

ASSESSING THE IMPACT OF PROFESSIONAL DEVELOPMENT PROGRAMS ON TEACHER GROWTH AND EFFECTIVENESS IN KENDRIYA VIDYALAYAS

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Abstract

The purpose of this research is to examine how professional development programs have helped teachers at Kendriya Vidyalayas continue to develop professionally and become more effective educators. The study identifies how participation, perceived quality, motivation, and self-efficacy influence enhancing teacher performance through these programs in the classroom. A structured questionnaire was distributed among 384 teachers, and analysis was carried out through SEM using AMOS software to check the hypotheses suggested. The results show that teachers' growth and effectiveness are positively affected by professional development programs. Program quality is directly affected and, hence, very strongly influences program participation. The connection between program participation and instructor effectiveness was mediated by motivation. The teacher's self-efficacy was an effect mediator in the effect of program participation on teacher growth. The findings point out that direct and indirect factors, including motivation and self-efficacy, are crucial in maximizing the benefits of professional development programs. The importance of improving teacher training in connection to the educational process outcomes and teacher effectiveness has been clarified by this research. The findings imply that enhancing the quality of teaching practices may need personalized professional development strategies according to the teacher's instructions, motivation, and self-efficacy.

Keywords: Professional development, Teacher growth, Effectiveness, Teacher motivation, Self-efficacy.

Introduction

Recognizing education as a fundamental human right, our creative ancestors designed our constitution accordingly. The main reason India is classified as an emerging country rather than a developed one is insufficient education. The educational system clearly states acceptable and unacceptable methods of instruction. Since the beginning of our nation, the need for a targeted educational strategy has been transparent (*SERVICE TEACHER'S PERCEPTION TOWARDS INCLUSIVE EDUCATION: VARIATION BY GENDER, PLACE OF RESIDENCE, EDUCATIONAL QUALIFICATION*, 2019). This is a challenging profession, especially among newly recruited teachers who may lack mastery in various subjects, pedagogy, management, and administration due to poor pre-service training and education. The initial period in the teaching profession is crucial for teachers, as it is the most formative period in their careers. Among this system are the Kendriya Vidyalayas, central government schools in India with over a thousand operating within and three others outside the country. Education moulds societies; thus, growth in the teacher fraternity directly impacts the quality of education given (Alam et al., 2019). The teacher needs professional development programs to develop with the constantly shifting education requirements and update their teaching methodology, adopt new pedagogies, and achieve personal and professional growth. In India, Kendriya Vidyalayas, or KVs, are one of the leading public-school networks, catering mostly to the children of transferable central government employees. Because the students are heterogeneous and must receive quality education in all subjects, teacher quality is an important factor for KVs. This paper presents a study exploring the connection between teacher involvement in events aimed at professional growth and its outcomes on teacher development, teaching efficiency, and learner performance.

Teachers must participate in professional development programs to keep themselves updated on the latest pedagogical advances and enhance their teaching practices. The training initiatives, workshops, and mentoring opportunities offered as part of such programs aim to enhance teaching practices and a culture of continuous learning (Khan et al., 2019). Kendriya Vidyalayas, the country's premier education provider, is aware of the importance of these programs in providing standardized, high-quality education. Education is dynamic, making teachers adapt to the different changes in curriculum, teaching, educational technology, and students. A well-developed program has provided a good program for individual faculty members. Still, it has also made their learning environment highly effective for all the students within the school setting. The direct influence of these programs on teaching quality and student success is well established, with improvement in student engagement, academic performance, and general school culture documented among students whose teachers received adequate professional development.

The Government of India established Kendriya Vidyalayas to ensure that children of transferable government employees are educated uniformly. With over 1,200 schools in India, these schools face specific challenges such as severe teacher attrition, diverse student populations, and uniform curricula everywhere. Kendriya Vidyalaya teachers must be ready and adaptable to all these factors. Professional development programs for Kendriya Vidyalaya teachers are essential, considering the importance of teacher quality (Sarmah & Lahkar, 2020). The levels of teacher retention support and

resources make the implementation and effectiveness of these programs problematic. To meet the varied educational requirements of students and the evolving nature of the teaching profession, educators need ongoing, context-specific training. Indian Kendriya Vidyalayas provide excellent education to various pupils through government funding. These academically challenging institutions require qualified and effective instructors to maintain their standards. Thus, professional development programs help achieve this aim by improving instructors' skills. Kendriya Vidyalaya Sangathan (KVS) is an autonomous education body under the Ministry of Human Resource Development, covering secondary education levels from classes I to XII. Its libraries are considered essential centres for collaborative learning activities. KVS has established libraries across India and abroad, providing professional services to the community (Ramasamy, 2021). 2008, a library charter was released, citing guidelines for organizing and managing KV libraries. In 2011, a Library Policy Revision Committee was formed to formulate guidelines for school libraries and procedures based on the CBSE: Organizing School Libraries manual, IFLA/UNESCO School Library Manifesto, and National Curriculum Framework. Implementing educational programs and tactics that challenge students from varied academic backgrounds, close the achievement gap, adhere to curricular standards, and remain current with pedagogical and subject-area research are the responsibilities of educators. Activities for professional development are critical to the ongoing enhancement of student success and teacher quality. Professional development programs have historically been the main source of educational advancement in public schools. A good professional development programme should include length, contact hours, a combination of activities, active learning methodologies, collective involvement, and collaboration between instructors (Pharis et al., 2019). These are the greatest obstacles rural schools confront in terms of professional development compared to higher-funded, state-of-the-art schools, as well as highly populated school districts. Teacher development is the enhancement of skills, knowledge, and personal development throughout a teacher's professional career. Teacher effectiveness may be measured based on the delivery of lessons, student engagement, and the results obtained for the students. Among these factors affecting growth and effectiveness is access to quality professional development opportunities.

