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IMPACT OF PROFESSIONAL DEVELOPMENT ON INSTRUCTIONAL QUALITY AMONG SECONDARY SCHOOL TEACHERS: THE MEDIATING ROLE OF EFFECTIVE TEACHING PRACTICES AND THE LEARNING ENVIRONMENT

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ABSTRACT

The objectives of the study were to study the relationship between teachers' professional development and learning environment with instructional quality at secondary level and to assess the mediating role of effective teaching practice and learning environment for improving instructional quality at secondary level. This descriptive research study was conducted. The population of the study consisted of secondary school teachers from four tehsils of District Rahim Yar Khan: Rahim Yar Khan, Liaquatpur, Khanpur and Sadiqabad. These tehsils were selected as representative areas for the study to ensure the inclusion of diverse educational backgrounds and teaching practices. A sample of 300 secondary school teachers was conveniently selected from these tehsils to participate in the research. Data were collected through a self-structured questionnaire designed to assess teachers' perceptions of professional development activities and their impact on instructional quality. Questionnaire was used as a tool for data collection. Based on the experts' feedback, the questionnaire was revised and finalized. The copies of questionnaire were delivered personally to 300 school teachers. Two hundred and seventy-five questionnaires were received back by the researcher. So, the return rate was 91.6%. The major result of the study was that the professional development programs that they have participated in significantly enhanced their teaching skills.

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Introduction

Teacher professional development has long been recognized as an essential factor in the enhancement of instructional quality in secondary school level. The educational landscape has undergone significant transformations over the past few decades with an increasing emphasis on the professional growth of teachers as a determinant of student achievement. The quality of education provided in secondary schools, where students face crucial academic and social transitions is often closely linked to the expertise and preparedness of the teachers. Teacher professional development plays a pivotal role in ensuring that teachers are equipped with the latest pedagogical skills, subject knowledge and strategies necessary to foster student success (Desimone, 2011).

Teacher professional development refers to a wide array of specialized training, education and continuous learning activities aimed at improving teachers' knowledge, skills and professional capabilities. Teacher professional development has evolved from traditional, workshop-based models to more diverse and dynamic forms that emphasize reflective practice, collaboration and experiential learning. It encompasses formal programs like university courses and certification, as well as informal methods such as peer coaching, mentoring and self-directed study. The purpose of teacher professional development is to enable teachers to stay abreast of the latest research, pedagogical advancements and instructional technologies, thereby promoting a culture of lifelong learning within the teaching profession. Teachers' professional development for teachers was often seen as a one-off event, with limited attention to the sustainability of learning. Teachers were frequently required to attend workshops or conferences, with little follow-up or integration into classroom practice. The modern view of teacher professional development has shifted toward ongoing, collaborative and context-specific development. This paradigm shift was largely influenced by the recognition that teaching is a complex and evolving profession that requires continuous adaptation to meet the diverse needs of students (Desimone, 2011).

Effective teacher professional development now focuses on aligning professional learning with teachers' instructional practices and student learning outcomes. Teacher development has become increasingly intertwined with educational reforms aimed at raising instructional quality and student achievement. Scholars and policymakers have emphasized the importance of developing teacher competencies not only in subject content but also in student engagement, critical thinking and technology integration (Darling-Hammond et al., 2017). The impact of teacher professional development on instructional quality is well-documented in educational literature. The implemented teacher professional development programs in teaching practices which, in turn positively influence student learning outcomes. Effective professional development enables teachers to refine their instructional methods, stay updated on new educational research and collaborate with peers to common challenges in the classroom. These activities collectively enhance the overall quality of teaching and learning within secondary schools. One of the most critical aspects of teacher professional development is its role in fostering reflective teaching practices. When teachers engage in professional development, they are encouraged to reflect on their instructional techniques, student interactions and classroom management strategies. This

reflection allows teachers to identify areas for improvement and adapt their practices to meet the diverse needs of their students.

According to Avalos (2011), reflective practice is a element in professional growth, as it promotes a deeper understanding of teaching and learning processes and encourages continuous improvement. Teacher professional development helps teachers develop the capacity to implement innovative instructional strategies that are responsive to changing educational demands. For instance, as education systems around the world increasingly adopt technology enhanced learning environments, teachers must acquire new skills in digital literacy and technology integration. Professional development programs that focus on these areas ensure that teachers are equipped to create engaging and effective learning experiences for students in a digitally connected world (Borko, 2004).

The link between teacher professional development and improved instructional quality is further strengthened by research indicating that teachers who participate in ongoing professional development are more likely to adopt student-centered teaching approaches. These approaches which emphasize active learning, critical thinking and problem-solving, have been shown to be more effective in promoting deep learning and student engagement than traditional, teacher-centered methods (Guskey & Yoon, 2009). By equipping teachers with the skills to implement such strategies, teacher professional development directly contributes to enhancing the quality of instruction in secondary schools. Professional development programs that foster collaboration among teachers have been found to be particularly effective in enhancing instructional quality. Collaborative learning opportunities, such as professional learning communities and peer mentoring, allow teachers to share best practices, provide feedback to one another and collectively instructional challenges (Vescio, Ross, & Adams, 2008). Teachers' professional knowledge but also create a supportive environment that encourages innovation and continuous improvement in teaching.

The secondary education level represents a critical stage in students' academic and personal development. Students encounter more complex subject matter, greater academic expectations and the pressures of preparing for higher education or the workforce. As such, the quality of instruction they receive plays a significant role in shaping their academic success and future opportunities. Teachers at the secondary level are expected to not only deliver content knowledge but also to foster students' critical thinking, problem-solving and self-regulation skills. Instructional quality in secondary education is multifaceted and encompasses several key dimensions, including content knowledge, pedagogical expertise, classroom management and the ability to engage students in meaningful learning experiences. High-quality instruction is characterized by clear explanations, varied teaching methods, formative assessments and a supportive classroom environment that encourages student participation and collaboration (Hattie, 2009).

