ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.04 No.01 (2026)

SHAPING MINDS: SECONDARY SCHOOL TEACHERS' PERSPECTIVES ON PROFESSIONAL DEVELOPMENT

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Abstract
In modern era, it has been realized that skillful teaching faculty play a vital role for the completion of teaching-learning process. To achieve this objective it is necessary to focus on the teaching training for professional growth of in-service teaching staff. The professional development of teachers has emerged as a cornerstone in the pursuit of educational quality and reform across the globe. In Pakistan, where government schools constitute a major segment of the national education system, the role of well-trained and professionally developed teachers is particularly crucial in addressing the challenges of quality education, equity, and inclusivity. Among the diverse cadre of educators, science and arts teachers serve as fundamental pillars for both cognitive and cultural development of students. However, disparities in their professional development experiences may lead to uneven educational outcomes. The major objective of this study is to examine the perception of secondary school teachers regarding professional development. The secondary school teachers from Gujranwala were the population of this study while 337 (Science= 159, Arts= 178) respondents were selected as sample through simple random sampling technique. A structured questionnaire was used to collect the primary data from respondents by applying survey method. The findings indicated a significant difference between science and arts teachers about the factors pedagogical training and usage of digital tools and technology while there was not found a significant difference but means difference was indicated in curriculum content mastery, classroom management and inclusive education and communication and soft skills. Significantly, this study will prove as stepping stone to boost the learning environment by adopting innovative professional techniques.
Keywords: *Professional Growth; Shaping Teachers' Minds; Secondary School Level*

INTRODUCTION

Development refers to "structured professional learning that results in changes in teacher practices and improvements in student learning outcomes" (OECD, 2009). In Pakistan, teacher professional development is facilitated by various institutions such as the Provincial Institutes of Teacher Education (PITEs), the National Institute of Professional Development (NIPD), and the Directorate of Staff Development (DSD). Despite such institutional efforts, significant gaps exist in both the availability and quality of professional training, particularly when comparing science and arts educators (Bashir, 2013; UNESCO, 2020).

In Pakistan, the quality of education in government schools remains a persistent challenge, often attributed to inadequate and inconsistent professional development of teachers (Bashir, 2013; UNESCO, 2020). While national policies emphasize teacher training as a priority for improving learning outcomes, existing programs often adopt a generalized approach, lacking differentiation based on subject needs. This is particularly evident in the contrasting professional development needs of science and arts teachers two key pillars of secondary education.

Science teachers require specialized training in inquiry-based instruction, laboratory techniques, use of simulations, and integration of scientific thinking, particularly in alignment

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.04 No.01 (2026)

with STEM education goals (Iqbal & Mahmood, 2010). In contrast, arts teachers need support in creative and culturally relevant pedagogy, visual and performing arts integration, and promoting critical thinking and cultural literacy (Rehmani, 2006). However, many training programs in Pakistan are not sufficiently tailored to these distinct pedagogical domains, potentially leading to uneven instructional quality across disciplines.

Additionally, with the implementation of the Single National Curriculum (SNC) and broader education reforms, there is a growing need for teachers across disciplines to master curriculum content, stay informed about policy shifts, and adopt interdisciplinary approaches (Government of Pakistan, 2021). Yet, teachers often lack updated knowledge and ongoing support, which undermines their effectiveness in the classroom (Shamim, 2008).

The increasing demand for digital competence among teachers, particularly after the COVID-19 pandemic, further complicates the situation. While some science teachers may be more exposed to digital tools and simulations, arts teachers often receive limited training in integrating technology into their subject areas (Ali, 2021). This imbalance can hinder equitable student access to enriched learning experiences across the curriculum.

Moreover, both groups of teachers face challenges in classroom management and inclusive education, especially in overcrowded and under-resourced government schools where diversity, disability, and socio-economic disparities are significant (Malik & Habib, 2016). Yet, professional development on inclusion often lacks practical applicability and subject-specific adaptation.

Lastly, communication and soft skills such as language proficiency, interpersonal communication, and collaboration are essential yet underdeveloped in many government school teachers, affecting classroom interaction and student engagement (OECD, 2009; Shamim, 2008). Despite the critical importance of these areas, limited empirical research in Pakistan has explored and compared how science and arts teachers are professionally developed across these dimensions. This gap in knowledge prevents policymakers, training institutions, and school administrators from designing subject-sensitive and evidence-based professional development programs.

Therefore, this study aims to fill this gap by systematically comparing the professional development of science and arts teachers in government schools of Pakistan. It will explore key domains including pedagogical training, curriculum mastery, digital technology use, classroom management, and communication skills, in order to inform more effective and equitable teacher training practices across subject areas.