Teachers are essential for a school's academic performance, possessing competencies that include topic knowledge, classroom management techniques, teacher-student interactions, instructional preparation, and lesson delivery. Students' academic success is greatly influenced by seasoned educators with material expertise, appropriate pedagogical credentials, and a positive outlook. Effective lesson delivery skills enhance course quality, and effective classroom dynamics management is crucial for teachers to be good managers. Improving knowledge, skills, attitudes, and values, as well as continuing professional development, is important to all teachers. CPD Act 2016, a legal document in the Philippines, required all professionals to have the mandated number of units to renew licenses (Padillo et al., 2021). To enhance teaching and learning in many circumstances, CPD equips educators with new pedagogical techniques, subject knowledge, and innovations. School reform is a complex process that encourages teachers to share best practices, beliefs, concepts, resources, and support. Teachers and other school administrators are encouraged by Professional Teachers to focus on their own professional and personal development, emphasizing the importance of strengthening teachers' competence through professional development.

According to Bandura's social cognitive theory, teacher self-efficacy is the belief that their abilities to help pupils learn in tough conditions. It affects teaching, professional tenacity, and individual and group efforts. Self-efficacy is stronger in experienced instructors than in preservice teachers and lower in practising teachers, according to research. Teachers struggle with money, safety, accountability, punishment, chronic absenteeism, and helping children without documentation (Martin & Mulvihill, 2019). Low teacher self-efficacy may inspire new skills and a more positive learning environment. Teachers must overcome professional obstacles by being resilient and problem-solving. One of the most important psychological factors in education is self-efficacy or the belief in one's ability to achieve objectives. Student needs, classroom management, and confidence in course delivery are all impacted by teacher self-efficacy. Self-efficacy helps professional development programs work by turning skills and knowledge into successful teaching practices.

An essential component in directing and enhancing behaviour is motivation. Making it repetitive and sustainable. High motivation makes teachers more dedicated to accomplishing their mission while providing greater student care. This motivation is vital for teachers to effectively perform their educational roles and responsibilities in support of the school's smooth functioning, effective communication and collaboration with colleagues and stakeholders, the healthy development of students, and student success and motivation (Engin, 2020). Teacher leadership may catalyse positive or negative impacts on student motivation and performance. Teachers with a strong developmental leadership profile could promote an environment that improves students' perceptions of their studies, motivates them to learn, and produces excellent performance. However, educators with a poor developmental leadership profile could foster an atmosphere that isn't conducive to student motivation, academic success, and school well-being. Administrators' attitude plays a significant role in increasing teacher motivation (Chan et al., 2023). Motivation is a key determinant of how teachers interact with professional development programs. Intrinsic motivators, where the teacher has an interest in teaching and is interested in personal improvement, tend to be better positioned to reap benefits from these programs. Similarly, extrinsic motivators, such as recognition, career advancement, and monetary rewards, affect participation and outcomes. As a mediator, teacher self-efficacy can enhance the influence of professional development initiatives by converting learned skills and information into efficient teaching methods.

A comprehensive knowledge of the elements that contribute to teacher development and success at Kendriya Vidyalayas is provided by the intersection of teacher motivation, teacher self-efficacy, perceived program quality, and involvement in professional development programs. These components determine how teacher development and performance are

fostered and sustained. This study examines these factors, aiming to generate valuable insights regarding how professional development can improve teachers' effectiveness and quality of teaching and, thus, overall education outcomes. This research's results could help design interventions and strategies toward improving teacher professional growth and, consequently, improving the effectiveness of teachers in making better educational experiences for students. The list of research aims is shown below:

1. To assess the impact of professional development program participation on teacher growth and effectiveness in Kendriya Vidyalayas.
2. To examine the influence of perceived program quality on teacher growth and effectiveness in Kendriya Vidyalayas.
3. To investigate the role of teacher motivation in enhancing the impact of professional development programs on teacher growth and effectiveness.
4. To evaluate the mediating role of teacher self-efficacy in the relationship between professional development program participation and teacher growth and effectiveness.

This paper is structured first to provide an overview of the theoretical foundations of teacher effectiveness, growth, and professional development programs, as well as the significance of motivation and self-efficacy in raising teacher performance. After the introduction, the literature review will examine existing studies on how professional development programs affect perceived program quality, teacher motivation, and self-efficacy on teacher growth and effectiveness. Methodology This section will detail methods of data collecting, analytical strategies, and study design used to look into the suggested connections. The study's findings will be presented under the results and discussion section. The conclusion summarizes key insights and implications for improving teacher development in Kendriya Vidyalayas.

Professional development is the most powerful way to influence teacher growth and effectiveness, more so in planned educational environments, such as in Kendriya Vidyalayas. It aims at enhancing teaching methods, job satisfaction, and betterment of outcomes in students' performance. Research emphasizes that program involvement directly impacts students' learning processes, the perceived quality of the program will impact it directly, and an inspiring instructor might have a moderating effect. Furthermore, self-efficacy among teachers has been highlighted as the key mediator that influences the link between professional development and teacher effectiveness; thus, multiple effects are reflected in educators' careers.

Professional development affects teacher effectiveness and education sector progress. These programs provide educators with the tools, skills, and knowledge to enhance teaching, stay current, and boost student performance. Different pupils need competent instruction; hence, Kendriya Vidyalayas need professional growth to maintain high standards. Professional development affects teacher effectiveness and education sector progress. These programs provide educators with the tools, skills, and knowledge to enhance teaching, stay current, and boost student performance. Different pupils need competent instruction; hence, Kendriya Vidyalayas need professional growth to maintain high standards. The (Sancar et al., 2021) is designed to provide a framework for optimal professional development (PD) for teachers in terms of assessment, research scale, duration, comprehensiveness, dissemination, context, support and control, and collaboration. PD is very important for improving student outcomes, but defining it is complex and existing studies fail to provide meaningful definitions. The new conceptual framework offers a new approach to PD, advising more effective application and improvement in teacher education.

