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The Effectiveness of Professional Development Programmes in Improving Teaching Practices and Student Learning Outcomes at Samtse Higher Secondary School

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Abstract

This study explored the effectiveness of Professional Development (PD) programmes in improving teaching practices and students' learning outcomes at Samtse Higher Secondary School. PD is often utilised as an agency to educate teachers and bring about changes in their classroom practices. Employing a mixed-methods approach, this study collected quantitative data using students' performance records and qualitative data through classroom observation and interviews. A total of 17 classroom observations and five focus group interviews were conducted.

The findings revealed improvement in teachers' classroom practices after attending the PD programme. Teachers demonstrated increased use of technology to support classroom instruction, enhanced classroom management practices, and use of diverse assessment strategies. Qualitative findings also revealed that teachers perceive PD as a beneficial and relevant programme in helping them enhance instructional efficacy and address diverse learning needs. However, analysis of students' learning outcomes indicated no measurable improvement, largely due to the differences in the abilities of students, their prior knowledge and motivation. Despite limited short-term effects on students' learning outcomes, the study highlights that PD programmes significantly improves classroom engagement, teacher competence and students' participation. The study suggests that context-based and ICT-related PD programmes are essential to bring in pedagogical change and positive classroom practices.

Keywords: Professional Development, teacher practice, student learning outcomes, classroom engagement

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Introduction

Education is considered as a cornerstone of societal development. Türkkahraman (2012) claims that education is a process and essential tool that helps societies achieve their national goals. Given the important role of education for society in the long run, the quality of teaching in the classroom must not be underestimated. According to Balta and Eryılmaz (2019), teachers are one of the important elements of education as they are the actors in the class who manage the learning process in the classroom. The academic performance and the quality of learning outcome depend on the quality of teaching and learning experiences created in the classroom by the teachers. Jacob et al. (2020) state that a teacher who is better prepared to teach the subject to a specific audience can create student gains over a less prepared or a less experienced teacher. One of the important ways to upscale in-service teachers' competencies is through PD programmes for teachers.

PDs for the teachers have been recognised as an important tool for equipping them with the skills, knowledge, and strategies needed to enhance effective learning experiences. Thus, the education policy mandates 60 to 80 hours of PD annually for teachers (Tshomo, 2020). The end goal of any PD programme in the school is to prepare teachers to be effective in their classes and accordingly increase students' achievement (Balta & Eryılmaz, 2019, as cited in King, 2016; Lingard et al., 2003). In the rapidly evolving educational landscape, where learning needs of students are diverse and educational tools in abundance, PD for teachers can act as a catalyst for enhancing students' academic performance and overall learning outcomes.

At Samtse Higher Secondary School, where 'striving for academic excellence' and holistic student development are the watermarks of each member of the school community, the implementation of PD programmes for teachers is seen as a significant approach and intervention to transform teaching practices and enhance student achievement. Desimone (2023) asserts that high-quality PDs for teachers must be linked with their curriculum and lessons, followed by consistent reviews that can change what teachers do and create in the classroom. As the teachers are the agents of change in the classroom, the quality of teachers is central for the student development and academic success in particular.

However, the success of teacher PD and the academic achievement of students remain areas requiring thorough investigation. Numerous articles in this field suggest a positive relationship between teacher PD and student achievement, yet there is a lack of consensus in the literature on what teacher PD components are necessary to contribute positively to student outcomes (Didion et al., 2019, as cited in Blank & Alas, 2009; Kennedy, 1998; Yoon et al., 2007). Further, despite its importance, there is limited research on how PD components align with teachers' needs and translate into improved teaching practices and student outcomes in the context of the Bhutanese education system. This research explored the effectiveness of PD programmes in improving teaching practices and student learning outcomes at Samtse Higher Secondary School. By

evaluating the effectiveness of PD programmes on improving teaching practices and student learning outcomes, this study aimed to provide valuable insights into how PD can be streamlined to foster a more impactful educational environment. The findings of this research will also contribute to enhancing the quality of education and ensure that both teachers and students are empowered to actualise their potential.

