining additional industry certifications can distinguish an individual in a pool of applicants and demonstrate their expertise in their field. Engaging in independent learning and professional development shows initiative and enthusiasm for continued growth, signaling to employers that an individual is open to new experiences. Moreover, professional development can have a significant impact on an organization's workforce. Employers who encourage and support their employees' pursuit of professional development opportunities can benefit from a stronger team. It can lead to higher productivity and job satisfaction, as employees become more confident in their work and feel valued by their employer. This, in turn, translates to improved employee performance, overall morale, and increased retention rates. By investing in professional development training programs, employers show their employees that the company is committed to their success and interested in cultivating their advancement. This type of investment can be challenging to find and retain talented employees, and offering professional development opportunities can help attract and retain skilled individuals. Research indicates that 74 percent of employees feel that a lack of professional development opportunities prevents them from reaching their full potential, while 94 percent of employees would stay longer at a company if it invested in staff development. Employers that offer professional development opportunities and growth plans are more likely to attract potential employees interested in striving for excellence and pursuing career advancement. In summary, investing in professional development programs can enhance an existing team's skills and incentivize new talent to join a company, as it shows the company's commitment to the professional growth and development of its employees (Parsons, 2022).

Continuous learning is crucial in schools for both students and adults. Teachers and administrators who continually improve their own knowledge and abilities offer a good example for students, emphasizing the importance and value of learning. This, in turn, develops a learning culture throughout the school, allowing educators to effectively engage their students. The school demonstrates its commitment to improving the performance of all educators by arranging team-based professional development and expects all teachers and administrators to engage on a regular basis, albeit for various reasons, at different intervals, and in different formats. As a result, everyone in the school becomes more focused and productive. Effective teaching does not occur by accident. Although some teachers have natural abilities, all great teaching is the result of hard work, practice, research, and reflection. A teacher can never have too much knowledge of how students learn, what obstacles they face, and how their instruction might improve learning results. Professional development is the only way for instructors to gain this expertise. Whether students are high, low, or average performers, their teachers will benefit from regular participation in high-quality professional development (Mizell, 2010).

Professional development is a critical tool for enhancing classroom instruction and student performance. While there has been a constant demand for high-quality professional development programs, there is a shortage of such programs that meet the criteria of coherence, active learning, sufficient duration, collective participation, focus on content knowledge, and innovative instead of traditional approaches (Yoon et al., 2007). According to Birman et al. (2007), there are limited opportunities for teachers to engage in intensive, sustained, and content-focused professional development in mathematics. In the period between the 2003/04 school year and the summer of 2004, teachers participated in professional development averaging 8.3 hours on teaching mathematics and 5.2 hours on in-depth study of mathematics. Of the elementary teachers, 71 percent participated in professional development focused on instructional strategies for teaching mathematics, but only 9 percent participated for more than 24 hours during the one-year period. Furthermore, during the same time, only 49 percent of elementary teachers participated in professional development focused on the in-depth study of mathematics, and only 6 percent participated for more than 24 hours. Similarly, 51 percent of secondary mathematics teachers attended professional development focused on in-depth mathematics study, but only 10 percent spent more than 24 hours on the subject during the year. The findings illustrate the need for more intensive and sustained professional development programs to enhance teachers'

content knowledge and instructional practices in mathematics, thereby improving student learning outcomes.

In order to address the challenges facing professional development, various technological solutions have been explored to provide support and facilitate the process. However, there are several crucial components of professional development that can benefit from the integration of new technologies. A variety of systems have been designed and documented that present the complex nature of teaching through video-based case studies. These systems vary in the degree of structure imposed on the cases, ranging from loosely to tightly structured. They also vary in the duration of the case, ranging from a single lesson to an eight-week project, as well as the purpose of the case, such as demonstrating a particular teaching philosophy or technique. Such technological interventions can significantly enhance the quality and effectiveness of professional development for educators (Marx et al., 1998).