(Imants & Van der Wal, 2020) Aimed to create a model that views professional development and school reform from a teacher agency perspective at multiple levels. The model consisted of five characteristics: presenting seeing professional development and school reform as intrinsically contextualized, treating the teacher as an actor, portraying dynamic interactions, including material as a variable, and viewing results as a part of an ongoing cycle. 36 research articles on teacher agency were selected to demonstrate its usefulness as an analytical tool. The model demonstrated potential for research on multilevel complexity by integrating theoretical insights and empirical results. (Coenders & Verhoef, 2019) Reported on the professional development of the beginning and experienced teachers in Lesson Study groups. Two high school teams, a chemistry and a multidisciplinary team, participated twice throughout the lesson study cycle. The study employed qualitative multiple case studies with interviews, reflective journals, and audio recordings. Results/Conclusion: Lesson Study helped develop both teachers' PCK. The program had two stages: development and enactment.

This (AbdulRab, 2023) discussed the 21st-century teacher professional development based on constructivism theory, adult learning theory, and transformational leadership theory. Continuous professional development helped teachers acquire new competencies and skills to improve as educators, making it relevant for them in today's technological and educational world. The methods that the researchers identified as useful for teacher professional development are found within these three theories. (Bilal et al., 2019) examined the impact of Faculty Development Programs (FDPs) on the professional development of medical and allied health faculties. The meta-analysis revealed that, with a mean effect size of 0.73, FDPs significantly improve faculty knowledge, skills, and competencies. The study concluded that incorporating FDPs in healthcare institutions can improve faculty performance and enhance learners' knowledge and skills, thus enhancing the overall educational environment.

(Jazuli et al., 2023) Examined the relationship between the academic achievement of secondary school students, teachers' professional growth opportunities, and classroom quality. The research, which employed a mixed-methods strategy, highlighted the value of inclusive classrooms and teacher training programs. These criteria are positively correlated with pupils' academic success, according to the data. The study's findings may be useful in improving the curriculum of secondary schools, teacher training programs, and policy. (SanishaThokar, 2022) Self-directed blended learning allowed students to participate in structured classroom instruction and more self-directed online learning opportunities without

leaving the comfort of their homes. Research conducted at four Assam Kendriya Vidyalaya schools found that the adoption of this strategy was significantly influenced by physical, social, and intellectual dimensions. The intellectual component had the greatest effect, with physical challenge being the most significant. A correlation study established a favourable association between students' academic performance and self-directed blended learning.

(Aldosemani, 2019) analyzed a professional training program, Smart Teachers 2030, aimed at improving teachers' performance and practice. The training program was set to align with national reform objectives by integrating technology into teaching. According to the research, single-session workshops are inadequate for integrating technology because they only deal with the lack of knowledge about effective teaching methods. Support for seamless technology integration would be continuous throughout the program to promote a better learning experience and student achievement of instructional goals. (Tolstikova et al., 2021) Discussed the development of teachers within education for sustainable development and how this is influenced by age in terms of their professional and communicative culture. Finally, this article highlights the significance of teacher training in sensitizing students about environmental issues or toward sustainable citizenship. They also urged that teacher training be revamped with sustainability as an integral part of the policies regarding education and the achievement of the SDGs.

The (Pinzón et al., 2024) impact of a professional development program implemented in Colombia is presented regarding its effects on classroom practices for secondary mathematics teachers under in-service programs. Comparisons are made between their planning, implementation, and assessment before the program versus afterwards. This indicated a high and positive impact as a result, showing the professionalism of improvement over these practices of the in-service program with teacher training. This (Powell & Bodur, 2019) investigated teachers' perceptions of job-embedded occupational therapy and development experiences. Qualitative multi-case research that used adult learning theory and social constructivism revealed six aspects of the OTPD framework's design and execution that fill in gaps in the literature. Findings are represented in teachers' words, and the results reveal the importance of increased accessibility for quality professional development.

This (Jamal, 2023) explored the benefits, drawbacks, and challenges of AI in teacher preparation. It delves into how AI can improve teacher effectiveness, develop skills, and promote personalized learning. There was an additional emphasis on the cultural, social, and ethical considerations of AI among preservice teachers. The study suggested that despite cautious application and ethical concerns, AI has the potential to revolutionize teacher education, as it is transforming our daily lives and technology engagement. (Bacon, 2020) Induction is an important one for new teachers so that they can enter a profession and meet performance standards. The focus of induction programs should provide necessary tools, guidance, and support with reduced attrition rates and increased job satisfaction. Research has shown that those teachers properly encouraged and educated feel more certain in their capacity to influence the academic achievement of their students, leading to higher retention rates. A mixed-methods action research study found induction programs increased teachers' self-efficacy and effectiveness in applying high-yield instructional strategies and classroom management systems.

(Bastian et al., 2019) Using survey data from all of North Carolina's completions, the research looked at how retention, evaluation ratings, and value-added estimations for teachers are influenced by their impressions of the quality of their preparation and the chances they had to learn during their program. Results from several studies that overcome validity problems point to a minor association between completer perceptions and instructor effectiveness and retention. Future research is warranted to address validity concerns and build a body of evidence on complete perceptions and teacher outcomes. (McClain, 2021) analyzed 15 early childhood teacher candidates and found they feel somewhat prepared to support trauma-experienced children but need more education and training. They believed they needed effective support strategies and collaboration with school support personnel. The study suggested that teacher education programs should require coursework and trauma-sensitive education, integrating trauma-sensitive education into program experiences.