Research Question

How effective are PD programmes in enhancing teaching practices and student learning outcomes at Samtse Higher Secondary School?

Sub-questions

1. How do PD programmes influence teachers' instructional methods?
2. What are the changes in student engagement and performance after implementing PD programmes?
3. How do teachers perceive the effectiveness of professional development programmes in enhancing their teaching skills?

Literature Review

Teacher PD programmes have gained significant attention in the field of education research given their impact on classroom teaching practices and improved student learning outcomes. This literature review explored existing research on teacher PD programmes focusing on impact on teachers' classroom practices and students' learning outcomes. It also explored key challenges associated with implementing effective teacher PD programmes in schools.

Importance of Teacher PD Programme

Teachers play an important role in shaping students' learning outcome. PD programmes have been at the centre of efforts designed to improve teaching practice and the learning outcome of students. As student achievement is closely tied to teacher competencies, successful implementation of effective PD for teachers is a catalyst for improving student achievement (Balta & Eryılmaz, 2019). Teachers who receive PD on instructional activities and implement them can benefit students. Darling-Hammond et al. (2017) point out that students who received enhanced instructional activities from teachers who have attended PD demonstrated significantly higher science and reading achievement than students who were engaged in usual instruction. Literature suggests the need for ongoing PD for teachers to yield benefits in instruction and improve quality of instructional practice in the classroom. For example, Tournaki et al. (2011) point out the pressing need for PD activities to be sustained and ongoing, not only throughout the school year, but also across one's career to ultimately benefit students. Teachers who attended PD on a regular basis demonstrated improved pedagogical skills and content competencies. PD programmes for teachers

are described as critical in promoting teaching quality, fostering a culture of continuous improvement, supporting faculty career development, meeting the needs of diverse student populations, and supporting institutional goals (Fernandes et al., 2023). Mustafa and Paçariz (2021) stress the importance of PD in equipping teachers with new knowledge and skills that lead to positive changes in classroom practices and beliefs. They further noted that PD enhances teachers' content knowledge, supports scaffolded learning, and fosters opportunities for professional collaboration.

Impact of PD Programmes on Teaching Practices

Many researchers like (e.g., Amaro-Jimenez et al., 2020; Hourani & Stringer, 2014; Opfer & Pedder, 2010; Wilkinson et al., 2023) have agreed on the various benefits of effective PD that contribute to improved classroom practices. Designing PD based on content and pedagogical needs, using active learning strategies that include collaboration, modelling effective strategies, embedding coaching, giving constructive feedback, and occurring over an extended period to provide time for processing and reflection can foster enhanced teaching practices (Bates & Morgan, 2018; Cordingley, 2015; Darling-Hammond et al., 2017; Walter & Briggs, 2012). Oftentimes, PD is used as an agency to educate teachers and affect change in their practices in the classroom (Hasim et al., 2022). Effective PD programmes have been shown to positively influence teaching practices on multiple fronts, including teacher self-efficacy. For example, the PD programme had a positive effect on teacher expectations about their ability to handle student management issues in the classroom (Ross & Bruce, 2007). Effectively designed PD can transcend from a teacher-centred to a learner-centred approach of teaching in the classroom. In line, Czajka and McConnell (2019) reported that teachers started teaching in a more student-centred way after attending PD programmes. Loveall (2024) also asserted that PD sessions helped shape teachers' practice by providing them with time to reflect on classroom feedback, review current practices, and refine their teaching approaches. Similarly, Pokhrel (2021) emphasised that reflective teaching is essential for improving classroom practices, as it enables teachers to recognise the strengths and weaknesses of their own practices. In the same vein, Germuth (2018) found that PD programmes and coaching supported teachers in identifying new ways to strengthen their role as facilitator, engaging more students and encouraging them to take greater responsibility for their own learning.