In the pursuit of enhancing the effectiveness of classroom instruction and student performance, it is essential to ensure that teachers' capacity is developed through quality professional development programs that promote best practices. It is important to note that such programs must be carefully selected to optimize the use of valuable resources such as time and effort. Furthermore, it is imperative to provide teachers with ongoing support as they implement new curricula and pedagogies. However, this support can be lacking in environments where fellow teachers or administrators are resistant to change. The development of online professional development programs for teachers has become increasingly popular due to the need to provide flexible scheduling options, access to powerful resources not available locally, and the ability to offer real-time, work-embedded support that can guide teachers' growth towards becoming more effective educators. These online programs aim to address the challenges of traditional professional development by providing personalized and self-directed learning opportunities that can accommodate different learning styles and needs. Additionally, they can foster a collaborative learning environment, where teachers can share their experiences and learn from one another, leading to a more effective implementation of new strategies in the classroom. As such, the development of high-quality online professional development programs can provide a solution to the ongoing challenges faced by teachers as they strive to improve their practice and enhance student learning outcomes (Dede et al., 2008).

(low) Upon examining the studies, the researcher observed that the quality and impact of the professional development programs were not consistent and were less than ideal. Furthermore, the researcher noted that the research base was relatively modest, given the initial pool of over 1,300 citations. These findings were not what most people would have expected, as they deviated from the factors typically identified as contributing to the effectiveness of professional development efforts. Therefore, although it is true that many workshops are poorly structured and emphasize untested ideas and techniques, they should not be regarded as a prime example of ineffective professional development practices. It is clear that the issue is more nuanced than that and requires a more comprehensive assessment of the different approaches and their effectiveness.

In the context of Vietnam, the significance of professional development programs for teachers is being increasingly recognized, albeit not yet widespread, and its efficacy remains relatively low. Consequently, there is a pressing need to examine the contents, methods, and forms of professional development activities intended for Mathematics teachers. The objective of this study is to delve into the intricacies of these activities to gain an in-depth understanding of the factors that contribute to their success or failure. The study seeks to analyze the characteristics of the training courses, the objectives of the training, the methods employed, and the evaluation of outcomes. Through this analysis, the research aims to provide insights into the key factors that contribute to successful professional development programs in Vietnam and to identify the obstacles that impede the effectiveness of these programs. Ultimately, the research aims to provide recommendations for the improvement of Mathematics teacher professional development programs in Vietnam.

2. Methods

2.1 Participants

We questioned 22 school administrators and 10 math teachers from three public high schools in Bac Ha district, Lao Cai province, Vietnam. We created three different questionnaires to acquire a thorough knowledge of professional development for math teachers. The first questionnaire is designed to collect information about the specific topics of professional development programs in which math teachers have participated. The second questionnaire is designed to collect information on the various strategies and tactics used in math teacher professional development initiatives. Finally, the third questionnaire tries to elicit math teachers' perspectives and feedback on their experiences with professional development initiatives. We hope to provide a complete and nuanced assessment of professional development for math teachers by using these three questionnaires, which will assist in shaping the creation of future

professional development activities in this sector.

2.2 Procedure

We used the convenience sample method for this study, which allowed us to collect data swiftly and easily from a specific group. We visited numerous high schools in Bac Ha district, Lao Cai province, Vietnam, to collect data on math teacher professional development. We issued a survey to 32 people, including 22 (68.75%) administrators and 10 (31.25%) mathematics teachers, after obtaining permission from both the school and the participating teachers. We were able to acquire useful insights into these educators' perspectives and experiences with professional development activities by using this strategy.