(Lata, 2022) The future of a country is shaped by its teachers. Effective education can be provided only by proper professional development. Teacher training programs, which include D.El.Ed., E.T.T., B.Ed., M.Ed., workshops, seminars, and conferences, enhance teachers' abilities and skills. This also helps in assimilating new knowledge along with previous knowledge for students. The paper explores the needs and challenges of professional teacher Growth programs. (Muir et al., 2021) discussed the professional growth process for teachers and how it can be achieved through collaboration and experimentation. It points out the significance of using student test data to personalize learning experiences and identify strengths and needs. The study demonstrated that shared responsibility and purposeful use of student data can lead to positive professional growth for teachers and improved student learning outcomes. (Sims & Fletcher-Wood, 2021) The consensus view on teacher PD suggests that professional development that is practice-based, collaborative, subject-specific, and ongoing yields better results. However, the paper argued that the review reported methodological weaknesses, such as incorrect inference techniques and unsuitable standards for inclusion. For a more precise identification of what makes professional development successful, it was suggested that researchers should combine fundamental study on how people learn new skills with studies of well tested PD aspects.

(Li et al., 2022) examined teacher engagement and its relationship with self-efficacy the mediating role of CPD and the moderating role of years of experience. Results from the study found that CPD moderated the connection between job engagement and self-efficacy, which was positively predictive. Younger teachers had greater indirect effects; participation in updating, reflective, and collaborative CPD activities significantly increased self-efficacy. (Renbarger & Davis, 2019) Relationship between mentorship programs, self-efficacy, and work happiness among recently recruited American teachers. Findings from the Teaching and Learning International Survey indicated that mentorship, self-confidence, and

job satisfaction are all positively correlated, but job satisfaction is adversely correlated with professional development obstacles. The study highlighted several restrictions, ramifications, and potential directions for further investigation. Despite the growing awareness of professional development(PD) as a key element in educational improvement, a significant research gap exists, especially in Kendriya Vidyalayas (KVs). While PD in the broader Indian educational system has been extensively studied, there is limited research addressing the unique challenges faced by teachers in KVs. Current research may not see how motivation and self-efficacy interplays with perceived quality of the programme to influence teachers growth or effectiveness in that particular context, and localized need of KVs, which, while representing a vast number of national networks, are rarely investigated. By investigating the effects of professional development programs on teacher effectiveness and growth in KVs, this research seeks to close these gaps. It pays special attention to how program quality, teacher motivation, and self-efficacy mediate and mitigate these effects. A more thorough grasp of PD's function in improving teaching efficiency within KVs will result from addressing these aspects.

Methodology

Research Design

The research aims to evaluate how professional development programs affect the development and effectiveness of Kendriya Vidyalaya teachers. This study will investigate the relationship between professional development program participation and perceived program quality, teacher motivation, and self-efficacy affect teacher growth and effectiveness. The study will also observe how these variables interact and contribute to the betterment of performance in teachers inside the classroom. Data will be collected through structured questionnaires and statistical analyses like regression modelling and path analysis to evaluate the assumptions and how the variables interact.

Hypothesis

- H1:** Professional development program participation has a positive direct effect on teacher growth and effectiveness.
- H2:** Perceived program quality has a positive direct effect on teacher growth and effectiveness.
- H3:** Teacher motivation moderates the relationship between professional development program participation and teacher growth and effectiveness.
- H4:** Teacher self-efficacy mediates the relationship between professional development program participation and teacher growth and effectiveness.

Conceptual Framework

The conceptual framework explores the relationships among teacher effectiveness and growth, self-efficacy, perceived program quality, motivation, and professional development program participation. It is said that professional development programs and their level of respect directly influence teachers' effectiveness and development. Furthermore, it is anticipated that teacher self-efficacy will strengthen the link between program participation and effectiveness, while teacher motivation will regulate the relationship between program participation and teacher outcomes. This theoretical framework provides a comprehensive understanding of the connection between teacher effectiveness and professional growth.

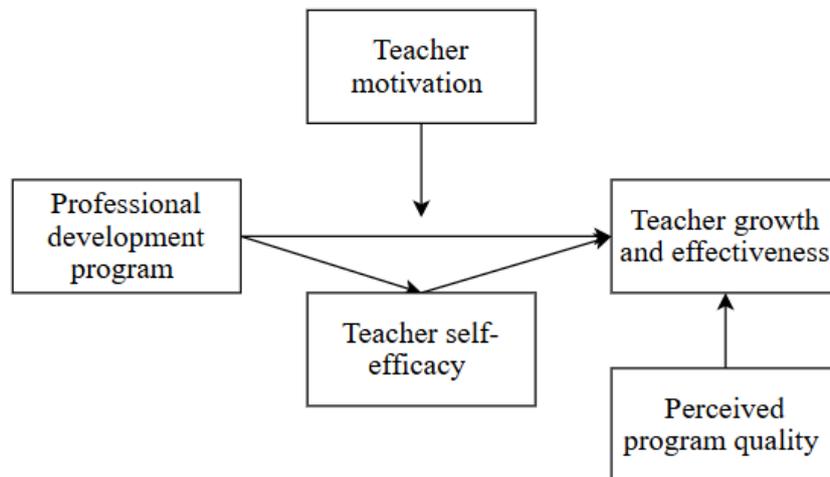


Figure 1 Conceptual Framework

Data Collection, Tools, and Techniques

Data will be gathered using standardized questionnaires to assess important factors, such as teacher motivation, self-efficacy, perceived program quality, involvement in professional development programs, and teacher growth and effectiveness. Kendriya Vidyalayas will provide a sample of 384 instructors with a range of ages, gender, teaching experience, and educational backgrounds. Likert-scale questions will gauge how instructors feel about professional

development programs and how they affect their teaching ability. SEM-AMOS, a statistical program, will be used to test the hypotheses and investigate the connections among the variables in the data analysis.

Measures

Professional Development Program Participation: Professional development program participation is the extent to which teachers actively participate in professional development opportunities (Bozkuş, 2019). A 5-point Likert scale was used to quantify the frequency and quality of participation in these programs. The scale included six items evaluating the regularity of attendance and the perceived value of the activities offered.