Influence of PD Programmes on Student Learning Outcomes

The goal of PD programmes for teachers is to improve student learning outcomes. For instance, Wallace found that PD has significant effects on student achievement when the effects of PD are mediated by teacher practice (2009). Further, Mutch-Jones et al. (2022) report that the longer duration of PD had a positive effect on students' assessment. Students whose teachers attended a recent PD of significant duration performed better on the three assessments compared to other groups of students. Similar findings were also revealed by Zhaohui and Anning (2020) where teachers attending PD programmes within the past three years have improved research abilities

and instructional methods. These skills have also helped improve students' learning outcomes significantly, according to the teachers. This highlights that in order to achieve students' outcomes, teachers' quality and development should not be compromised. Yoon et al. (2007) indicate that teacher PD affects students' learning outcomes in numerous ways. It revealed that PD improved teachers' knowledge and skills, where teachers acquire effective knowledge and skills required to guide and facilitate in the classroom, eventually leading to enhanced classroom practices and better students' learning outcomes. Further, Ajani (2018) posits that in-service PD is considered as an important measure to quality education as it equips teachers with skills, values and attitudes that are relevant, current and effective in promoting academic excellence. Similarly, Mohamed et al. (2024) contend that well-structured PD programmes enhance student performance by equipping teachers with advanced teaching strategies, innovative instructional techniques, and a deeper understanding of subject matter.

Methodology

This study adopted a mixed methods research design, combining both quantitative and qualitative approaches. The mixed methods approach has enabled the researcher to comprehensively evaluate the effectiveness of PD programmes. According to Pole (2007), the use of a combination data set assists to build on the strengths and eliminate the limitations of either methodology used alone. In this study, the quantitative data collected provided insights on the effectiveness of PD programmes on teaching practices and student outcomes, while the qualitative data provided findings into teachers' experiences and perceptions.

Research Participants

The study employed a purposive sampling method (total sampling technique) to collect quantitative data from 428 students (198 boys and 230 girls). Purposive sampling focused on particular characteristics of a population (academic achievement) which enabled the researcher to answer research questions (Etikan, 2016). In this study, student achievement data (test scores and academic achievement) was analysed to measure the impact of PD programmes on learning outcomes. Data were collected for the period before and after teachers' participation in PD programmes to identify trends. A convenience sampling approach was used to select the qualitative teacher participants. Focus group discussions was conducted with 6 different domain groups, consisting of six domain teachers in each group, to gain insights into the alignment of PD programmes with their professional needs, the impact of PD on their teaching practices, and their perceptions on its effectiveness.

Data Collection Tools

Data were collected employing tools such as:

Academic Results

Three sets of academic performance data were collected from students in Grades 9 to 12. These data included results from two internal unit tests and mid-term examinations. These data were used to examine and analyse trends in academic achievement of the students.

Classroom Observations Checklist

A classroom observation was used to collect the data, guided by an observation checklist to evaluate aspects such as instructional strategies, student engagement, and use of technology to assess changes in teaching practices resulting from PD participation. Domain teachers' classrooms were observed weekly to assess progress, document instructional changes, and provide additional feedback and identify areas for improvement. The classroom observation collected both quantitative and qualitative data. The qualitative data were collected by counting the number of teacher-student interactions, recording student participation rates, or timing how long a teacher spends on each activity. Further qualitative data were collected by observing teacher-student interactions, recording teaching strategies employed in the classroom and writing detailed notes on level of student engagement.

Focus Group Discussions

Six semi-structured focus group discussions (FDG) were conducted to collect feedback from the domain teachers including the strengths and weaknesses of the programmes, challenges faced, and suggestions for improvement. Each FGD consisted of approximately five to six participants, including both male and female members. Each discussion session lasted between 45 minutes and one hour. The FGDs were conducted once with all six groups at the end of the intervention. To conduct the semi-structured interview, the researcher used interview guides throughout the process. As pointed out by Bryman (2012), an interview guide, with a list of guiding questions was formulated with the intention to give the FGD participants a wider scope within which to respond. Interview guides allowed the researcher to conduct the interview flexibly and with ease.