2.3 Analysis

The Social Sciences Statistics Program (SPSS) version 20 was used to process the obtained data in this study. We used a 3-Likert scale with the following coding process to maintain consistency in coding: 1 = Never/Bad, 2 = Sometimes/Good, and 3 = Usually/Excellent. We used Narli's (2010) advice to construct the interval width of the 3-Likert scale to establish group boundary values for outcome discussions. The interval width was determined to be .66; Interval Width = (Upper value – Lower value)/n = (3-1)/3 = .66; and this value was utilized to generate group boundary values to understand the data. The group boundary values are as follows: (1) Scores ranging from 1.00 to 1.66 are considered as Never/Bad, (2) Scores ranging from 1.67 to 2.33 are considered as Sometimes/Good, (3) and scores ranging from 2.34 to 3.00 are considered as Usually/Excellent.

3. Results

3.1 Contents of Professional Development for Assessment of Learning Results in Mathematics

Table 1 shows the contents of professional development for assessment. In the frequency of organizing these contents, ranking from the highest to the lowest score was as follows: Using tactics and assessment methods that are suited for the purposes of mathematics education (M = 2.63); Using assessment results in improving student learning outcomes (M = 2.56); Assessing students' talents and learning results (M = 2.53); Implement the assessment procedure (M = 2.47). In the quality of organizing these contents, ranking from the highest to the lowest score was as follows: Implement the assessment procedure (M = 2.00); Assessing students' talents and learning results (M = 1.94); Using assessment results in improving student learning outcomes (M = 1.91); Using tactics and assessment methods that are suited for the purposes of mathematics education (M = 1.84).

Table 1. Contents of Professional Development

	Frequency (n)				Quality (n)			
	Never	Sometimes	Usually	M	Bad	Good	Excellent	M
1. Assessing students' talents and learning results.	4	7	21	2.53	11	12	9	1.94
2. Using tactics and assessment methods that are suited for the purposes of mathematics education.	2	8	22	2.63	14	9	9	1.84
3. Implement the assessment procedure.	4	9	19	2.47	10	12	10	2.00
4. Using assessment results in improving student learning outcomes.	3	8	21	2.56	12	11	9	1.91
Total				2.55				1.92

M: Mean; n: number of participants.

3.2 Methods of Professional Development for Assessment of Learning Results in Mathematics

Table 2 shows the methods of professional development for assessment. In the frequency of organizing these methods, ranking from the highest to the lowest score was as follows: Presentation method (M = 2.63); Problem-solving method (M = 2.59); Group discussion method (M = 2.53); Self-study method (M = 2.47); Question and answer method (M = 2.44). In the quality of organizing these methods, ranking from the highest to the lowest score was as follows: Presentation method (M = 2.44); Problem-solving method (M = 2.38); Group discussion method (M = 2.25); Question and answer method (M = 1.91); Self-study method (M = 1.88).

Table 2. Methods of Professional Development

	Frequency (n)				Quality (n)			
	Never	Sometimes	Usually	M	Bad	Good	Excellent	M
1. Presentation method	2	8	22	2.63	4	10	18	2.44
2. Group discussion method	4	7	21	2.53	6	12	14	2.25
3. Problem-solving method	3	7	22	2.59	5	10	17	2.38
4. Question and answer method	5	8	19	2.44	11	13	8	1.91
5. Self-study method	4	9	19	2.47	10	16	6	1.88
Total				2.55				2.24

M: Mean; n: number of participants.

3.3 Forms of Professional Development for Assessment of Learning Results in Mathematics

Table 3 shows the forms of professional development for assessment. In the frequency of organizing these forms, ranking from the highest to the lowest score was as follows: Professional development through offline course/program (at school) (M = 2.63); Professional development through online course/program (M = 2.56); Professional development through professional group activities (M = 2.56); Professional development offline and online course/program (M = 2.50); Professional development through workshop (M = 2.50); Professional development through time attendance, lectures (M = 2.41). In the quality of organizing these forms, ranking from the highest to the lowest score was as follows: Professional development through offline course/program (at school) (M = 2.44); Professional development through professional group activities (M = 2.44); Professional development through time attendance, lectures (M = 2.41); Professional development offline and online course/program (M = 2.38); Professional development through online course/program (M = 1.88); Professional development through workshop (M = 1.81).