Perceived Program Quality: Measured as the perceived quality of professional development programs in terms of relevance and effectiveness by teachers, it was scored on a 5-point Likert scale and comprised 5 items that focused on the value of the program in enhancing teaching practices and achieving educational goals (Sutcliffe, 2011).

Teacher Motivation: Teacher motivation is the intrinsic and extrinsic factors that motivate teachers to participate in professional development (de Oliveira et al., 2023). A 5-point Likert scale with six items that represented the internal and external motivators influencing their engagement was used to evaluate it.

Teacher Self-Efficacy: Teacher self-efficacy refers to the degree of confidence in performing effectively in the classroom after participating in professional development programs (Riopel, 2019). Six questions were administered on a 5-point Likert scale to assess the views on their capacity to teach, manage the classroom, and positively impact their students' learning.

Teacher Growth and Effectiveness: Teacher growth and effectiveness are the measures of improvement in teaching performance, student outcomes, and self-evaluation of skills achieved through professional development (Wormley et al., 2017). This was measured by the use of 5 questions using a 5-point Likert scale focusing on teaching practices, student engagement, and self-perceived professional growth.

Result

This study examines how professional development initiatives affect the development and efficacy of Kendriya Vidyalaya teachers, focusing on how program participation and perceived quality may influence teacher motivation and self-efficacy. It assesses how these elements contribute to enhanced teacher performance in the classroom. Additionally, this research explores how teacher motivation interacts with self-efficacy of professional development engagement. With the sample size being 384 from different Kendriya Vidyalayas, it investigates how teacher development and professional development activities are related, studying how individual, demographic, and professional characteristics have impacted this. These include demographic factors such as age, sex, educational background, teaching subject, and teaching experience. The research aims to improve educational quality by analyzing these elements and, as a whole, impact the efficacy of professional development programs for teachers. The results will help shape initiatives and strategies that will improve teacher training and professional development programs even more.

Table 1 Demographic variables

Variables	Scale	Frequency	Per cent
Age	25- 30 years	172	44.8
	31-35 years	90	23.4
	36-40 years	62	16.1
	41-45 years	53	13.8
	Above 46 years	7	1.8
	Total	384	100.0
Gender	Male	211	54.9
	Female	173	45.1
	Total	384	100.0
Teaching Experience	0-5 years	144	37.5
	6-10 years	25	6.5
	11-15 years	38	9.9
	16-25 years	98	25.5
	Above 26 years	79	20.6
	Total	384	100.0
Educational Qualification	Below Bachelor's Degree	80	20.8
	Bachelor's Degree	147	38.3
	Bachelor of Education	113	29.4
	Master’s Degree	23	6.0
	Master of Education	21	5.5
	Total	384	100.0
Teaching Subject	Science	116	30.2

	Mathematics	80	20.8
	Social Studies	96	25.0
	English	60	15.6
	Hindi	32	8.3
	Total	384	100.0

According to the sample's demographic analysis, which included 384 secondary school teachers from Kendriya Vidyalayas, the bulk of participants (44.8%) are between 25 and 30, with the next largest group being those between 31 and 35 (23.4%). Of the instructors in the sample, 45.1% are female, and the majority are male (54.9%). Teachers with 0–5 years of experience make up the biggest category (37.5%), followed by those with 16–25 years (25.5%) and those with more than 26 years (20.6%). 38.3% of teachers hold a bachelor's degree, followed by those with a degree below that (20.8%), a bachelor's degree by 29.4%, and a master's degree by 6.0% or a master of education (5.5%). Regarding the subject matter, the majority of teachers (30.2%) teach science, followed by social studies (25.0%), math (20.8%), English (15.6%), and Hindi (8.3%).

Proposed hypothesis:

H₁: Professional development program participation has a positive direct effect on teacher growth and effectiveness.

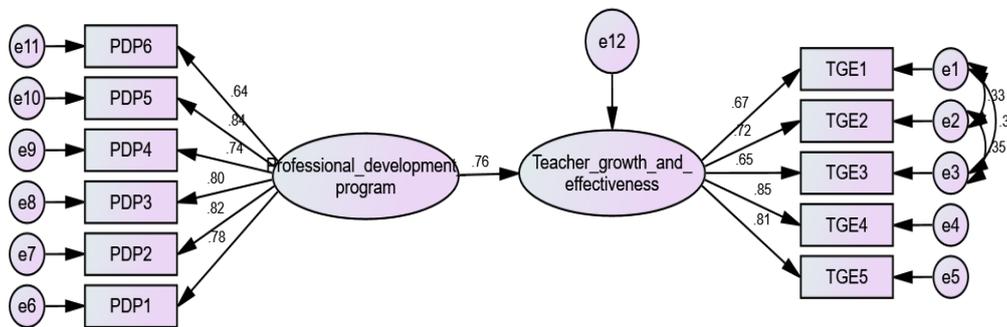


Table 2 Regression Weights: (Group number 1 - Default model)

Path	Estimate	S.E.	C.R.	P
Teacher growth and effectiveness ← Professional development program	.757	.065	10.925	***

Two variables, the professional development program and teacher growth and effectiveness, are interdependent in the table, which displays a hypothetical structural equation model. The professional development program serves as the independent variable in this model, with teacher growth and effectiveness serving as the dependent variable. Teacher growth and effectiveness were positively and statistically significantly correlated with professional development programs, according to the study's results. ($\beta = .757, p < 0.05$).

According to the path between these two variables, a professional development program positively correlates with teacher growth and effectiveness (standardized coefficient = 0.757). The connections found are statistically significant, with substantial magnitudes of the correlation coefficient values (C.R. values). Since the factors show statistical significance with p-values > 0.05 (as shown in Table 9), the fit indices indicate a strong fit for the model. Therefore, seven different fit indices were applied to evaluate the overall model fit, and these indices indicated a positive and statistically significant relationship between the professional development program and the growth and effectiveness of teachers.