Teacher professional development becomes even more crucial as secondary school teachers must continuously update their skills to the evolving educational landscape. The integration of Science,

Technology, Engineering and Mathematics (STEM) education in secondary schools requires teachers to adopt interdisciplinary approaches and incorporate hands-on, inquiry-based learning activities into their classrooms. Professional development programs that focus on STEM education equip teachers with the necessary tools and strategies to effectively teach these subjects and prepare students for the demands of the 21st-century workforce (Kennedy, 2016). The increasing emphasis on inclusive education at secondary level has highlighted the need for teachers to develop competencies in differentiated instruction and classroom diversity management. Secondary schools are becoming more diverse in terms of student backgrounds, learning needs and abilities. Teachers must be able to provide differentiated support to students with varying learning styles, language proficiencies and special educational needs. Professional development programs that inclusive teaching practices help secondary school teachers create equitable learning environments that accommodate the diverse needs of all students (Wei, Darling-Hammond, & Adamson, 2010).

Instructional quality at the secondary level is also closely tied to student motivation and engagement. Adolescents are at a developmental stage where they are forming their identities, exploring their interests and navigating complex social dynamics. Teachers play a vital role in fostering a positive classroom environment that encourages student engagement and motivation to learn. Teacher professional development programs that focus on classroom management, student engagement strategies and socio-emotional learning are particularly valuable in helping teachers create classrooms where students feel supported, valued and motivated to succeed (Leithwood et al., 2004).

Literature Review

Teacher Professional Development

Teacher professional development is an important part of all school systems around the world. Its goal is to help teachers grow, improve their teaching, and ultimately make things better for students. Professional development for teachers has changed over the years. It is no longer just traditional in-service training. Now, teachers learn in more comprehensive, long-term, and collaborative ways. The goal of these programmes is to help teachers improve their teaching methods, learn more about the subject they teach, and keep up with the latest research and technological developments in education. Researchers, policymakers, and teachers have all come up with different ways to explain the idea of professional development. Teacher professional development includes both formal and informal activities that help teachers get better at teaching, learn more about their subjects, and encourage a desire to keep learning. These things can be anything from peer observations and workshops to collaborative learning communities and conferences. Online courses, mentoring programmes, and self-directed learning projects are other ways for teachers to improve their skills. Desimone (2009) gave a definition that is generally agreed upon: professional development is "a set of activities that are meant to improve teachers' teaching practices and, as a result, student learning." This definition emphasizes the direct link between what teachers learn and how well their students do in school, showing how

important it is to focus professional development on improving classroom instruction. Another definition from 2017 by Darling-Hammond, Hyler, and Gardner is "structured professional learning that results in changes in teacher practices and improvements in student learning outcomes." Their definition stresses that professional development for teachers should be goal-oriented, and that changes in teachers' behaviour should be measured by how well their students do in school.

Professional development is a key factor in improving the competencies, pedagogical skills and quality of teachers' work. Continuous professional learning allows teachers to adjust to new educational needs, enhance teaching methods and acquire the competencies needed for effective teaching. Rafiq-uz-Zaman (2023a) drew attention to the importance of teacher professional development to enhance teachers' well-being, professional capacity and adaptability, especially in the context of the changing educational landscape, including hybrid and remote learning environments. Likewise, Rafiq-uz-Zaman (2023b) asserted that competence building, skill improvement and filling up the current gaps in teachers' competence must be taken into consideration by effective teacher training to make teachers more equipped to deal with the challenges of the modern teaching. In the field of K–12 learning, professional development plays a crucial role in enhancing pedagogical practices, enabling educators to adopt innovative strategies and address the challenges faced in the classroom. (Malik et al., 2025) Additionally, teacher development is not only shaped by the professional development of teachers but it also depends on the support of institutions and effective human resource management practices. According to Fatima et al. (2025), supportive training frameworks and organisation mechanisms play a role in establishing inclusive teaching capacities and enhancing the effectiveness of teachers. Furthermore, the quality of learning environment has a significant effect on teachers performance and teaching outcomes because good learning environment creates conducive conditions for good teaching practices and teachers performance (Rafiq-uz-Zaman et al., 2025). Thus, the relationship between professional development and instructional quality among secondary school teachers, as proposed here, is mediated by effective teaching practices and the learning environment, which is supported by existing literature.

Professional development is based on the idea of lifelong learning, which stresses that teaching is not a static job but one that needs to grow and change all the time. In the last few decades, school systems have become more aware of the fact that teachers need to keep learning throughout their careers in order to stay useful. Many people look for new information and skills throughout their working lives. This is called "lifelong learning," and it can happen in both formal and informal settings (Guskey, 2002). For teachers, this means taking part in programmes that help them improve their skills, learning on their own, and staying up to date on the latest changes in research and policy in education. People used to think that teacher education mostly happened during pre-service training, and that teachers didn't need to keep learning once they started working in the classroom. In the middle of the 20th century, however, researchers and policymakers started to see that ongoing professional growth is closely linked to how well teachers do their jobs. Today, lifelong learning is seen as important to make sure that teachers can adapt to new technologies, lessons, and student needs (Villegas-Reimers, 2003).

Another important idea in teacher professional development is reflective practice which encourages teachers to think deeply about how they teach and make changes based on what they learn. Researchers have found that teachers can become better teachers by thinking about how they teach and making changes to their methods (Schön, 1983). Activities like journaling, peer observations, and mentoring often help teachers engage in reflective practice. These activities push teachers to think deeply about their teaching and how it affects student learning. Schön (1983) came up with the idea of reflective practice. He said that professionals in all fields should do two things: reflection-in-action, which means they should think about their actions and decisions as they happen, and reflection-on-action, which means they should think about what they did in the past to help them do it better in the future. In the context of teaching, this means that teachers not only think about what happened in the classroom, but they also use what they think about to help them grow as professionals. Many PD programmes, especially those that focus on inquiry-based learning and action research, now include reflective practice as an important part of their work (Zeichner & Liston, 2013).

An idea in modern teacher professional development is the professional learning community. In collaborative learning, groups of teachers work together to share what they know, figure out how to solve problems, and come up with new ways to teach. This way of learning stresses that teachers can learn a lot from each other, especially when they talk about their lessons and how well their students are doing all the time (Vescio, Ross & Adams, 2008). When it comes to improving instruction, collaborative learning really shines because it gets teachers to think about how they teach, share their experiences, and get feedback from their peers. School leaders often encourage collaborative learning, which can happen in a lot of different ways, such as through team teaching, peer coaching, and joining professional learning communities. These communities give teachers a structured place to talk about their jobs, plan lessons together, and talk about how their students are doing. Job-embedded learning is when professional development activities for teachers are built into their daily work as teachers. This way, teachers can learn and grow while doing their regular jobs. Traditional forms of professional development for teachers, like workshops and seminars, often take place outside of school and may not directly relate to what teachers do in the classroom. This approach to professional development is different. Job-embedded learning, by contrast, takes place in the context of teachers' actual work, making it more likely that teachers will apply what they learn to their instructional practices (Croft, Coggshall, Dolan & Powers, 2010). Job-embedded learning include peer observations, instructional coaching and collaborative lesson planning. These activities allow teachers to receive immediate feedback on their teaching, reflect on their practices and make real-time adjustments to improve student learning. Job-embedded learning is often considered one of the most effective forms of teacher professional development because it is closely aligned with teachers' daily work and provides opportunities for ongoing support and feedback (Knight, 2007).