Data Analysis

Descriptive analysis was administered using Microsoft Excel, where mean marks of students were derived to analyse the students' academic performance. The FGD data were analysed thematically. Thematic analysis is a method for identifying, analysing, and reporting patterns within data. In qualitative analysis, themes emerge from the data rather than being pre-specified: 'themes are concepts indicated by the data' (Merriam, 2009). The data collected were organised, coded, and

themes were generated. The classroom observation data were interpreted based on the themes drawn from the interview data.

For the purposes of identification and to ensure participant anonymity, data obtained from the interviews were coded using the labels Focus Group Discussion 1 (FGD1) through Focus Group Discussion 5 (FGD5). The acronym FGD refers to *Focus Group Discussion* and is used throughout the results section to distinguish responses from the five different discussion groups without revealing the identities of individual participants.

Furthermore, the study was guided by Research Policy and Procedure of the Ministry of Education and Skills Development (MoESD), Bhutan throughout the process. Participants for the research were briefed in detail about the purpose of the research and their role in it. Duly signed consent forms were sought from the participants upon their agreement to participate in the research, with the assurance of their identity being protected.

Intervention Strategies

The interventions were identified based on the established concept of linking leadership and learning (Bush, 2022). This approach aligns with the 2019 Competency Framework for Principals of Bhutan, which was designed to promote excellence in the teaching profession and school leadership. These interventions were carried out for the period of 4 months simultaneously.

Conducting PD Programmes

Professional development programmes on active learning, differentiated instruction, and student-centred teaching approaches were provided to the teachers on a monthly basis. Previous study by AbdulRab (2023) pointed out that continuing PD of teachers helps them to become better teachers by acquiring new skills and improving their competencies. Thus, ongoing PD for teachers is required to keep them in touch with the rapid educational changes and demands.

Professional Learning Community

Peer coaching, professional learning, and collaborative lesson planning were implemented in different domains. A one-hour period was designated for all the domains each week to collaborate and work on PD. The head of the domain led the professional learning community, where domain teachers discussed teaching strategies, analysed student data, and shared best practices. Domain teachers were encouraged to collaborate and create engaging lesson plans and problem-solving activities. Further domain teachers were encouraged to try the new strategies in their classrooms and track student progress.

Classroom Observation, Feedback and Mentorship

Domain teachers were observed regularly to evaluate the impact of PD on teaching practices focusing on specific aspects such as instructional strategies, student engagement, classroom management, and use of technology. A standardised observation checklist was used to ensure consistency. A reflective discussion with the domain teacher was initiated after the observation to identify strengths and areas for improvement. After each observation, constructive, specific, and actionable feedback were provided. Each feedback session was concluded with practical steps the teacher could take to improve their practice, such as effectively implementing active learning, differentiated instruction, and student-centred teaching approaches.

Findings and Discussion

The findings of the study are organised and presented under identified central themes and sub-themes, with detailed descriptions derived from the data analysis performed using Excel. The results are presented in the form of text, tables, graphs and figures., and are further discussed in relation to the existing literature. The key themes emerging from the analysis include: (a) Effectiveness of PD on classroom teaching practices, (b) The relationship between teacher PD programmes and student learning outcomes, and (c) Teachers' perceptions of the impacts of PD programmes.