LITERATURE REVIEW

Curriculum and content mastery is a cornerstone of effective teaching. For teachers to deliver quality education, it is critical that they possess deep knowledge of the subject matter as well as a thorough understanding of how to teach it effectively. The professional development of teachers must, therefore, ensure that teachers acquire both subject expertise and pedagogical proficiency. In Pakistan, the challenge of providing teachers with adequate curriculum knowledge and content mastery is significant, particularly in government schools where resources and training opportunities are often limited.

Science teachers in Pakistan face significant challenges in mastering their curriculum due to the evolving nature of the scientific field and the lack of continual professional development. A study by Iqbal and Mahmood (2010) on secondary school science teachers highlighted that teachers often struggle to remain updated on new scientific concepts and teaching methodologies. According to their findings, many teachers continue to rely on outdated textbooks and methods, significantly hindering students' learning outcomes.

Moreover, the National Curriculum for Science in Pakistan has undergone multiple revisions, but many teachers have not received adequate training to implement these changes effectively.

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ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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As noted by Jamil (2016), teachers' limited understanding of curriculum changes results in ineffective implementation, with many teachers opting for a rote-based approach instead of inquiry-based learning, which is essential for fostering scientific thinking. This highlights the gap between curriculum expectations and teachers' preparedness to implement them.

In a more recent study by Malik and Choudhary (2020), science teachers expressed the need for regular updates and professional training on curriculum changes, new pedagogical approaches, and the integration of technology in science teaching. This indicates that science teachers require PD opportunities that provide not only content knowledge but also pedagogical strategies that align with curriculum goals.

Pedagogical training is a critical component of teacher effectiveness. Science teachers require a firm grounding in inquiry-based learning, experimental techniques, laboratory work, and the integration of technology to promote scientific thinking (Iqbal & Mahmood, 2010). Conversely, arts teachers benefit from training that emphasizes creative pedagogy, integration of indigenous art forms, and fostering critical and cultural literacy among students. The lack of discipline-specific pedagogy often results in suboptimal teaching strategies and reduced student engagement (Rehmani, 2006).

This study seeks to compare the professional development of science and arts teachers in government schools in Pakistan, focusing on key dimensions such as subject-specific pedagogical training, curriculum and content mastery, integration of technology, classroom management, and communication skills. Curriculum and content mastery is equally vital. Frequent changes in educational policies such as the implementation of the Single National Curriculum (SNC) under the National Education Policy of Pakistan demand that teachers are regularly updated on curriculum revisions and pedagogical shifts (Government of Pakistan, 2021). Science teachers, due to the evolving nature of scientific knowledge, require continuous content upgrading, while arts teachers must adapt to interdisciplinary approaches that link social sciences, literature, and history.

The integration of technology and digital tools into classrooms has gained prominence, particularly after the COVID-19 pandemic which exposed the digital divide in public education. While platforms like the Taleemabad App and the government's TeleSchool initiative have offered new avenues for learning, many teachers especially in rural government schools lack the training to utilize these effectively (Ali, 2021). Science teachers often have more exposure to simulations and digital labs, whereas arts teachers may face challenges in adopting multimedia tools for instruction.

Effective classroom management and inclusive education practices are essential in the diverse and often overcrowded public schools of Pakistan. Teachers must be equipped to manage mixed-ability classrooms and address the needs of differently-abled or marginalized students (Malik & Habib, 2016). This is an area where both science and arts teachers require targeted training, though their strategies and needs may differ based on the nature of their subjects.

Furthermore, communication and soft skills play a pivotal role in fostering student-teacher interaction, classroom dynamics, and collaborative learning environments. Proficiency in English and Urdu, interpersonal skills, and the ability to communicate subject content effectively are often overlooked in traditional teacher training programs (Shamim, 2008). This study aims to explore and compare the professional development practices of science and arts teachers in government schools of Pakistan with reference to the above-mentioned domains. By identifying the strengths, gaps, and opportunities within each group's professional learning experiences, the research will contribute to more equitable and subject-responsive teacher development policies.

Arts education in Pakistan faces unique challenges in terms of curriculum mastery. Unlike the structured and rigid curriculum for science subjects, arts education often focuses on creativity and cultural expression, which can make it more difficult for teachers to engage with specific

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ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.04 No.01 (2026)

content mastery (Nasir, 2015). As highlighted by Shah (2015), arts teachers in government schools often face difficulty in balancing the curriculum with practical, creative, and culturally relevant content that can engage students meaningfully.