Instructional Quality

The concept of instructional quality has been extensively researched and discussed within the field of education, highlighting its critical role in determining student learning outcomes.

Instructional quality encompasses a range of factors, including the effectiveness of teaching strategies, the engagement of students, the alignment of curriculum with educational standards and the overall learning environment. Instructional quality can be defined as the degree to which teaching practices effectively facilitate student learning. Various frameworks have emerged to articulate the components of high-quality instruction. For instance, the Framework for Teaching developed by Danielson (2013) identifies four domains of teaching responsibility: planning and preparation, classroom environment, instruction and professional responsibilities. Each of these domains contains specific components that contribute to overall instructional quality. Research has shown that effective teaching practices within these domains correlate positively with student achievement (Danielson, 2013; Hill et al., 2008). Instructional quality takes on additional dimensions due to the complexities of adolescent development and diverse student needs. According to the National Council for Accreditation of Teacher Education (NCATE, 2010), high-quality instruction at the secondary level includes rigorous content knowledge, culturally responsive teaching practices and the ability to engage students in critical thinking. Educators can create a learning environment that is both academically challenging and supportive of diverse learners.

To assess instructional quality, educators and researchers have identified several key indicators that serve as benchmarks for effective teaching practices. One of the primary indicators is the alignment of instruction with established learning standards. According to the Common Core State Standards Initiative (2010), effective instructional practices should be grounded in clearly defined academic standards that outline what students are expected to learn at each grade level. Research by Smith and O'Day (1991) has demonstrated that alignment between curriculum, assessment and instruction significantly influences student performance. Therefore, instructional quality can be measured by the extent to which educators align their teaching practices with these standards. The critical indicator of instructional quality is the use of evidence-based teaching strategies. Research has consistently shown that instructional practices grounded in empirical evidence lead to improved student outcomes (Hattie, 2009; Marzano, 2007). For instance, strategies such as formative assessment, differentiated instruction and collaborative learning have been associated with increased student engagement and achievement. Studies have demonstrated that teachers who effectively implement these strategies are better equipped to meet the diverse needs of their students, leading to higher levels of academic success (Black & Wiliam, 1998; Tomlinson, 2001).

The quality of classroom interactions serves as a vital indicator of instructional quality. Research by Pianta et al. (2008) identified key dimensions of effective classroom interactions, including emotional support, instructional support and classroom organization. High-quality interactions foster positive relationships between teachers and students, promote engagement and enhance the learning environment. Studies have shown that classrooms characterized by supportive interactions lead to improved student outcomes, including higher academic performance and social-emotional development (Hamre & Pianta, 2001). Educators adhere to high standards of instructional quality; various organizations have established guidelines and frameworks. The Interstate Teacher Assessment and Support Consortium has developed a set of standards that

outline essential competencies for effective teaching. These standards emphasize the importance of understanding students' diverse backgrounds, employing effective instructional strategies and fostering a supportive learning environment. Research has indicated that teachers who meet these standards demonstrate higher levels of effectiveness in their classrooms (Cochran-Smith & Villegas, 2015).

The Council for the Accreditation of Educator Preparation (CAEP, 2013) has established standards for educator preparation programs that emphasize the importance of instructional quality. These standards require that programs prepare candidates to create engaging learning environments, utilize data-driven decision-making and implement effective instructional strategies. Studies have shown that educators who complete preparation programs aligned with these standards are better equipped to deliver high-quality instruction (Darling-Hammond et al., 2017). The National Board for Professional Teaching Standards (NBPTS, 2016) has developed standards for accomplished teaching that serve as benchmarks for instructional quality. These standards emphasize the importance of reflective practice, ongoing professional development and collaboration among educators. Research has demonstrated that teachers who pursue National Board Certification exhibit higher levels of instructional quality and student achievement (Cantrell & Hughes, 2008).

Professional development plays a crucial role in improving instructional quality by equipping educators with the knowledge and skills necessary to implement effective teaching practices. Studies have shown that high-quality professional development focused on evidence-based strategies leads to significant improvements in teacher effectiveness and student outcomes (Garet et al., 2001; Hill et al., 2013). Professional development initiatives that emphasize collaboration, sustained engagement and alignment with instructional goals have been found to be particularly effective in enhancing instructional quality (Desimone, 2009). Ongoing support and mentorship are essential components of professional development that can positively influence instructional quality. Research has indicated that teachers who receive mentorship and coaching are more likely to implement new strategies effectively in their classrooms (Kraft & Papay, 2014). This support fosters a culture of continuous improvement, allowing educators to refine their practices and enhance student learning experiences.

The identification of the indicators and standards for instructional quality is essential, challenges remain in assessing and measuring these aspects effectively. One significant challenge is the variability in instructional practices across different classrooms and educational contexts. Research by Rowan et al. (2002) highlights the complexity of measuring instructional quality due to factors such as teacher experience, student demographics and school resources. Consequently, the development of reliable and valid assessment tools that capture the nuances of instructional quality remains a critical area for further research. The reliance on standardized testing as a primary measure of student achievement can create a narrow focus on specific content areas, potentially neglecting other essential aspects of instructional quality. Research by Popham (2001) emphasizes the importance of using multiple measures to assess student learning, including formative assessments, performance tasks and student feedback. By adopting a more

comprehensive approach to evaluation, educators can better understand the impact of instructional quality on student outcomes. Instructional quality is a multifaceted concept that encompasses various indicators and standards crucial for effective teaching practices. By aligning instruction with established learning standards, employing evidence-based strategies and fostering positive classroom interactions, educators can enhance the quality of instruction and ultimately improve student learning outcomes. The establishment of standards by organizations such as InTASC, CAEP and NBPTS provides a framework for educators to strive for excellence in their teaching practices.

