Polytechnic Teachers' Professional Development in Bangladesh: Barriers, Opportunities and Measures

Engr. Md. Ruhul Amin

Engr. Md. Humayon Kabir

Engr. Sudipta Roy Sujan

Barishal Polytechnic Institute, Barishal

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Abstract

Polytechnic institutes are playing vital role in building the economic growth by providing skilled workforce since the inception of Bangladesh. This research investigated various barriers that are affecting the Professional Development (PD) of polytechnic teachers in Bangladesh.   This also explores the existing resources that could be helpful to acquire PD options. Along with these, it also proposed some measures to enhance PD programs more effective. This research used mixed method approach for data analysis using Descriptive Statistics in SPSS and Excel. For data collection, tools like Questionnaire Survey (QS), Focus Group Discussion (FGD) and Key Informant Interview (KII) was used. The main findings of this research are infrequent PD programs, inappropriate courses, unavailability of ICT tools etc. the opportunities that could be leverages are digital environment and digital skill of teachers, running PD institutes, existing PD programs etc. This research has also proposed some strategy like complete roadmap of PD programs, adequate financial support for availing different equipment and timely execution of PD programs, collaboration opportunity with peers, institutes and industries etc. These findings would be successful if policy implications such as clearer guidelines of PD, transparency in selection of teacher for PD programs and award for performance, ICT integration, financial support and industry collaboration etc.

Keywords: Polytechnic Teachers, Professional Developments (PD), PD Barriers, PD opportunities, PD measures

1. Introduction

Bangladesh is craving for technical education where the technical education sector; especially Polytechnic Institutes need quality teachers. However, Bangladesh has adopted technical education as the priority among the priorities like many other developing countries. The journey is not so smooth due to a lot of problems. One of the greatest problems is the educators who will lead the human capital toward modern skill sets. Professional development is necessary to fill in the gaps in the skill sets of new teachers, and to continue to develop the expertise of teachers (Evers et al., 2016). Professional Development is critical for improving and maintaining teachers' quality(Phillips, 2008). There are a lot of problems defining a country's technical sector like funding, proper policy for teachers' training, teachers' willingness, and sufficient institutes for training.

1.1Statement of the Problem

Recently, Technical Education has been a buzzword in the research periphery of the education sector in Bangladesh. On the contrary, technical teachers' professional development is a less discussed topic. Though in the developed world this is a common research topic. Bangladesh has little or almost no sample of research on this topic. That's why the challenges regarding polytechnic teachers' professional development are unknown. It is also not clear which are the existing opportunities that could be taken as leverage to face those barriers. This study will address the key barriers as well as other barriers and explore the existing opportunities for the professional development of polytechnic teachers in Bangladesh. It will also propose some measures to strengthen the professional development of polytechnic teachers in Bangladesh in the near future.

1.2 Importance and Rationale of the Study

Considering the demand of the job market Technical Education requires continuous positive change and adapting to the trend of cutting-edge technologies. This requires the teacher's knowledge and skill level on that standard. As this study will reveal the barriers to the professional development of polytechnic teachers in Bangladesh, it will help enhance the standard knowledge, market-responsive skills, and proactive attitude of polytechnic teachers to ensure the quality of technical education in Bangladesh. As a result, polytechnic graduates will be able to meet the required demands of stakeholders as well as industry demands and satisfy the job provider's purposes. Moreover, this study will explore existing opportunities for promoting skills, delivery quality, attitude, dealing with students, solving problems, teaching-learning process, and softly handling capacity of Polytechnic teachers' professional development in Bangladesh, which will help policymakers as well as educators to strengthen institutional capacity by enhancing collaboration among stakeholders. Above all, the proposed measures of this study will help smoothen the continuous growth of the professional development activity of polytechnic teachers in Bangladesh. It will then result in enhancing national development.

1.3 Scope of the Study

The current state of professional development for polytechnic teachers in Bangladesh is a significant concern, with a focus on theoretical content and a lack of emphasis on practical skills (Haolader & Paul, 2013). While it is a matter of professional development of polytechnic teachers, there is huge opportunity to research on it. There are some researches on professional development of university teachers in Bangladesh, but almost no research on polytechnic teachers' professional development. Thus, no specific barriers are identified yet, which delays professional development of polytechnic teachers in Bangladesh. In the context of Bangladesh, finding the specific barriers by questioning and interviewing, the prime participants of this research may help understand the

problem fully and make a comprehensive solution. Besides, a qualitative study with the other stakeholders such as administrators of TMED, DTE and BTEB will make it more credible.