Table 3. Forms of Professional Development

	Frequency (n)				Quality (n)			
	Never	Sometimes	Usually	M	Bad	Good	Excellent	M
1. Professional development through offline course/program (at school).	3	6	23	2.63	5	8	19	2.44
2. Professional development through online course/program.	3	8	21	2.56	12	12	8	1.88
3. Professional development offline and online course/program.	4	8	20	2.50	6	8	18	2.38
4. Professional development through time attendance, lectures.	6	7	19	2.41	4	11	17	2.41
5. Professional development through workshop.	5	6	21	2.50	11	16	5	1.81
6. Professional development through professional group activities.	3	8	21	2.56	4	10	18	2.44
Total				2.52				2.27

M: Mean; n: number of participants.

4. Discussion

In terms of professional development content aimed at enhancing math learning outcomes evaluation among instructors, "Using tactics and assessment methods that are suited for the purposes of mathematics education" has attracted the most investment. According to the assessments of the participating teachers, despite the significant attention and effort, this content has been deemed to produce ineffective effects. On the other side, the content area "Implement the assessment procedure" received the least investment yet produced extremely good outcomes, according to the participating instructors. However, all content sections obtained just average/good results and did not achieve a high degree of efficiency. These findings show that professional development content has not been as

helpful as hoped. As a result, researchers and policymakers must work together to provide more effective professional development content in order to improve implementation efficiency. Furthermore, math teachers should be consulted in order to enhance efficiency and get the best results possible during the professional development process.

A variety of strategies have been used in professional development for teachers focused at assessing mathematics learning results. It is worth noting that all of these strategies were used comprehensively, resulting in different teaching models and a dynamic learning environment. Three of the five strategies used were highly acclaimed by participating teachers and had considerable outcomes. However, as part of their professional development, teachers have viewed the question-and-answer approach and self-study method less positively. This emphasizes the significance of carefully selecting and implementing the most successful strategies when developing professional development programs for math teachers. Presentation, problem-solving, and teamwork have proven to be very effective and should be prioritized, while others, such as the question-and-answer method, should be replaced with more appropriate alternatives. All professional development approaches must be properly assessed and scrutinized to ensure that they efficiently build math teachers' capacity and, eventually, benefit student learning results.

Teachers' professional development forms for assessing math learning outcomes have been extensively used. The incorporation of online professional development programs and courses is a new trend to strengthen teacher ability and incorporate information technology in training. However, teachers do not value this type of training as much, and it is not as successful as training through workshops. Online training can be difficult for elderly teachers and those who live in remote or poor locations. To optimize the effectiveness of the professional development process, developers must examine the most successful forms of training as judged by math teachers when building professional development programs. Furthermore, some training methods, such as online training or workshops, are not always beneficial. This underlines the importance of math instructors and developers working together to generate acceptable suggestions for future professional development programs. It is critical to assess the success of various forms of professional development in order to establish programs that fulfill the demands of math teachers in various circumstances.

5. Conclusion

In conclusion, the professional development content, methods, and forms utilized for assessing math learning outcomes among instructors have been extensively implemented. However, the effectiveness of these methods varies greatly. Despite the significant attention invested in "Using tactics and assessment methods that are suited for the purposes of mathematics education," this content produced unsatisfactory results. On the other hand, "Implementing the assessment procedure," which received the least investment, proved to be the most successful. While three out of five strategies were highly acclaimed by teachers, the question-and-answer approach and self-study method received lower ratings. Furthermore, while online training is a new trend in professional development, teachers do not value it as much as training through workshops. These findings highlight the need for policymakers and researchers to collaborate with math teachers to create more effective professional development programs. Careful selection and implementation of successful strategies and forms of training are critical for building math teachers' capacity and improving student learning outcomes.

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