Professional development plays a vital role in supporting educators' growth and enhancing instructional quality. Ongoing training, mentorship and collaboration are essential for equipping teachers with the knowledge and skills necessary to implement effective teaching strategies. Despite the challenges in assessing instructional quality, a comprehensive approach that incorporates multiple measures can provide valuable insights into the effectiveness of teaching practices. Prioritizing instructional quality is essential for fostering positive learning environments and promoting student success. As educational stakeholders continue to advocate for high-quality instruction, the commitment to establishing and maintaining standards of instructional quality will remain fundamental to achieving meaningful improvements in education.

Role of Professional Development in Enhancing Instructional Quality

Professional development has long been recognized as a cornerstone of educational improvement, particularly in its role in enhancing instructional quality. As teaching practices evolve alongside advancements in research, policy and pedagogy, the need for continuous teacher education becomes increasingly crucial. Professional development not only equips teachers with the skills and knowledge necessary to meet new challenges in the classroom but also fosters a culture of reflective practice, innovation and lifelong learning. Instructional quality, in turn, is significantly influenced by the professional growth of teachers, who are central to student learning outcomes. Professional development has transitioned from basic in-service training to more complex, targeted initiatives aimed at diverse student needs and ensuring that teachers remain competent in a rapidly changing educational landscape.

Professional development for teachers was minimal, often involving basic training in subject matter with little focus on instructional strategies or reflective practice. However, over time, educational researchers and policymakers began to realize that teacher effectiveness was directly tied to the quality of instruction provided which in turn depended on ongoing professional growth. The mid-20th century saw a shift in this perspective, as education systems worldwide began to place greater emphasis on structured PD programs designed to improve teaching skills and classroom management techniques (Desimone, 2009). The connection between PD and instructional quality became more evident as studies began to show that teachers who engaged in systematic professional development were more likely to adopt innovative teaching strategies and demonstrate higher levels of instructional efficacy. This shift coincided with broader movements towards education reform, particularly in the wake of global initiatives aimed at

improving educational standards and outcomes (Guskey, 2002). Professional development programs have consistently demonstrated positive impacts on teachers' instructional practices, particularly when they are sustained, collaborative and aligned with teachers' real-world classroom experiences. Research in the early 21st century began to show that the most effective PD programs were those that focused on practical, hands-on approaches to teaching rather than theoretical knowledge alone. These programs encouraged teachers to integrate new pedagogical techniques into their daily practice, often leading to improved student engagement and learning outcomes (Wei, Darling-Hammond, & Adamson, 2010).

Teachers who participated in PD programs that emphasized formative assessment techniques were better equipped to adjust their teaching methods in real-time, tailoring instruction to meet the diverse needs of their students. This, in turn, led to higher levels of student achievement, particularly in core subject areas such as mathematics and literacy (Timperley, Wilson, Barrar, & Fung, 2007). Moreover, PD that focused on differentiated instruction enabled teachers to meet the needs of students with varying abilities, fostering a more inclusive learning environment and contributing to instructional quality. Effective professional development is often characterized by several key features, including its duration, collective participation, content focus, active learning and coherence with school goals and curriculum. Research has shown that PD programs that span longer periods, typically over the course of a year or more, result in deeper learning and more sustained changes in instructional practice (Borko, 2004). This is because teachers need time to reflect on new strategies, integrate them into their teaching and receive feedback on their implementation. When teachers work together in professional learning communities or teams, they are more likely to engage in reflective practice, share strategies and collectively solve problems related to instructional challenges. Studies have found that this type of collaborative learning fosters a shared sense of purpose and accountability which further enhances instructional quality (Hord, 2009).

PD programs that focus on specific content areas are also more likely to lead to improvements in instructional quality. Teachers who receive targeted training in their subject areas are better able to deepen their content knowledge and improve their pedagogical techniques. This is particularly true in subjects like science and mathematics, where specialized knowledge is essential for effective teaching (Garet et al., 2001). PD programs that emphasize active learning where teachers have opportunities to practice new skills, observe peers and receive coaching are more likely to result in positive changes in teaching practices. Reflective practice is a key component of effective professional development, as it encourages teachers to critically examine their own instructional methods and identify areas for improvement. Historically, teacher education often focused on the acquisition of knowledge, with little emphasis on self-reflection or the application of theory to practice. However, modern PD programs have increasingly incorporated reflective practices as a central element, recognizing that teachers who reflect on their teaching are better able to make informed adjustments that enhance instructional quality (Schön, 1983).

Reflective practice has become an integral part of teacher professional development, often facilitated through tools such as teaching journals, peer observations and mentoring. Teachers

who engage in reflective practice are more likely to develop a deeper understanding of their students' needs and the effectiveness of different teaching strategies. This process of self-examination not only enhances teachers' instructional practices but also contributes to their professional growth, as they become more adept at identifying and areas for improvement (Hattie & Timperley, 2007). Professional learning communities have emerged as a powerful tool in enhancing instructional quality through sustained professional development. These communities provide teachers with ongoing opportunities for collaboration, feedback and shared learning. Professional learning communities encourage teachers to engage in continuous dialogue about instructional practices, student outcomes and effective teaching strategies. Research has shown that when teachers participate in professional learning communities, they are more likely to implement new instructional methods and improve their teaching effectiveness over time (Vescio, Ross & Adams, 2008).

Professional learning communities help create a culture of continuous improvement within schools, where teachers feel supported in their efforts to enhance instructional quality. By providing a structured environment for collaboration, professional learning communities allow teachers to learn from one another and collectively solve instructional challenges. This collaborative approach to professional development has been shown to lead to sustained improvements in both teaching practices and student achievement (Stoll et al., 2006). The integration of technology into professional development has opened up new avenues for enhancing instructional quality. Online PD programs, webinars and virtual learning communities have made professional development more accessible to teachers, particularly those in remote or rural areas. These technology-enhanced PD opportunities allow teachers to engage in self-paced learning, collaborate with peers across geographical boundaries and access a wide range of resources to support their professional growth (Desimone & Garet, 2015).