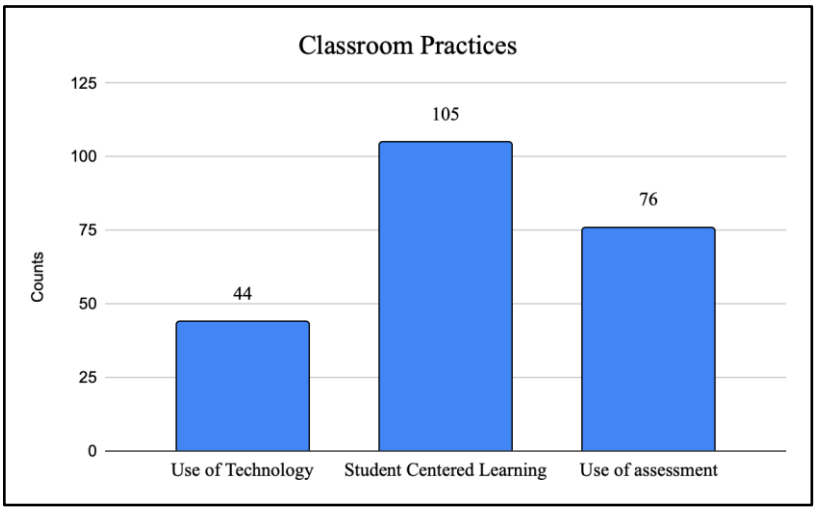
Effectiveness of PD on Classroom Teaching Practices

A total of 17 classroom observations were conducted during the course of four months. Based on the PD intervention, the classroom teaching was observed for how teachers integrate technology in the learning process, initiating student-centred learning processes, and use assessment in the classroom. As per the observation data, teachers were found to be integrating all forms of ICT in a single classroom, such as PowerPoint, online platforms, and collaborative tools. Teachers acknowledged that they integrate these tools to make the classroom more student-centred. In doing so, they also include pair work, group collaboration, and encourage students to ask questions. Such processes, according to the teachers, were considered essential for initiating the student-centred learning process. Likewise, formative assessments, such as questioning, peer feedback, and teacher guidance during tasks, were counted as active use of assessment in the classroom.

The results indicated that teachers are making the best use of knowledge and experiences gained through PD into the classroom. As indicated in Figure 1, translating the knowledge learnt during the PD, teachers were able to initiate learning experiences that are learner-centred by engaging various ICT tools. Further, it was observed that teachers were able to employ various forms of assessment tools during the learning process.

Figure 1

Classroom Observation Indicators and Scores Across 17 Sessions



A total of 44 instances of use of ICT were recorded, indicating a consistent application of technology across classrooms. Tools, such as PowerPoint, online platforms, and collaborative digital tools, were used to support teaching and enhance student engagement. The results suggested that teachers' potential to engage students has improved after the implementation of PD interventions. These findings align with Powers et al. (2015), who posited that teachers who participate in PD have a positive impact on their students' school engagement than teachers who do not receive the training. Further, Leslie (2019) reported an improvement in student engagement, satisfaction, learning, and achievement after the faculty were trained on student engagement framework. It can be noted that the PD intervention effectively enhanced teachers' use of technology to promote student engagement.

Similarly, a total of 105 learner-centred instructional activities were recorded across 17 classroom observations, indicating that teachers were able to apply professional skills acquired through PD programmes. Student-centred practices frequently observed included collaborative learning through pair and group tasks, questioning techniques, student presentations, and opportunities for learners to exercise autonomy in selecting tasks, materials, and methods aligned with lesson objectives. These findings suggest that teachers are increasingly adopting interactive and participatory pedagogical approaches that position students at the centre of the learning process.

The classroom observation findings were further supported by evidence from Focus Group Discussions (FGDs 1 and 5), where teachers reported using participatory strategies such project-based learning, and digital tools (e.g., Quizlet, Canva, and Grammarly). Participants noted that these approaches made classrooms more interactive, collaborative, and engaging, while also promoting greater student ownership of learning. Teachers attributed their ability to implement such practices to exposure to new pedagogical ideas, instructional strategies, and ICT tools introduced during PD programmes, which they were able to integrate into their classroom contexts.

The alignment between observational data and teacher perceptions indicates that professional learning experiences were successfully translated into classroom practice. This finding is consistent with Pehmer et al. (2015), who reported that teacher PD can lead to meaningful instructional changes that enhance student engagement through improved classroom discourse and scaffolding strategies. Similarly, Harrington et al. (2015) emphasized that teachers' active engagement with students, instructional processes, and professional self-awareness are critical drivers for creating engaging learning environments.