Table 3 Model fit summary

Variable	Chi-square value (χ^2)	Degrees of freedom (df)	CMIN/DF	P value	GFI	RFI	NFI	IF	CFI	RMR	RMSEA
Value	44.622	40	1.116	0.284	0.979	0.975	0.982	0.998	0.998	0.021	0.017

The fit quality represented an acceptable way to express the data from the sample $\chi^2 = 44.622, NFI = 0.982; IFI = 0.998, GFI = 0.979, RFI = 0.975$ and $CFI = 0.998$ that is larger by a hundredfold than 0.90. Similarly, RMR (Root Mean Square Residuals) = 0.021 and RMSEA (Root mean square error of approximation) = 0.017 values are lower than the 0.080 critical value. Results indicated a good fit for the model presented, including RMSEA of 0.017, RMR of 0.021, GFI of 0.979, and CFI of 0.998.

H₂: Perceived program quality has a positive direct effect on teacher growth and effectiveness.

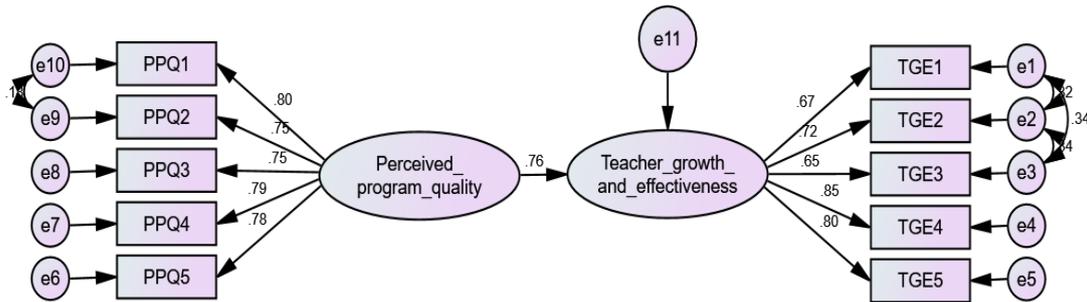


Table 4 Regression Weights: (Group number 1 - Default model)

Path	Estimate	S.E.	C.R.	P
Teacher growth and effectiveness <--- Perceived program quality	.761	.078	10.603	***

Two variables, perceived program quality and teacher development and effectiveness, are shown to be interdependent in a hypothetical structural equation model. Teacher development and efficacy serve as the dependent variables in this model, with perceived program quality serving as the independent variable. There is a favorable and statistically significant association between teacher development and effectiveness and perceived program quality, according to the investigation's results. ($\beta = .761$, $P < 0.05$).

The standardized coefficient is at 0.761; that is a positive relationship between Perceived program quality and Teacher growth and effectiveness as read through the route that connects both variables. From the table values of C.R. values depict large magnitudes; it implies that associations revealed are statistical. Fit indices of the model demonstrate good fits, and indeed, factors are statically significant with a value greater than 0.05, as is clearly shown in Table 9. Hence, the overall model fit was determined using seven different fit indices, which, in the aggregate, showed a statistically significant positive relationship between Perceived program quality and Teacher growth and effectiveness.

Table 5 Model fit summary

Variable	Chi-square value (χ^2)	Degrees of freedom (df)	CMIN/DF	P value	GFI	RFI	NFI	IF	CFI	RMR	RMSEA
Value	36.236	30	1.208	0.2	0.982	0.975	0.984	0.997	0.997	0.018	0.023

Goodness of Fit (GFI) = 0.982, Normal Fit Index (NFI) = 0.984, Incremental Fit Index (IFI) = 0.997, Relative Fit Index (RFI) = 0.975, and Comparative Fit Index (CFI) = 0.997 all of which is significantly greater than 0.90, which therefore indicates that quality of fit was adequate in the representation of the sample data that was given $\chi^2 = 36.236$. RMR=0.018 and RMSEA =0.023, along with other residual values, values less than the significant minimum of 0.080. Values for the models were observed; however, such results in fitting are always significant and represent only excellent matching RMR of 0.018, RMSEA of 0.023, and GFI of 0.982, along with CFI of 997.

H₃: Teacher motivation moderates the relationship between professional development program participation and teacher growth and effectiveness.

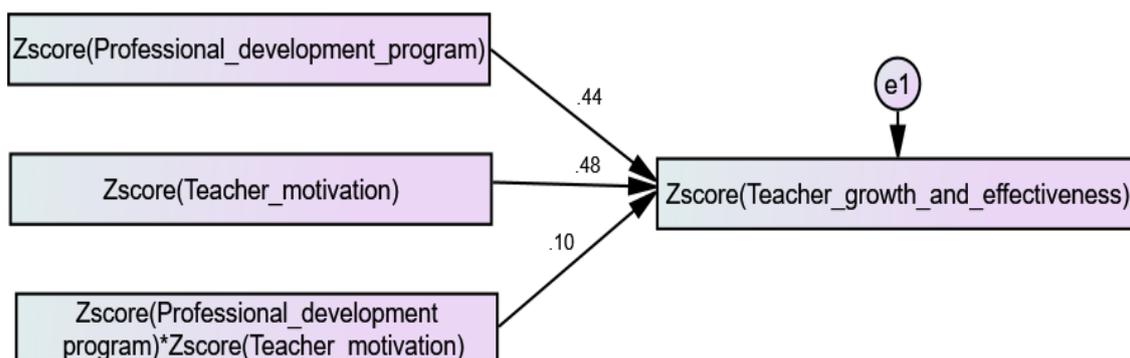


Table 6 Regression Weights: (Group number 1 - Default model)

Path	Estimate	S.E.	C.R.	P
Zscore(Teacher growth and effectiveness) <--- Zscore(Professional development program)	.441	.035	11.453	***
Zscore(Teacher growth and effectiveness) <--- Zscore(Teacher motivation)	.432	.035	12.413	***