Technology-enhanced PD often incorporates interactive tools, such as video analysis and digital simulations which allow teachers to observe and analyze instructional practices in real-time. These tools provide teachers with valuable insights into their teaching methods and offer opportunities for immediate feedback and reflection. As a result, teachers are better equipped to implement effective instructional strategies that enhance student learning outcomes (Darling-Hammond et al., 2017). While the positive impact of professional development on instructional quality is well-documented, several challenges remain in ensuring that PD programs lead to meaningful changes in teaching practice. One of the primary challenges is the disconnect between PD programs and the actual classroom context in which teachers work. Many PD programs are designed at a systemic level and may not adequately the specific needs of individual teachers or their students (Opfer & Pedder, 2011). As a result, teachers may struggle to implement new strategies effectively, particularly if they do not receive ongoing support or coaching. Another challenge is the variability in the quality of PD programs. While some PD programs are well-designed and based on research-backed principles, others may lack coherence or fail to provide teachers with the tools they need to improve their instructional practices. Ensuring that all teachers have access to high-quality PD is essential for enhancing instructional quality across the board (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007).

Professional development plays a critical role in enhancing instructional quality, directly influencing teachers' effectiveness in the classroom. Through targeted, sustained and reflective PD, teachers are better equipped to meet the diverse needs of their students and improve learning outcomes. While challenges remain in ensuring the quality and relevance of PD programs, ongoing research and innovation in the field continue to highlight the importance of investing in teachers' professional growth as a means of improving educational quality.

Objectives of the study

The objectives of the study were to study the relationship between teachers' professional development and learning environment with instructional quality at secondary level and to assess the mediating role of effective teaching practice and learning environment for improving instructional quality at secondary level.

The Research Design

This descriptive research study was conducted to explore the Impact of Professional Development on Instructional Quality among Secondary School Teachers: The Mediating Role of Effective Teaching Practices and the Learning Environment. The study emphasized the importance of professional development initiatives in enhancing the teaching capabilities of educators and improving the learning environment in secondary schools. The population of the study consisted of secondary school teachers from four tehsils of District Rahim Yar Khan: Rahim Yar Khan, Liaquatpur, Khanpur and Sadiqabad. These tehsils were selected as representative areas for the study to ensure the inclusion of diverse educational backgrounds and teaching practices. A sample of 300 secondary school teachers was conveniently selected from these tehsils to participate in the research. This sampling approach ensured a fair representation of teachers from both urban and rural areas within the district. The research employed a descriptive design to examine the variables under study. Data were collected through a self-structured questionnaire designed to assess teachers' perceptions of professional development activities and their impact on instructional quality.

Construction of Questionnaire

Questionnaire was used as a tool for data collection. After reviewing the relevant literature, a questionnaire was developed. The questionnaire consisted on knowledge and skills, effective teaching practices, learning environment, continuous improvement, professional development with school goals, impact on students learning, facilitate learning, leadership and mentoring skills and work environment on five-point Likert scale (strongly disagree to strongly agree).

Validity and Reliability of tool

After the construction of the questionnaire, a validation process was conducted to ensure its content validity and appropriateness for the research objectives. The initial version of the questionnaire was submitted to five experts in the fields of education and professional

development. These experts included academic researchers, teacher trainers and practitioners with significant experience in secondary education and instructional quality. The experts provided detailed feedback, highlighting specific areas for improvement. Based on the experts' feedback, the questionnaire was revised and finalized. The revised instrument contained a total of 44 items, structured on a five-point Likert scale. The finalized questionnaire reflected all the modifications suggested by the experts, ensuring it was robust relevant, and capable of producing reliable data. Researcher checked reliability of the tool by using the Cronbach's Alpha formula and the reliability of the tool was 0.864.

Data Collection

Data was collected through a self-developed questionnaire. The copies of questionnaire were delivered personally to 300 school teachers. Two hundred and seventy-five questionnaires were received back by the researcher. So, the return rate was 91.6%.

Table 1: *Demographic Information of Respondents*

Category	Response	Frequency	Percentage
Gender	Male	137	49.8%
	Female	138	50.2%
Location of School	Urban	165	60.0%
	Rural	110	40.0%
Academic Qualification	BA/B.Sc	73	26.5%
	MA/M.Sc	102	37.1%
	MS/M.Phil	69	25.1%
	Ph.D	29	10.5%
	Other (please specify)	2	0.7%
Professional Qualification	B.Ed.	148	53.8%
	M.Ed.	95	34.5%
	Other Teaching Certification	32	11.6%
Years of Teaching Experience	Less than 1 year	24	8.7%
	1-5 years	92	33.5%
	6-10 years	77	28.0%
	11-15 years	57	20.7%
	16 years and above	25	9.1%

The demographic data of the 275 surveyed teachers shows a balanced gender distribution with 137 males (49.8%) and 138 females (50.2%). Majority of the teachers (165, or 60.0%) were from urban schools, while 110 teachers (40.0%) were from rural areas. The academic qualifications of the respondents displayed a variety of educational backgrounds. The largest group held an MA/M.Sc degree (37.1%), followed closely by those with a BA/B.Sc (26.5%) and MS/M.Phil (25.1%). A smaller percentage, 10.5%, had obtained a Ph.D. degree indicating a noteworthy level of advanced academic achievement among the respondents. The data revealed that 148 teachers

(53.8%) held a B.Ed., while 95 teachers (34.5%) possessed a M.Ed. 32 teachers (11.6%) had other teaching certifications. The majority of teachers (33.5%) had between 1-5 years of experience, while 28.0% had 6-10 years. Only 8.7% had less than a year of experience and 9.1% had over 16 years of teaching experience.

Data Analysis

Data were analyzed utilizing the Statistical Package for the Social Sciences (SPSS). The researcher computed the frequency, mean, and standard deviation for each item during the analysis. A t-test for independent samples was employed to compare opinions toward various groupings. The significance of the difference was assessed at the 0.05 level of significance. Conclusions and recommendations were derived from data analysis and findings.

Results

Table 2: *Demographic analysis*

Variable	Option	Frequency	Percentage
Gender	Male	137	49.8%
	Female	138	50.2%
Location of School	Urban	165	60.0%
	Rural	110	40.0%
Professional qualification	BA/B.Sc	73	26.5%
	MA/M.Sc	102	37.2%
	MS/M.Phil	69	25.1%
	Ph.D	29	10.5%
	Other (please specify)	2	0.7%
Professional qualification	B.Ed.	148	53.8%
	M.Ed.	95	34.6%
	Other Teaching Certification	32	11.6%
Years of Teaching Experience	Less than 1 year	24	8.7%
	1-5 years	92	33.5%
	6-10 years	77	28.0%
	11-15 years	57	20.7%
	16 years and above	25	9.1%

Table 2 describes the demographic variables in detail. the gender distribution among the respondents was almost equal, with 49.8% (n=137) of the teachers identifying as male and 50.2% (n=138) as female. This balance reflects a diverse teaching workforce, indicating that both genders contribute significantly to the educational

The table shows that majority of teachers 60.0% worked in urban schools, while 40.0% were in rural area. This results a greater representation of urban education contexts within the sample

which could impact the findings related to professional development as urban schools may have different resources and challenges compared to rural ones.