1.4 Objectives of the Study

a. Finding the barriers to polytechnic teachers' professional development in Bangladesh.

b. Finding existing opportunities to enhance polytechnic teachers' professional development in Bangladesh.

c. Finding measures to further strengthen continuous professional development for polytechnic teachers in Bangladesh.

1.5 Methodology

1.6 Research Design

This research employed a mixed-method approach to comprehensively explore the professional development (PD) landscape for polytechnic teachers in Bangladesh. This approach combined quantitative and qualitative data collection methods to gain a deeper understanding of the research questions:

- What are the barriers to the professional development of polytechnic teachers in Bangladesh?
- What are the prevailing opportunities for professional development of polytechnic teachers in Bangladesh?
- Which measures should be taken to strengthen the professional development of polytechnic teachers in Bangladesh further?

1.7Data Collection Tools

For quantitative data collection, we used a Questionnaire survey to explore various PD barriers, to measure the frequency of PD activities for polytechnic teachers in Bangladesh, to identify prevailing opportunities to take leverage for PD and to seek some proposal for smooth running of PD activities for polytechnic teachers in Bangladesh.

For qualitative data collection, we developed a semi-structured FGD guidelines for trainers of different training centers of Bangladesh. FGDs will be conducted with smaller groups of trainers of different training centers as well as with teachers of two prime universities of Bangladesh namely DUET and IUT, to dig deeper into their experiences with PD. Semi-structured interview guides was facilitated discussions on specific topics related to barriers, opportunities, and proposal for smooth PD programs for teachers.

We also developed a semi-structured KII for conducting in-depth interviews with heavyweight personnels of TMED, DTE, BTEB, TTTC and VTTI.

1.8 Population Sampling

We have used simple random sampling technique to select teachers from 12 government polytechnics of Bangladesh from eight divisions. In total, we selected 192 members of teachers i.e., 16 teachers participate from different polytechnic institutes and different department. Among the 12 government polytechnics above, 8 are for co-education and the remaining 4 are for female students only. As it covers the 8 divisions of Bangladesh, this research represents the picture of whole Bangladesh. It provides a representative sample of the overall population.

We have applied cluster sampling method for teachers/trainers of different training institutes such as TTTC, VTTI, NACTAR, etc. for ensuring heterogeneity and representation. We also used this technique for teachers of DUET and IUT. It is to be mentioned that 8 members of teachers were

selected from each institution i.e., in total 40 members of teachers were selected along with principals of both TTTC and VTTI were selected randomly for their vast experience in this sector. Finally, we have categorized policymakers into layers based on their institutions (e.g., TMED, DTE, BTEB). These strata represent different policymaking bodies. Then, we randomly selected policymakers from each stratum. This ensures the representation from all relevant institutions involved in shaping PD policies. We interviewed in total 24 administrators i.e., 8 from each institution.

1.9 Data Analysis

Data analysis was conducted using a mixed-methods approach. Quantitative data from the teacher questionnaire survey (QS) was analyzed using descriptive statistics (means, standard deviations, skewness) to understand teachers' perceptions about course relevancy, instructor efficiency, and the impact of various factors on their professional development. The frequency of teachers' perceptions was also measured using the Descriptive Statistics method. Qualitative data from Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) provided deeper insights into teacher attitudes, experiences, and suggestions for improvement. Together, these analyses revealed a complex relationship among teachers' motivation, quality of PD programs, institutional support and access to resources that shape the professional development arena for polytechnic teachers in Bangladesh.