However, one participant reported that the PD did not result in substantial changes because they were already practicing student-centred teaching approaches prior to the training, although the programme helped expand their awareness of additional strategies. This variation highlights the importance of recognising teachers' prior experiences and baseline competencies when designing PD interventions.

Further, the observation data also indicated that teachers are using diverse assessment tools to assess students' learning progress. For instance, 76 different assessment incidences were observed across 17 different classroom observations. The findings indicate that teachers are becoming more responsive in applying the assessment knowledge and strategies acquired through the PD intervention. However, the classroom observation data also highlighted that for the successful implementation of assessment practices in the classroom, the assessment tools must be well-oriented to the teachers. Kennedy (2016) emphasised that for PD to successfully change how teachers use assessment, it must move beyond prescribing assessment techniques or simply presenting knowledge about assessment. The results of the classroom observation on teaching practices suggested that the PD intervention has successfully helped teachers learn to observe, interpret, and respond to evidence of students' thinking in real time.

Overall, the findings suggest that effective PD programmes contribute to shifts in teacher practice by strengthening pedagogical knowledge, enhancing confidence in implementing learner-centred strategies, and promoting reflective professional engagement. These results highlight the importance of sustained, practice-oriented PD that focuses not only on skill acquisition but also on transforming teacher beliefs and instructional mindsets to support meaningful student engagement.

Relationship between Teacher PD Programmes and Student Learning Outcomes

To analyse the relationship between PD programmes and student learning outcomes, student pass percentages from the Mid-Term Examination were compared across two academic years: 2024 (pre-PD) and 2025 (post-PD). Additionally, pass percentages from two internal unit tests conducted after the PD intervention in 2025 were collected to provide further context.

Table 1

Comparative Student Pass Percentages (Pre- and Post-PD Intervention)

Assessment	Academic Year / Period	Pass Percentage
Mid-Term Examination	2024 (Pre-PD Baseline)	78.8%
Mid-Term Examination	2025 (Post-PD)	75.4%
Unit Test 1	2025 (Post-PD)	74.00%
Unit Test 2	2025 (Post-PD)	43.40%

As presented in Table 1, the pass percentage for the Mid-Term Examination decreased slightly from 78.8% in 2024 to 75.4% in 2025, following the PD intervention. Further the results from the unit tests conducted in two different terms in 2025 showed considerable variation.

The findings indicated that teachers' PD had no immediate observable impact on overall student learning outcomes, particularly in terms of academic performance. This result was supported by participants across all six FGDs, who reported that they had not yet noticed significant improvements in students' academic results. Participants suggested that this may be due to the time required for pedagogical changes to translate into measurable outcomes, as well as the absence of systematic mechanisms to formally assess student progress following the PD interventions.

However, participants in FGD 2 reported observing positive behavioural and engagement-related changes among students, including increased motivation, classroom interaction, confidence, and participation. These findings suggest that while measurable academic gains may not yet be evident, early indicators of improved learning processes and student engagement are emerging, which could contribute to longer-term learning outcomes.

Similar findings were reported in earlier studies by Lu et al. (2019) where PD initiative had no significant effect on student learning outcome. In fact, after controlling for factors such as student and teacher characteristics, the results showed a slight negative impact, suggesting that the programme did not effectively enhance learning outcomes. However, other research on the similar context suggests that PD is positively linked to students' academic achievement, with teacher-centred collaborative activities proving more effective in enhancing learning outcomes (Akiba & Liang, 2016; Alwaely et al., 2023; Lai & McNaughton, 2016).

The analysis of student achievement across the 2024 and 2025 academic years showed no improvement in overall student learning outcomes following the PD intervention, with a slight decline observed in pass percentages. This finding contrasts with the anticipated impact of the PD

programme, indicating that the intervention did not produce measurable gains in academic performance within the study period.