The table indicates that academic qualifications, 37.2% of the teachers held an MA/M.Sc degree making it the most common qualification among respondents. BA/B.Sc (26.5%), MS/M.Phil (25.1%) and Ph.D. (10.5%) followed, with a very small percentage (0.7%) indicating other qualifications. This variety in academic backgrounds may provide a range of perspectives on professional development effectiveness, with higher qualifications potentially correlating with more advanced teaching practices.

The table explains that professional qualifications a majority 53.8% had a B.Ed., while 34.6% had an M.Ed. Only 11.6% reported holding other teaching certifications. The predominance of B.Ed. and M.Ed. qualifications suggests a strong foundation in educational theory and practice among the teachers, which may influence their engagement in professional development programs.

The table shows that years of teaching experience varied among the respondents. A notable 33.5% (n=92) had between 1-5 years of experience, while 28.0% (n=77) had 6-10 years. The presence of experienced teachers (20.7% with 11-15 years and 9.1% with over 16 years) indicates a blend of novice and seasoned educators, which could enrich discussions on professional development by including diverse insights and experiences.

Table 3: *Professional development and instructional quality*

Sr.no	Statement	SA *f* %	A *f* %	UNC *f* %	DA *f* %	SDA *f* %	Mean
1.	Professional development influences instructional quality effectively.	95 34.6	115 41.8	35 12.7	20 7.3	10 3.6	6.67
2.	Professional development improves instructional practices of teachers.	100 36.4	100 36.4	35 12.7	25 9.0	15 5.5	3.73
3.	Collaboration with peers during professional development enhance teaching approaches.	110 40.0	115 41.8	25 9.1	15 5.5	10 3.6	3.71
4.	teachers feel more confident in teaching abilities after attending professional development programs.	125 45.5	100 36.8	35 12.7	10 3.6	0 0.0	3.80
5.	The feedback teachers receive during professional development is constructive.	100 36.4	115 41.8	30 10.9	20 7.3	10 3.6	3.66
Total		106 38.5	113 39.7	32 11.6	13 6.5	6 3.2	4.24

The above table 3 describes the Professional development and instructional quality. The results revealed that a significant majority of the 275 teachers perceived that professional development effectively influenced their instructional quality. Specifically, 41.8% (n=115) of the respondents agreed with the statement, while 34.6% (n=95) strongly agreed, reflecting a strong consensus on the positive impact of professional development on their teaching effectiveness. Only 3.6% (n=10) strongly disagreed, indicating minimal skepticism regarding this assertion. The mean score of 3.67 suggests an overall favorable view of the influence of professional development on instructional quality, with a standard deviation of 0.83 indicating that the responses were relatively consistent among the participants.

The active pursuit of professional development to improve instructional practices, the results indicated that 36.4% (n=100) of teachers agreed, while another 36.4% (n=100) strongly agreed, highlighting a notable commitment to professional growth. In contrast, only 5.5% (n=15) strongly disagreed with the statement. The mean score of 3.73 reflects a generally positive attitude toward seeking professional development, while the standard deviation of 0.88 suggests some variation in responses, indicating that while many teachers actively seek out opportunities, there may be differing levels of engagement among them.

Collaboration with peers during professional development indicate that 41.8% (n=115) of teachers agreed that such collaboration enhanced their teaching strategies, while 40.0% (n=110) strongly agreed. This suggests that the majority of teachers valued the collaborative aspects of professional development. Only 3.6% (n=10) of respondents strongly disagreed, indicating minimal dissent about the benefits of peer collaboration. The mean score of 3.71 signifies a strong perception of the positive effects of collaborative learning, with a standard deviation of 0.82 showing consistency in the responses among participants.

The table shows about feeling more confident in their teaching abilities after attending professional development sessions, 36.8% (n=100) of teachers agreed, while 45.5% (n=125) strongly agreed. This indicates a strong belief among participants that professional development sessions positively influenced their self-efficacy in teaching. Only 1.8% (n=5) of respondents strongly disagreed, reflecting a general consensus on the effectiveness of these programs in boosting confidence. The mean score of 3.80 suggests a very positive perception of the impact of professional development on confidence levels, with a standard deviation of 0.77 indicating low variability in the responses.

The results regarding the feedback received during professional development sessions indicated that 41.8% (n=115) of teachers agreed that the feedback was constructive and 36.4% (n=100) strongly agreed, underscoring the perceived value of feedback in enhancing their professional skills. Only 3.6% (n=10) of participants strongly disagreed, suggesting that most educators found the feedback beneficial. The mean score of 3.66 reflects a positive view on the constructive nature of feedback received, while the standard deviation of 0.85 indicates that the majority of responses were relatively close to the mean, demonstrating a general consensus among the teachers regarding the effectiveness of feedback in their professional development.

Table 4: *Professional development and learning environment*

Sr.no	Statement	SA *f* %	A *f* %	UNC *f* %	DA *f* %	SDA *f* %	Mean
1.	Professional development has equipped to create a conducive classroom environment.	115 41.8	115 41.8	25 9.1	12 4.4	8 2.9	3.76
2.	teachers use inclusive teaching practices that they learned during professional development training.	120 43.6	100 36.4	30 10.9	15 5.5	10 3.6	3.72
3.	classroom management skills improved because of professional development program.	103 37.4	100 36.4	40 14.5	20 7.3	12 4.4	3.65
4.	The learning environment of classroom is inclusive.	105 38.2	105 38.2	40 14.5	18 6.5	7 2.5	3.71
5.	Professional development encourages collaboration among teachers to enhance diverse the learning environment.	113 41.1	105 38.2	35 12.7	13 4.7	9 3.3	3.75
Total		111 40.2	107 38.2	34 12.3	15 5.6	9 3.3	3.7

The table 4 reveals that Professional development and learning environment. The responses to the statement regarding whether professional development has equipped teachers to create a conducive classroom environment revealed that a significant portion of teachers perceived positive impacts from their training. Specifically, 41.8% (n=115) agreed and another 41.8% (n=115) strongly agreed, indicating a strong belief in the effectiveness of professional development in enhancing classroom environments. Only 2.9% (n=8) of teachers strongly disagreed, suggesting minimal resistance to the perceived benefits. The mean score of 3.76 indicates a generally favorable view, while the standard deviation of 0.85 reflects a consistent response pattern among the teachers.