Results and Discussion

2. Barriers of Professional Development

Barriers to the professional development of polytechnic teachers in Bangladesh are many. These barriers consist of challenges faced by the teachers, poor quality of courses, stakeholder's lack of knowledge on Professional Development and Training (PDT), etc. In modern days, a lack of ICT tools is also a prominent barrier. These barriers are also dependent on numerous factors. These are as follows:

2.1 Barriers Faced by Teachers

Teachers in polytechnic institutes face some barriers like lack of time for taking professional development courses or training, lack of in-service training and their attitude towards in-service training is not always positive as they have family commitments and matter of physical and psychological well-being. Even some of them are not ready to be a good teacher. Moreover, a great number of teachers are not willing to keep themselves up to date with the changing trends of modern technology. According to a study, Inadequacy of in-service training, individual problems like negative attitudes towards in-service training courses, and inconvenient course time are emphasized by the participants of professional development(Eroglu & Kaya, 2021). Another study suggests that factors responsible for negatively affecting professional development activities are low financial status, unfavorable family environment, physical and psychological well-being, lack of time, lack of accountability for professional development activities, etc. (Vashetina et al., 2022). From our study, we found that our questionnaire survey with teachers of polytechnic institutes suggests that teachers have very positive or neutral attitudes toward taking in-service training. The teachers also expressed a strong desire to both acquire pedagogical expertise and pursue higher degrees such as MScTE, PGDTE (for technical teachers), and M.Ed., M.Phil., and Ph.D. (for non-technical teachers).

Figure 1

Teachers attitude

Polytechnic teachers' attitude towards in-service training-
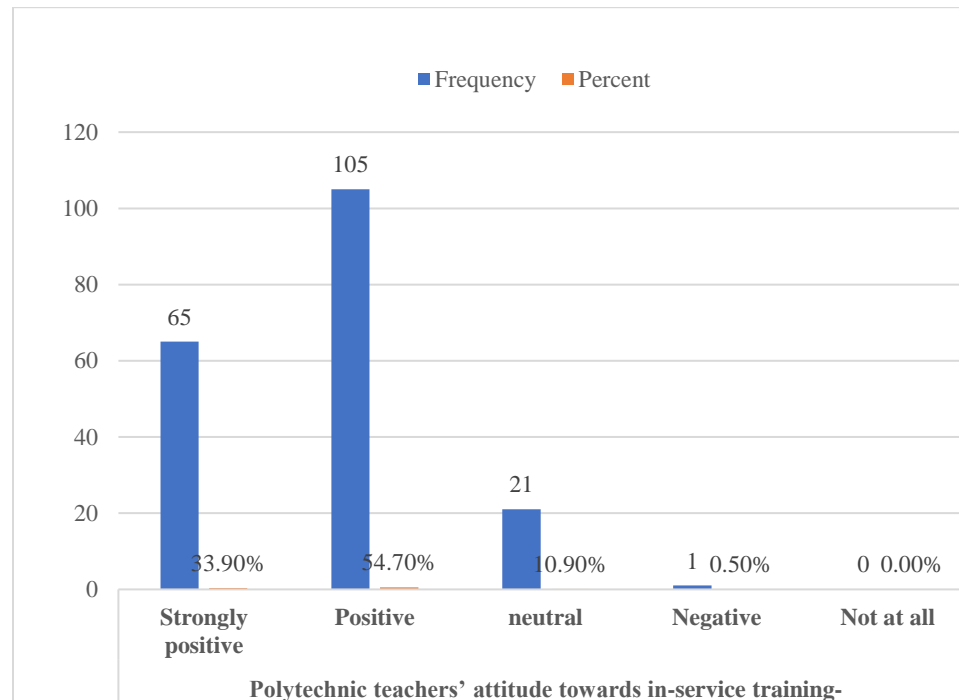
Our QS suggests that the teachers' desire to adapt to the changing trend of technology is mostly somewhere between strong and moderate. The descriptive analysis suggests that the average of the responses is 1.93 suggesting they have a general desire to adapt. However, the SD is 0.910 i.e., around 1 suggests that the data points are somewhat spread out around the mean. There is likely a mix of very ready teachers and some who are less so. Moreover, a skewness value of 0.893 suggests that it possesses a positive skew meaning more people are ready than those who are less ready.