Many arts teachers lack adequate training in both the content and pedagogical aspects of the curriculum. Rehman (2017) emphasized that the integration of local art forms, music, and visual storytelling into the arts curriculum is often neglected due to insufficient teacher preparation. The National Curriculum for Fine Arts, which provides guidelines for arts education, is rarely updated in response to changes in cultural contexts, leading to a gap in teachers' ability to deliver contemporary, culturally relevant content.

Research conducted by Zia and Qamar (2019) on the professional development of arts teachers in Punjab found that teachers often rely on traditional methods of teaching, and as a result, students' understanding of arts concepts and their creative abilities remain underdeveloped. The study recommended a greater focus on practical, hands-on training in the arts, emphasizing both content mastery and innovative teaching methods.

One of the core challenges in Pakistan's professional development system is the lack of systematic and content-specific teacher training. As highlighted by Aslam (2013), teachers in both science and arts disciplines often receive generalized PD that does not adequately address the specific content knowledge needed for effective teaching. This leads to a mismatch between curriculum expectations and teacher expertise. In particular, the gap in content mastery in both science and arts subjects is exacerbated by a lack of structured, subject-specific training programs.

Furthermore, studies indicate that teachers are often not updated on the latest curriculum changes and teaching strategies. A report by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2015) highlighted that curriculum reforms in Pakistan often do not reach teachers in remote areas, leading to disparities in the quality of education. In the case of science education, this problem is especially pronounced, with a significant number of teachers struggling to implement the National Science Curriculum effectively. Similarly, for arts teachers, the integration of local and global art trends into the curriculum remains a challenge due to insufficient PD support.

The literature highlights a strong correlation between curriculum mastery and teaching effectiveness. A study by Nadeem and Imran (2018) on government school teachers found that teachers with better content knowledge were more confident in their teaching methods and had better student outcomes. This study also noted that PD programs focusing specifically on content mastery, such as subject workshops, positively impacted teacher confidence and effectiveness, particularly in science subjects.

For arts teachers, the literature suggests that curriculum mastery is just as important as creativity in fostering an enriching learning environment. According to Nasir (2015), arts teachers who were trained in both content and pedagogy were better able to engage students in creative processes while also delivering the curricular content in a structured and meaningful way. This approach improved student outcomes, particularly in developing critical thinking and cultural awareness.

Curriculum and content mastery remains one of the most crucial aspects of professional development for both science and arts teachers in Pakistan. However, the existing PD frameworks fail to address the specific needs of these teachers, leading to discrepancies in teaching effectiveness. Science teachers require continuous training on the evolving nature of the scientific curriculum, while arts teachers need support in integrating culturally relevant content alongside traditional pedagogical methods. A focus on subject-specific PD, particularly one that includes both content mastery and pedagogy, is essential for enhancing teacher effectiveness and ensuring that students receive a quality education in both science and the arts.

Professional development (PD) plays a pivotal role in improving teaching quality, particularly

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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through subject-specific pedagogical training tailored to the distinct needs of different disciplines such as science and arts. In Pakistan, the education system continues to face challenges in ensuring equitable, effective, and contextually relevant training for government school teachers across subjects (UNESCO, 2015; Aslam, 2013). Research has consistently emphasized that a "one-size-fits-all" approach to PD is inadequate for improving learning outcomes across diverse disciplines (Rehmani, 2006).

Science teachers require training in inquiry-based instruction, experimental techniques, use of laboratory equipment, and integration of scientific thinking in classroom teaching. According to Iqbal and Mahmood (2010), many science teachers in Pakistan lack hands-on exposure to lab work and practical scientific methods, resulting in rote-based instruction rather than inquiry-driven learning. Furthermore, Demir and Qureshi (2019) conducted a phenomenological study in Punjab, revealing that science teachers perceive existing PD programs as overly theoretical and disconnected from real classroom environments.

Other research supports the need for contextualized, resource-oriented science pedagogy in public schools. As noted by Nasir et al. (2022), the integration of science content with relevant, low-cost experiments and locally available materials can improve conceptual clarity among students—yet teachers rarely receive training in such methodologies. This indicates a gap in pedagogical alignment between curriculum goals and professional development offerings.

Arts teachers, on the other hand, require training that supports creativity, visual and performing arts pedagogy, integration of local cultural forms, and fostering critical and aesthetic literacy. However, arts education is often marginalized in teacher training programs in Pakistan. Rehmani (2006) observed that while arts education has immense potential to promote creativity and cultural understanding, it is frequently treated as supplementary, with limited formal pedagogical support offered during in-service training.