In response to whether teachers use inclusive teaching practices learned during professional development training, the data indicates that a majority perceived a positive impact. Specifically, 36.4% (n=100) agreed, while 43.6% (n=120) strongly agreed, highlighting a strong commitment to applying inclusive strategies in the classroom. Only 3.6% (n=10) of the participants strongly disagreed, indicating a consensus on the effectiveness of professional development in promoting inclusivity. The mean score of 3.72 suggests a generally positive attitude toward the application of inclusive practices, with a standard deviation of 0.81 demonstrating that responses were fairly consistent.

The statement on improvements in classroom management skills due to professional development opportunities, the results showed that 36.4% (n=100) of teachers agreed, while 37.4% (n=103) strongly agreed, indicating a substantial perception of enhanced classroom management abilities.

Only 4.4% (n=12) strongly disagreed, reflecting a minimal proportion of teachers who felt that their skills had not improved. The mean score of 3.65 suggests a favorable view on the impact of professional development on classroom management and the standard deviation of 0.88 indicates some variability in responses, but the overall trend remained positive.

The findings regarding the inclusivity of the learning environment indicated that 38.2% (n=105) of teachers agreed that their classrooms were inclusive and an equal percentage strongly agreed. This reflects a strong belief among educators that they have created inclusive learning environments, supported by professional development. Only 2.5% (n=7) strongly disagreed, indicating that very few teachers perceived their classrooms as non-inclusive. The mean score of 3.71 signifies a positive perception of inclusivity, while the standard deviation of 0.80 suggests consistent responses among the teachers.

Professional development encouraging collaboration among teachers to enhance diverse learning environments, the data reveals that 38.2% (n=105) agreed with the statement, while 41.1% (n=113) strongly agreed, indicating a strong belief in the value of collaboration fostered through professional development. Only 3.3% (n=9) strongly disagreed, reflecting minimal skepticism. The mean score of 3.75 indicates a positive perception of collaboration opportunities, with a standard deviation of 0.84 showing consistency in the responses across the sample.

Table 5: *Professional development and effective teaching*

Sr.no	Statement	SA *f* %	A *f* %	UNC *f* %	DA *f* %	SDA *f* %	Mean
1.	Continuous professional development has positive impact on teaching skills.	115 41.8	105 38.2	30 10.9	15 5.5	10 3.6	3.75
2.	Continuous professional development programs are relevant to teaching practice at classroom level.	120 43.6	110 40.0	25 9.1	12 4.4	8 2.9	3.77
3.	Continuous professional development helps teachers with new strategies to meet the diverse students' needs.	112 40.7	115 41.8	28 10.2	14 5.1	9 3.3	3.68
4.	Professional development programs are equipped with latest instructional strategies.	107 39.1	115 41.8	35 12.6	11 4.0	7 2.5	3.73
5.	Continuous professional development helps with innovative teaching resources that teachers can implement in classrooms.	121 44.0	110 40.0	28 10.2	10 3.6	6 2.2	3.76
6.	Continuous professional development provides teachers with the tools to achieve professional goals.	117 42.5	113 41.1	25 9.1	12 4.4	8 2.9	3.73
Total		115 50.3	111 40.4	22 10.3	12 4.5	8 2.9	3.7

The above table explains about the Professional development and effective teaching. The responses to the statement regarding the positive impact of continuous professional development on teaching skills indicated that a majority of teachers perceived significant benefits from these programs. Specifically, 38.2% (n=105) agreed and another 41.8% (n=115) strongly agreed, highlighting a strong belief in the effectiveness of continuous professional development in enhancing their teaching abilities. Only 3.6% (n=10) strongly disagreed, suggesting that most teachers recognized the value of these programs. The mean score of 3.75 reflects a generally favorable view, while the standard deviation of 0.85 indicates consistency in the responses among the teachers.

In response to whether continuous professional development programs are relevant to their classroom practices, the data showed that 40.0% (n=110) of teachers agreed, while 43.6% (n=120) strongly agreed. This indicates a high level of agreement among educators that these programs effectively address their teaching needs. Only 2.9% (n=8) strongly disagreed, reflecting minimal dissent regarding the relevance of professional development. The mean score of 3.77 suggests a positive perception of the alignment of these programs with classroom practice and the standard deviation of 0.84 indicates a uniformity in responses across the sample.

The statement on whether continuous professional development helps teachers with new strategies to meet diverse students' needs, the results indicated that 40.7% (n=112) agreed and another 40.7% (n=112) strongly agreed. This reflects a strong belief that professional development provides valuable strategies for addressing the varied needs of students. Only 3.3% (n=9) strongly disagreed, which suggests that the majority of teachers found these programs beneficial. The mean score of 3.68 indicates a positive view on the effectiveness of continuous professional development in introducing new strategies, with a standard deviation of 0.82 reflecting consistency in teacher perceptions.

Considering whether professional development programs are equipped with the latest instructional strategies, the findings revealed that 41.8% (n=115) agreed and 39.1% (n=107) strongly agreed. This indicates that a majority of teachers believe that the training they receive is up-to-date and beneficial for their instructional practices. Only 2.5% (n=7) strongly disagreed, demonstrating minimal opposition to the effectiveness of the training content. The mean score of 3.73 reflects a positive attitude toward the instructional strategies offered in these programs, with a standard deviation of 0.79 suggesting a strong agreement among participants.

In terms of whether continuous professional development helps teachers with innovative teaching resources, the results indicated that 40.0% (n=110) agreed and 44.0% (n=121) strongly agreed, showcasing a strong belief in the value of these resources for enhancing teaching practices. Only 2.2% (n=6) strongly disagreed, reflecting a consensus on the positive impact of professional development in this area. The mean score of 3.76 suggests that teachers feel well-equipped with innovative resources, while the standard deviation of 0.83 indicates a degree of consistency in responses.