Figure 2

Teachers' readiness to co-opt with the technological revolution
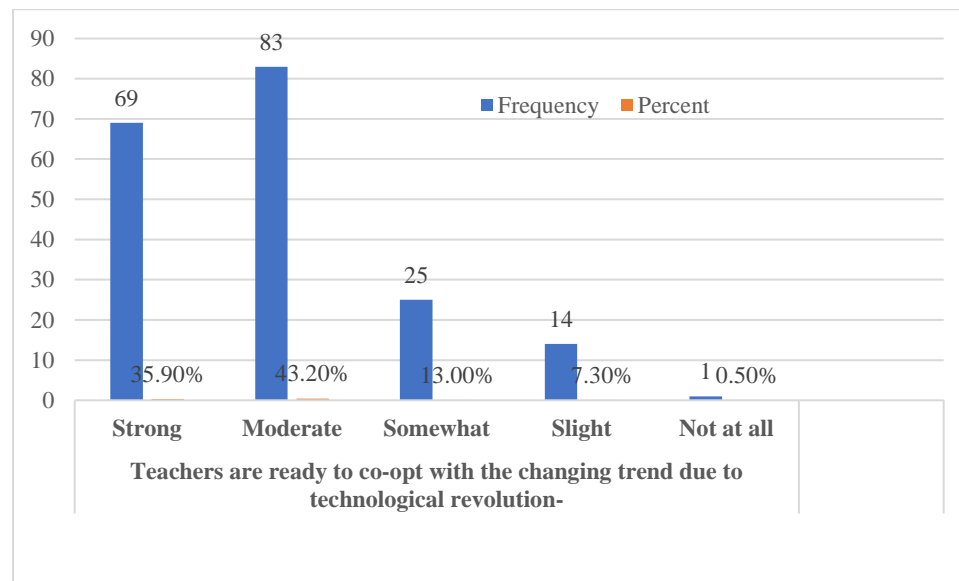
Contrary to this, they suggest that challenges due to inconvenient times, effects of family commitments as well as effects of physical and psychological well-being are either high or average.

Figure 3

Effect of Family Commitment on PD

Effect of family commitment on teachers' Professional development.
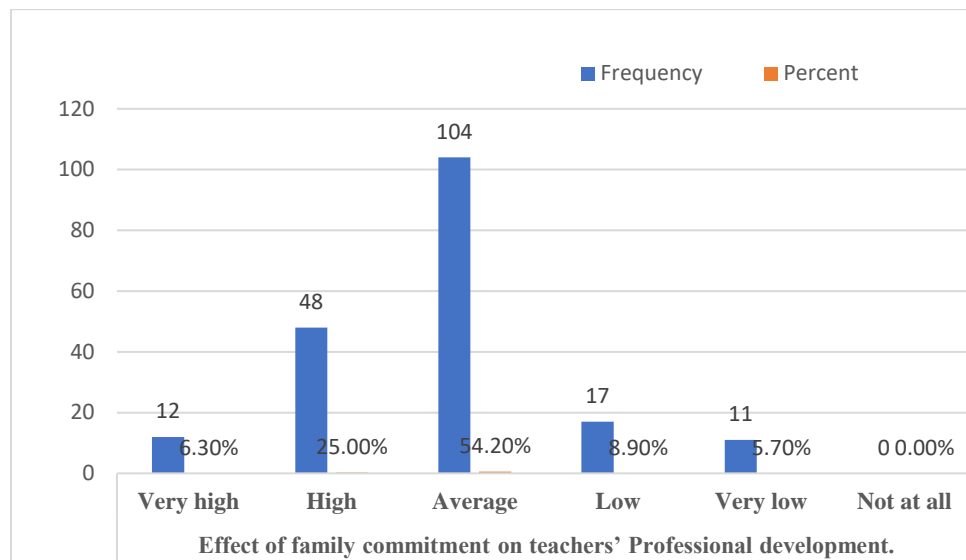
Figure 4

Effect of Physical and Psychological Well-being on PD

Effect of physical and psychological well-being
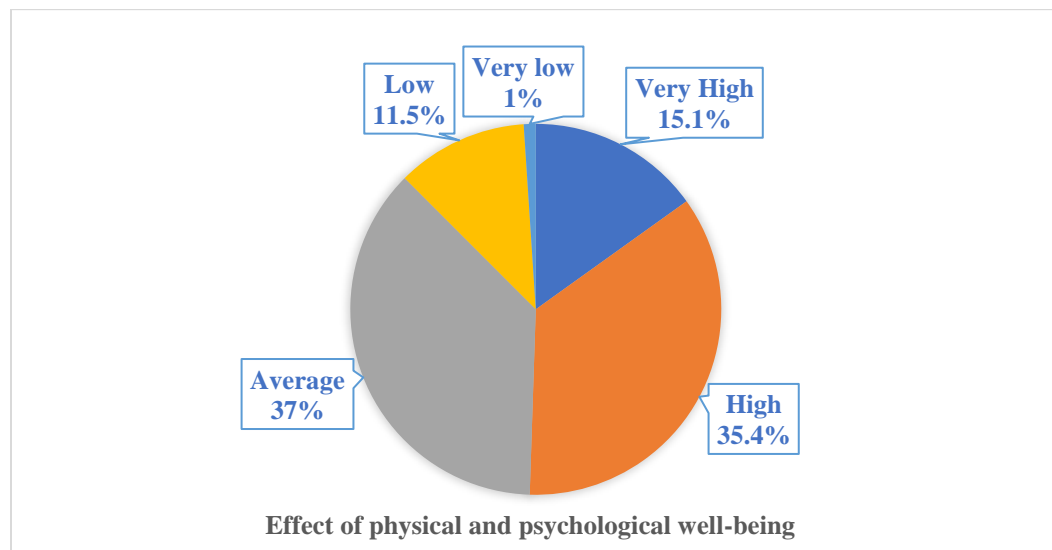
Figure 5