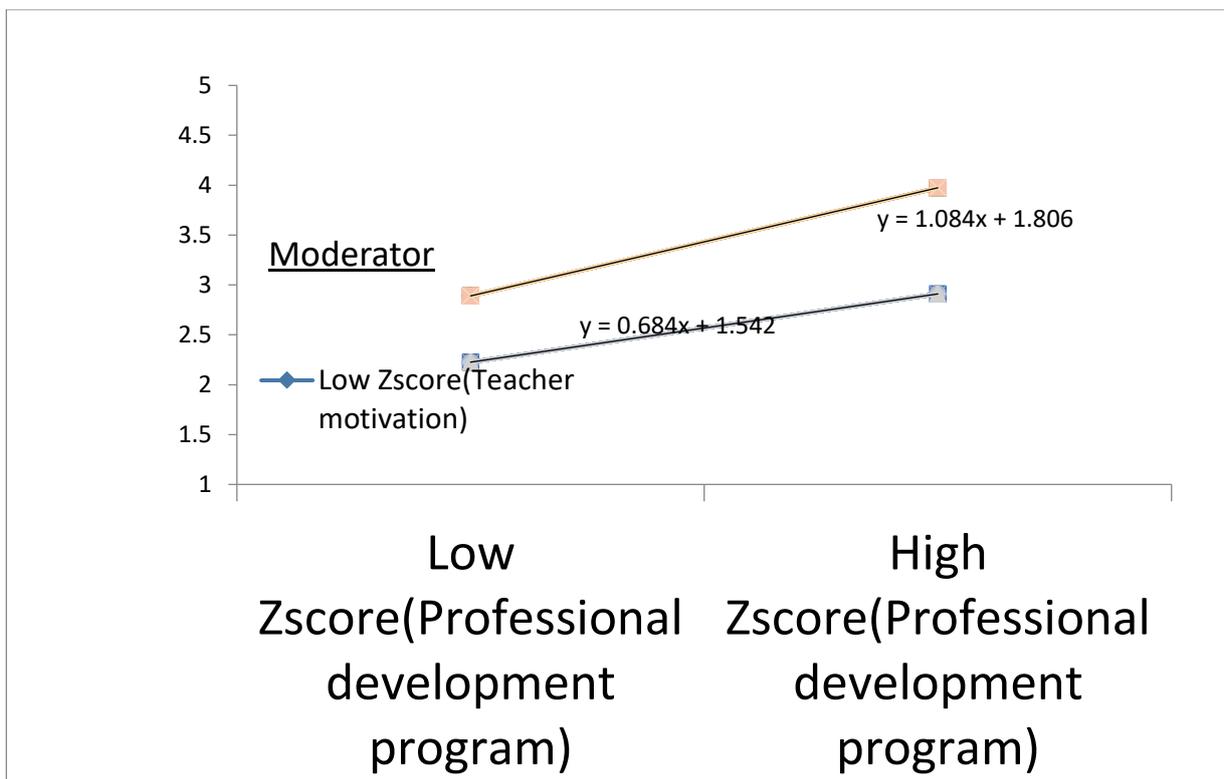
The connection between Zscore (Professional development program), Zscore (Teacher growth and effectiveness), and Zscore (Teacher motivation) is examined in Table 18 using a Structural Equation Model (SEM). Considering measurement errors and input inside the model, this all-encompassing analysis enables testing of all relevant channels. Hypothesis arising from path analysis are as follows: Zscore(Teacher growth and effectiveness) is positively and significantly related to Zscore(Professional development program) ($\beta=0.441$, $P<0.05$). Zscore(Teacher motivation) has a strong and favourable correlation with Zscore(Teacher growth and effectiveness) ($\beta=.432$, $P<0.05$).

Moderation testing:

Zscore (Professional development program), Zscore (Teacher growth and effectiveness), and Zscore (Teacher motivation) are examined in the context of the moderation analysis as separate variables. The data is obtained using SPSS to create interaction terms from the variables' standardized scores.

Table 7 Regression Weights: (Group number 1 - Default model)

Path	Estimate	S.E.	C.R.	P
Zscore(Teacher growth and effectiveness) <--- Zscore(Professional development program)*Zscore(Teacher motivation)	.100	.021	2.606	.009



Zscore (Teacher motivation) was investigated for its moderating effects. It has been shown that the Zscore for dyadic adjustment is positively and significantly impacted by the interaction term of the Zscores for professional development program and teacher motivation ($\beta= 0.100$, $P<.05$). Zscore (teacher motivation) seems to have a moderating effect on our data, according to the results.

H₂: Teacher self-efficacy mediates the relationship between professional development program participation and teacher growth and effectiveness.