When asked whether continuous professional development provides them with tools to achieve their professional goals, the data showed that 41.1% (n=113) agreed and 42.5% (n=117) strongly agreed. This reflects a high level of confidence among teachers that these programs support their professional aspirations. Only 2.9% (n=8) strongly disagreed, indicating that the vast majority found these programs beneficial. The mean score of 3.73 suggests a positive perception of the role of professional development in helping teachers reach their goals, while the standard deviation of 0.84 indicates consistent responses across the sample.

Discussion

Teachers' professional development and its impact on instructional quality at the secondary level involves examining the strategies and outcomes associated with training, development programs and pedagogical advancements aimed at enhancing teaching practices. Research demonstrated that professional development programs particularly those that were continuous and targeted at specific skills had a significant effect on instructional quality (Darling-Hammond et al., 2017). Teachers who engaged in such programs reported improved classroom management skills, better lesson planning and increased student engagement. This directly influenced the students' academic performance, showing that well-trained teachers were more equipped to handle diverse classroom dynamics and effectively implement the curriculum (Desimone & Garet, 2015).

Professional development that incorporated reflective practices allowed teachers to critically evaluate their instructional methods and make adjustments that aligned with students' needs (Avalos, 2016). This reflective approach was particularly valuable in the context of Southern Punjab where students come from diverse socioeconomic backgrounds, requiring adaptable and responsive teaching methods. Teachers who participated in programs that encouraged reflection and self-assessment reported greater adaptability and responsiveness in their teaching leading to improved instructional outcomes (Borko et al., 2017). Instructional quality improved when professional development emphasized collaborative learning. Teachers who participated in professional learning communities or peer-coaching sessions developed a more robust understanding of instructional strategies resulting in a positive impact on their teaching effectiveness (Vescio et al., 2008). Teachers to share experiences, exchange resources and collectively address challenges unique to their regional context, thereby enhancing instructional quality in ways that benefited students' learning experiences (Hargreaves & Fullan, 2012).

Barriers existed that hindered the full potential of professional development programs in Southern Punjab. Limited access to resources and support from educational authorities posed challenges, as did the occasional mismatch between the training content and the actual classroom needs. Studies highlighted the need for tailored professional development that considers regional educational challenges including resource limitations and classroom diversity, to ensure that teachers are effectively prepared (Guskey, 2002). Addressing these obstacles could enable teachers to maximize the benefits of professional development, ultimately enhancing instructional quality at the secondary level in Southern Punjab.

The objective of the study was to study the relationship between teachers' professional development and instructional quality at secondary level. The link between teachers' professional development and instructional quality confirmed that professional development significantly impacted instructional practices. Research demonstrated that teachers who engaged in professional growth activities displayed improved teaching strategies, stronger classroom management and more effective curriculum delivery, all of which contributed to enhanced instructional quality (Desimone & Garet, 2015). These improvements were particularly visible when development programs were aligned with teachers' instructional needs allowing them to directly apply new strategies in their classrooms, which ultimately promoted a more effective learning environment for students (Darling-Hammond et al., 2017).

The objective of the study was to assess the mediating role of effective teaching practice and learning environment for improving instructional quality at secondary level. The role of professional development in enhancing instructional quality was underscored by studies highlighting the need for targeted training and development programs. Research found that programs focused on specific skills, such as formative assessment or differentiated instruction, were effective in helping teachers adjust their teaching to meet students' diverse needs (Guskey, 2002). Professional development initiatives that unique contextual challenges such as large class sizes or limited resources were found to be particularly effective in enhancing instructional quality (Avalos, 2016). This evidence indicated that professional development could play a critical role in addressing instructional gaps and ensuring teaching practices were tailored to the regional educational environment.

Conclusion

It was concluded that the professional development programs that they have participated in significantly enhanced their teaching skills. They regularly updated their knowledge through various professional development opportunities which provided them with relevant training that improved their instructional quality. These programs helped them implement new strategies in the classroom, making their teaching more effective and aligned with their students' needs. They actively sought out these development opportunities which allowed me to collaborate with peers and receive constructive feedback that boosted their confidence and teaching abilities. The professional development programs helped them create a more inclusive and conducive learning environment in their classroom. They applied new classroom management techniques and inclusive teaching practices that they learned through training which ultimately made the learning space more welcoming for all students. They also experienced how professional development encouraged teachers to work together promoting a diverse and supportive learning atmosphere.

Continuous professional development played a vital role in their growth as an educator. It offered innovative teaching resources and strategies that they could directly implement in their classroom allowing there to better meet the needs of diverse learners. These opportunities also helped them achieve their professional goals by equipping them with tools that enhanced my

teaching practices. The alignment of professional development with my school educational goals and the involvement in decision-making regarding their development needs strengthened the connection between their growth and the school vision. The impact of these programs on student learning was evident. They saw improvements in student outcomes which they attributed to the instructional strategies they had learned and implemented. Regular assessment of student performance allowed them to adapt their teaching methods based on their feedback, contributing to their success. They also felt more prepared to equip their students with the skills necessary for their future challenges.

Recommendations

In light of the findings from this study, the following recommendations are made:

Regular and comprehensive training programs should be provided for teachers. These programs should both foundational teaching skills and advanced instructional techniques particularly focused on active learning and classroom engagement. Workshops on modern teaching methodologies such as project-based learning, differentiated instruction and digital literacy should help teachers remain effective and adaptable to evolving educational standards.

Teacher training should be adapted to specific challenges teachers face in this region. Developing training content that reflects local educational needs, linguistic diversity and available resources will enable teachers to deliver more relevant instruction. Training that also prepares teachers to work with students from varied backgrounds especially in underserved areas will make education more inclusive and accessible, fostering a more supportive learning environment.

Reflective teaching practices help educators assess their effectiveness and adapt their methods for improved outcomes. Professional development should include training on reflective techniques, such as self-assessment, peer observation, and student feedback analysis. Encouraging teachers to reflect on their instructional strategies and student engagement levels will help them make evidence-based adjustments to their teaching approaches, ultimately contributing to a higher quality of instruction.

Mentors can help novice teachers navigate classroom challenges, develop effective teaching strategies, and learn to adapt to the school's culture. Such support systems can make the transition smoother for new teachers, enhancing their confidence and performance, and leading to a stronger foundation for high-quality instruction.

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