However, this outcome should be interpreted with caution due to limitations in the study design and assessment comparability. The student cohorts compared across the two years were not identical, and the examination papers differed in content coverage and difficulty levels, which may have influenced student performance. Similarly, variations in the unit test items administered in 2025 likely contributed to fluctuations in pass percentages. As a result, the observed decline in achievement cannot be conclusively attributed to the PD intervention alone.

These findings suggest that while the PD intervention enhanced classroom practices and teacher engagement, its impact on measurable student achievement may require a longer implementation period, more consistent assessment instruments, or a more robust quasi-experimental design to be accurately captured.

Despite the limited quantitative impact, qualitative findings from focus group discussions (FGDs) suggest that the PD programme had positive effects on learning outcomes such as student engagement, motivation, and confidence. Teachers reported that students appeared more participative, interactive, and enthusiastic about learning. For instance, FGD 2 reported that:

> "Students seem to enjoy the lessons and have shown improvement in their understanding, as the approaches provide richer learning experiences and allow them to learn at their own pace. It is too early to attribute changes in academic performance solely to this approach, as various other factors may also play a role. However, we have noticed improvements in student participation."

These findings support Borg (2018), who emphasised that student outcomes should not be viewed solely in terms of academic achievement but also in relation to engagement and well-being. In this sense, the PD intervention has contributed to creating more dynamic and student-centred classrooms, even if these changes were not yet reflected in test scores. Powers et al. (2015) also found that teachers who participated in the PD programme were able to increase student engagement, suggesting that the programme positively influenced students' academic involvement, persistence, and social-emotional well-being.

While the PD intervention did not significantly enhance students' learning outcome in the form of test scores in the short term, it contributed to fostering important non-measurable outcomes that are essential for effective teaching and learning, highlighting the value of PD in improving classroom dynamics and student experiences.

Teachers' Perceptions on the Impacts of PD programmes

To explore teachers' perceptions of the impact of PD programmes on their teaching practices, six Focus Group Discussions were organised in domain groups. The FGDs were designed with heterogeneous groups to capture a diverse range of perspectives, ensuring variation in teaching experience, gender, and ICT competency. Since the interviews were conducted in domain groups, all the members in the group shared similar subject competency.

The results showed that teachers across different domains perceived PD as beneficial, relevant, and transformative in enhancing their professional competencies and classroom practices. The majority of the participants pointed out that PD intervention helped them to improve their teaching strategies. The participants stated that it helped them to integrate ICT in the learning process. For instance, FGD 1 reported that "The sessions exposed us to new ideas, strategies, and ICT tools that could be integrated into classroom practices". Likewise, FGD5 stated that "PD introduced updated content and methodologies, allowing us to unlearn outdated practices and adopt more effective, student-centred strategies". Earlier study by Mirzajani et al. (2016) identified that key factors enabling teachers to use ICT in the classroom included strong administrative support, clear directives, teachers' own ICT skills and adequate resources. PD on ICT is perceived as an enabling factor that encourages teachers to integrate and use it in their daily teaching process. Digital literacy and ability to integrate ICT pedagogically are no longer seen as supplementary skills in the 21st century. Bhattacharjee and Deb (2016) highlighted that the absence of adequate teacher competency in ICT compromises the integrity of the teaching and learning process.

The result from the FGDs also revealed that teachers perceive PD interventions as transformative in terms of their classroom practices. The participants reported that PD enhanced their instructional efficacy. With enhanced skills, participants were able to design more engaging lessons which resulted in more interactive and engaging classrooms, where students demonstrated higher levels of participation, confidence, and motivation. FGD 3 reported that:

> "We have observed increased student engagement and participation. By applying Universal Design for Learning (UDL) principles, such as offering multiple ways for students to access and demonstrate knowledge, students have shown more interest and confidence in learning."