A study by Bhatti and Zaman (2018) explored the experiences of arts teachers in Sindh and found that the lack of professional development in creative instructional strategies led many teachers to rely on outdated, passive teaching methods. The study recommended regular training in visual storytelling, music integration, and critical thinking to make arts instruction more engaging and meaningful.

There is a clear disparity in how science and arts teachers are professionally supported. While science receives more attention in educational reforms due to its link with STEM and national development agendas, arts education is often underfunded and overlooked in training curricula (Shah, 2015). This imbalance contributes to unequal teaching quality and limits students' holistic development. A review by UNESCO (2015) also noted that despite various national teacher education initiatives (such as the National Professional Standards for Teachers in Pakistan), most programs do not sufficiently differentiate between the pedagogical training needs of science and arts teachers. This leads to a uniform structure of PD workshops that fail to build the specialized skills required by teachers in their respective subject domains.

Research Questions

1. Is there a significance difference between science and arts teachers about professional development?
   - 1.1 Is there a significance difference between science and arts teachers about curriculum content mastery?
   - 1.2 Is there a significance difference between science and arts teachers about pedagogical training?
   - 1.3 Is there a significance difference between science and arts teachers about classroom management and inclusive education?
   - 1.4 Is there a significance difference between science and arts teachers about communication and soft skills?

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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1.5 Is there a significance difference between science and arts teachers about usage of digital tools and technology?

METHODOLOGY

The study adopted a quantitative based on demographic research design. This design is suitable for systematically comparing the professional development experiences and competencies of science and arts teachers across various dimensions. The goal was to quantify perceptions, training levels, and implementation gaps to identify significant differences between the two groups.The population includes all science and arts subject teachers teaching at the secondary level (Grades 9–10) in public/government schools across selected from Gujranwala. These provinces were chosen due to their large public-school networks and established teacher development structures (Government of Pakistan, 2020). A sample of 337 (Science= 159, Arts= 178) teachers were selected using simple random sampling technique by applying survey method. The main research instrument was as a structured questionnaire developed by the researcher based on existing literature and national teacher standards (e.g., National Professional Standards for Teachers in Pakistan, 2009). The questionnaire included: Demographic section**:** Gender, subject taught, years of experience, qualification level. Five Likert-scale sections (1=Strongly Disagree to 5=Strongly Agree), each aligned with one research factor: curriculum content mastery, pedagogical training, classroom management and inclusive education, communication and soft skills and usage of digital tools and technology. The instrument was validated by a panel of five education experts**,** including curriculum developers and teacher trainers from Lahore Punjab. Pilot testing was conducted with 30 teachers (excluded from the main study). The instrument's Cronbach's alpha was checked, indicating high reliability. Data was collected over a period of four months (May–Sep 2025). Formal permissions were obtained from the District Education Authorities (DEAs) and school principals. The researcher personally visited schools to administer questionnaires. Ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly followed. The collected data was entered in sheets for analysis by using Statistical Package for Social Science (SPSS). For this purpose both descriptive analysis (Mean, Standard Deviation, Factor Loading) and inferential statistics (independent sample t-test) were administered.

Analysis of Data

Table 1: *Descriptive Analysis about the Factors of Professional Development*

Factors	*M*	*SD*
Curriculum Content Mastery	3.40	.94
Pedagogical Training	3.12	.94
Classroom Management and Inclusive Education	3.54	.92
Communication and Soft Skills	3.24	.96
Usage of Digital Tools and Technology	3.74	.93

To identify the existing level of the teachers about professional development, descriptive analysis was administered. The findings indicated that the mean score of the factors was from 3.08 to 3.70. This means that the participants agreed about all the factors of professional development.

Table: 4.2**:** *Comparison Opinion between Science and Arts Teachers about Professional Development (Science= 159, Arts= 178)*

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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Factors	*Category*	*M*	*SD*	*t*	*df*	*Sig.*
Curriculum Content Mastery	Science	3.68	.75	2.29	265	.07
	Arts	3.12	.78			
Pedagogical Training	Science	3.67	.52	2.12	260	.03*
	Arts	3.22	.62			
Classroom Management and Inclusive Education	Science	3.69	.79	2.16	245	.11
	Arts	3.18	.95			
Communication and Soft Skills	Science	3.55	.86	2.36	273	.08
	Arts	3.15	.98			
Usage of Digital Tools and Technology	Science	3.80	.80	2.21	271	.02*
	Arts	3.01	.95			

Independent Sample t-test was applied to examine the comparison between science and arts teachers, the statistical values show that there was not a significant difference found about curriculum content mastery because p value was greater than .05 while mean score of science teachers (M= 3.68, SD= .75) was greater (M= 3.12, SD= .78) than arts respondents.