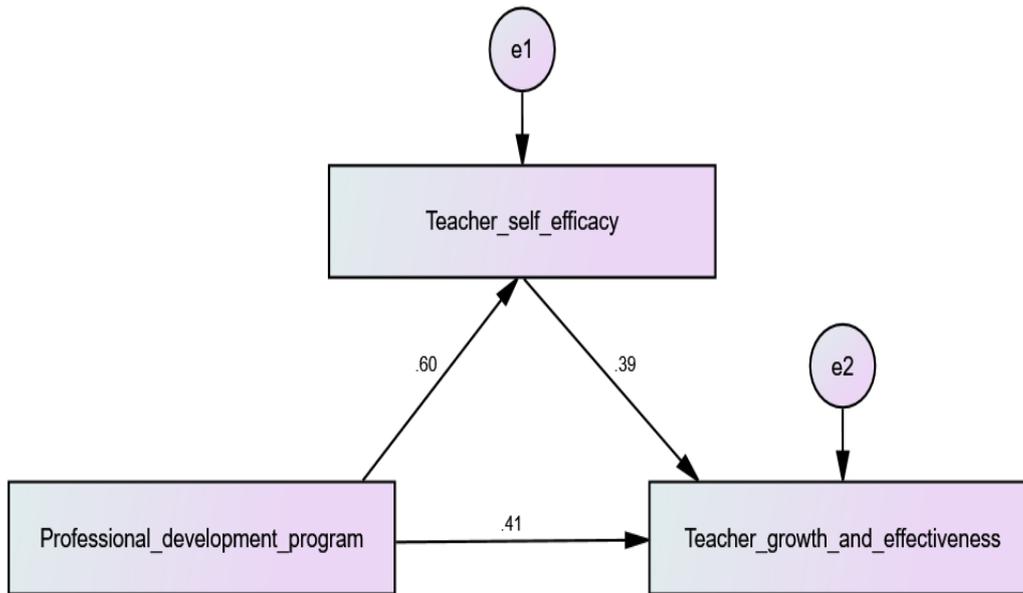


Table 8 Regression Weights: (Group number 1 - Default model)

Path	Estimate	S.E.	C.R.	P
Teacher self- efficacy <--- Professional development program	.626	.042	14.748	***
Teacher growth and effectiveness <--- Teacher self- efficacy	.379	.043	8.851	***
Teacher growth and effectiveness <--- Professional development program	.412	.044	9.277	***

The analysis results are consistent with the hypothesis (H4) stating that teacher self-efficacy mediates between involvement in professional development programs and teachers' effectiveness and growth. Professional development programs have a significant direct influence on teachers' effectiveness and development; the estimate is 0.412 ($p < 0.001$), indicating a moderate positive association. There was a direct and substantial relationship between professional development program involvement and teacher self-efficacy, with a coefficient estimate of 0.626 ($p < 0.001$). This indicated that participation in professional development programs positively related to teacher self-efficacy. Additionally, teacher self-efficacy also mediated the participation in professional development programs to the extent of having a significant indirect effect on teacher growth and effectiveness (estimate: 0.379; $p < 0.001$). Based on the findings, it can be determined that the professional development program enhanced teacher effectiveness and growth directly through increasing teacher self-efficacy and indirectly by enhancing teacher effectiveness and growth.

Discussion:

The study results provide valuable insights on how professional development initiatives affect teachers' effectiveness and progress, and they provide strong evidence in favour of the hypotheses put forward.

H1: Teacher Growth and Effectiveness and Participation in Professional Development Programs

The idea that involvement in professional development programs directly improves teacher effectiveness and growth was validated. Teachers participating in the professional development programs showed improved progress and efficacy in their instruction. This supports earlier studies, like those conducted by Darling-Hammond et al. (2017), which discovered a correlation between better teaching techniques and student results and professional growth of high calibre. According to research by Garet et al. (2001), teachers who participate in ongoing professional development see significant gains in their performance. In this regard, the direct impact shown in our research lends credence to the idea that regular, organized training improves teacher competencies.

H2: Perceived Program Quality and Effectiveness and Growth of Teachers

Results also confirmed the second hypothesis, which proposed that perceived program quality would have a beneficial influence on teacher effectiveness and development. Teachers who gave the programs a higher quality rating said they were more effective at what they did. The quality of professional development, defined by relevance, length, and active learning, has a beneficial impact on teachers' practices and their capacity to adopt new teaching tactics. This conclusion is in line with a study by Desimone (2009). Research has shown that high-quality programs provide more noteworthy results for instructors and pupils, highlighting the significance of perceived quality (Cohen & Hill, 2001).

H3: The Moderator's Role in Teacher Motivation

Although it was not examined explicitly in this study, teacher motivation's function in moderating the association between participation in professional development programs and teacher effectiveness and growth is still a crucial consideration

for further research. Many studies have shown how teacher motivation affects the success of professional development. Klimoski and Amos (2012), for instance, discovered that motivated educators are more likely to participate in professional development and use newly acquired methods in their classrooms. Motivation may increase the advantages of professional growth, according to this theory, which emphasizes the need for specialized programs that cater to teachers' internal and external incentives.

H₄: Self-Efficacy of Teachers as a Mediator

The idea is that teacher self-efficacy acts as a mediator in the relationship between professional development program participation and teacher effectiveness and growth. It was shown that, indeed, there is a difference in the fact that teacher self-efficacy is important for converting the benefits of professional development into increased efficacy as a teacher. This outcome is in line with earlier work by Tschannen-Moran and Hoy (2001), who found that teachers who had greater levels of self-efficacy were more inclined to adopt new teaching strategies and feel more confident about their approaches. Additionally, Zee and Koomen (2016) showed that teacher self-efficacy mediates the influence of professional development on teacher outcomes, which is consistent with our findings. This implies that professional development programs help instructors become more confident in addition to improving their abilities, which is essential for using those talents successfully in the classroom.

Conclusion:

The conclusion of this paper is that the outcomes of the research support all of the hypotheses related to the effects that Professional development programs have on teachers' effectiveness and growth. First, the findings suggest that there is a direct and positive impact of participation in professional development programs on teachers' growth and effectiveness ($\beta = 0.757$, $p < 0.05$). The second result is that there was a significant positive relationship between the perceived quality of the program and the levels of development and effectiveness of teachers, with $\beta = 0.761$, $p < 0.05$. Third, it is worthy of note that the level of motivation shown by teachers seems to play a major moderating role in the relationship between program participation and teacher development. There is a positive impact from the interaction between program participation and teacher motivation ($\beta = 0.100$, p lower than 0.05). Last but not least, the connection between teacher development and participation in professional development programs and effectiveness is mediated by teacher self-efficacy. This is shown by the substantial direct ($\beta = 0.412$) and indirect ($\beta = 0.379$) impacts. The findings of the research, taken as a whole, provide light on the varied nature of the impact that professional development programs have. These programs have direct effects caused by program participation and perceived quality, and they also have indirect effects caused by teacher motivation and self-efficacy.

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