Dubey (2024) emphasises that teachers need to be equipped with the skills, competencies, and attitudes to meet the needs of diverse students in inclusive classrooms. Similarly, Messiou and Ainscow (2015) argue that with increasing diversity in schools, teachers require more effective forms of PD to overcome emerging challenges and foster classroom environments where all students can access meaningful learning opportunities. The findings of this study indicate that teachers have diversified their instructional strategies to accommodate different learning styles and abilities. This suggests that PD programmes have supported teachers in adopting inclusive teaching

practices that benefit all learners, not just high achievers. These findings also resonate with Seden and Tamang (2025), whose study on building teachers' capacity through the capability approach to advance gender equality and social inclusion in Bhutanese schools found that teachers have become more responsive to learners' varied abilities and more intentional in creating inclusive learning spaces after the intervention.

Conclusion

Professional development interventions influence teachers' classroom practices which ultimately lead to improved student engagement and participation. The findings of this study provide overall understanding of how PD can impact classroom learning environments.

The results from the classroom observation revealed that teachers effectively translated knowledge and skill learnt from PD to improve their classroom practices. Integration of ICT in the lessons, implementation of student-centred learning and use of diverse assessment tools were observed across all classrooms, suggesting that PD positively enhanced teachers' instructional practices and classroom management strategies.

While students' learning outcome did not show significant improvement after the PD interventions, qualitative evidence highlights positive changes in students' engagement, motivation, and participation in the classroom. It can be noted that the impact of PD may not be captured and assessed through short-term academic outcomes of the students. As suggested by the qualitative evidence, there are broader implications which are manifested through diverse observable classroom behaviours of the learners.

The results also indicated that teachers perceive PD interventions as beneficial and relevant. The results reported that it helped them to improve their pedagogical practices, professional competencies, and classroom management strategies.

Overall, while PD may not have produced measurable results in student learning outcome, it has contributed to enhancing teaching quality and fostered meaningful and active classroom learning. The findings highlight that contextually relevant PD initiatives are essential for improving classroom practices and engaging diverse learners with its effectiveness depending on the competency of teachers to translate it in the classroom and scaffolding support available in the school environment.

Recommendations

The study revealed that PD programmes with continuous support, follow-up, and refreshers workshops can help teachers consolidate learning and consistently apply new strategies in the classroom. Thus, it is recommended that PD programmes should be ongoing rather than one-off

sessions. Schools can collaborate with schools within the cluster or continue to initiate ongoing PD programmes as school-based programmes.

PD programmes on classroom management strategies and ICT integration were observed as effective and impactful in the classroom practices. Thus, it is recommended that PD sessions should prioritise hands-on, subject-specific, and classroom-relevant activities. Teachers benefit more when strategies, ICT tools, and assessment methods are demonstrated in ways directly applicable to their teaching context. Teachers should be supported in pedagogically integrating technology to enhance student engagement and learning outcomes.

The study also revealed that teachers need practical skills and knowledge to translate what is learnt through PD into the classroom. Thus, it is recommended to establish a system where PD facilitators or experts can provide mentorship, collaboration and reflective practice sessions to allow teachers to share experiences, challenges, and best practices post-PD.

The study revealed no significant impact of PD on students' learning outcomes. Thus, the future studies can focus on conducting Longitudinal studies that track the same cohort of students over multiple years to better isolate the impact of changed teaching practices on learning outcome.

Limitations

During the course of the study, following challenges were faced and limitations were realised:

- The study was conducted in a single school, which may limit the generalisability of the findings. As the research was confined to one institutional context, the results may not be representative of other schools with different settings, student populations, or organisational practices.
- Students' learning outcomes were compared between 2024 and 2025 academic year given the limited time for this project. The differences in the abilities of students, their prior knowledge and motivation may have influenced the observed performance making it difficult to attribute the changes to PD interventions.
- The study measured only the short-term impacts of PD through observations, test scores and interviews. However, the long-term effects of PD on students' learning outcome, engagement, and changes in teaching practices were not captured.
- The study could not include data from the final examination. If such data were available, it could have provided more concrete and comprehensive findings on the long-term impact of PD on students' learning outcome.
- External variables such as school resources, classroom environment, and students' socio-economic background were not controlled. These factors could differ across different schools and may limit the generalisability of the overall findings.

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