Independent Sample t-test was applied to examine the comparison between science and arts teachers, the statistical values show that there was a significant difference found about pedagogical training because p value was less than .05 while mean score of science teachers (M= 3.67, SD= .52) was greater (M= 3.22, SD= .62) than arts respondents.

Independent Sample t-test was applied to examine the comparison between science and arts teachers, the statistical values show that there was not a significant difference found about classroom management and inclusive education because p value was greater than .05 while mean score of science teachers (M= 3.69, SD= .79) was greater (M= 3.18, SD= .95) than arts respondents.

Independent Sample t-test was applied to examine the comparison between science and arts teachers, the statistical values show that there was not a significant difference found about communication and soft skills because p value was greater than .05 while mean score of science teachers (M= 3.55, SD= .86) was greater (M= 3.15, SD= .98) than arts respondents.

Independent Sample t-test was applied to examine the comparison between science and arts teachers, the statistical values show that there was a significant difference found about usage of digital tools and technology because p value was less than .05 while mean score of science teachers (M= 3.80, SD= .80) was greater (M= 3.01, SD= .95) than arts respondents.

Conclusions

It was concluded that the respondents were agreed about the statements of all the factors of professional development such as; subject specific pedagogical skills, curriculum and content mastery, use of digital tools and technology, classroom management and inclusive education and communication and soft skills development. Moreover, there was found a significant difference between science and arts teachers about the factors subject specific pedagogical skills and use of digital tools and technology while there was not found a significant difference but means difference was indicated in curriculum and content mastery, classroom management and inclusive education and communication and soft skills development.

Discussion and Recommendations

This study contributes to the evidence-based understanding of subject-specific pedagogical training in Pakistan. Science teachers require hands-on, inquiry-driven approaches such as lab work and technology integration to foster scientific thinking while arts teachers benefit from culturally embedded, creative methodologies to cultivate critical and cultural literacy. Comparing these two strands can reveal whether current teacher training programs are sufficiently differentiated and aligned with pedagogical goals for each subject. In light of

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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Pakistan's recent Single National Curriculum (SNC) and evolving education policies, the study explores teachers' preparedness in curriculum and content mastery a core component of quality instruction. Understanding how science and arts teachers engage with curriculum reforms and interdisciplinary learning will inform future curriculum implementation strategies and teacher training frameworks.

The professional development of teachers is a cornerstone of educational reform and student achievement, particularly in government schools that serve the majority of Pakistan's student population. In the current era of curriculum transformation, digital integration, and inclusive education, it is essential to assess whether science and arts teachers receive equitable, relevant, and effective training tailored to the needs of their specific disciplines. This study holds significance for a variety of stakeholders in the Pakistani education system, including policymakers, teacher educators, school administrators, and the teaching community.

Moreover, the study addresses the integration of digital tools and technology, an area rapidly gaining prominence, especially after the COVID-19 pandemic exposed digital divides and deficiencies in teacher readiness by comparing the access, training, and application of educational technology among science and arts teachers, the study highlights potential inequities and provides a roadmap for tech-based professional development initiatives.

The research delves into the crucial area of classroom management and inclusive education, an ongoing challenge in Pakistan's overcrowded and under-resourced government schools. By evaluating how science and arts teachers are trained to manage diversity and inclusion, the study offers insights into the practical applicability of inclusive education policies in both content areas.

The study assesses teachers' communication and soft skills, including language proficiency, interpersonal effectiveness, and collaboration skills essential for creating student-centered, participatory classrooms. Identifying gaps or strengths in these areas will guide the design of more holistic professional development models. Additionally, the comparative nature of the research adds a unique dimension by identifying similarities and disparities between science and arts teachers in their professional growth pathways. Such comparisons will help educational planners in Pakistan to move away from one-size-fits-all training programs and adopt subject-sensitive, need-based professional development strategies. Consequently, the study will contribute to the academic literature on teacher professional development in Pakistan and offer practical recommendations for tailoring teacher training programs based on subject-specific needs. It also supports the broader goals of improving teacher effectiveness, student learning outcomes, and overall school performance in alignment with Pakistan's Vision 2025 and SDG 4 goals for inclusive and equitable quality education.

On the behalf of the findings of this research there are some recommendations; he further study should be conducted with other dimensions to determine the professional development of teaching faculty. Moreover, the seminar and workshops should be conducted to enhance the professional development of teachers. Additionally, professional development should play its role to develop the pedagogical skills with innovative techniques and strategies for the completion of learning objectives.

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ISSN P: 3006-1458
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