Effect of lack of time on PD

Please rate the challenges posed by lack of time for professional development of polytechnic teachers.
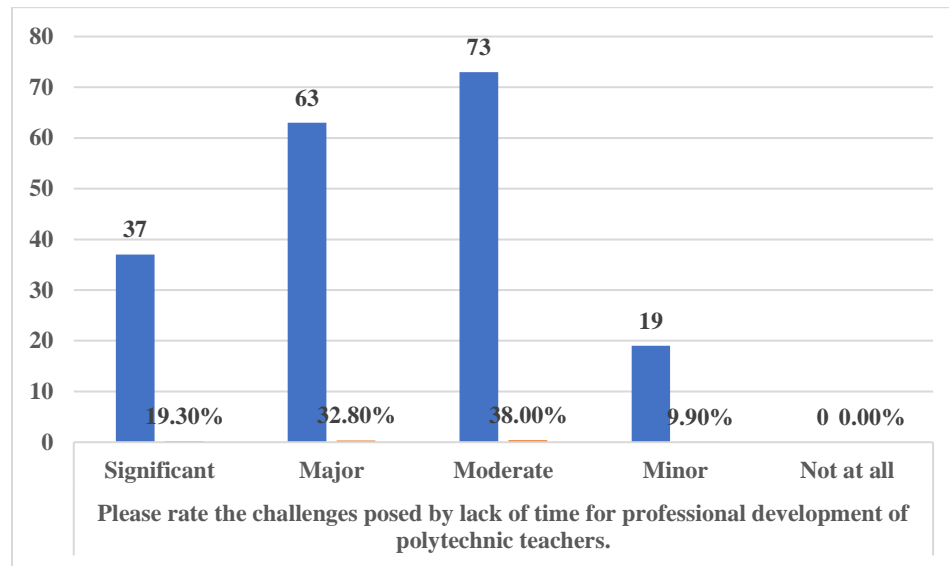
KII with administrators says that teachers are not prone to be quality teachers. They lack self-motivation for their professional development. One of the key personnel from DTE who was a polytechnic teacher previously told;

> "*During our days, we usually go to local shops to observe*
>
> *practical works so that we can help our students effectively.*
>
> *But nowadays it is rare."*

Moreover, our FGD finding is, teachers are reluctant to learn new ICT tools. So, we can come to this decision that though polytechnic teachers in Bangladesh are eager to take professional development activities due to their family commitment, lack of time, due to heavy workload, physical and psychological state of mind as well as their readiness to adapt with the technological change in education sector play an important role to hinder their PD activities.

2.2Barriers due to Quality of PD courses

Professional development activities are hampered largely by the course quality and poor or ill-prepared instruction of the instructors. Professional development might be hampered by monotonous course material since it frequently encourages attention to be paid to subject coverage rather than deep engagement(Petersen et al., 2020). The ability of teachers' trainers may be impeded by inadequate preparation (Su & Wang, 2022). During our study, we conducted QS with teachers, they rated course relevancy as moderate or less related though some people are likely to say highly related. Descriptive statistical analysis also suggests that the course relevancy and efficiency of the course trainers are somewhere between moderately and slightly related. Positive skewness in both ratings suggests a tendency for teachers to find the program less relevant and instructors less efficient. In conclusion, these findings signify poor course content and less prepared instructors are key obstacles to successful professional development programs for polytechnic teachers.

Figure 6

*Efficiency of the trainers*
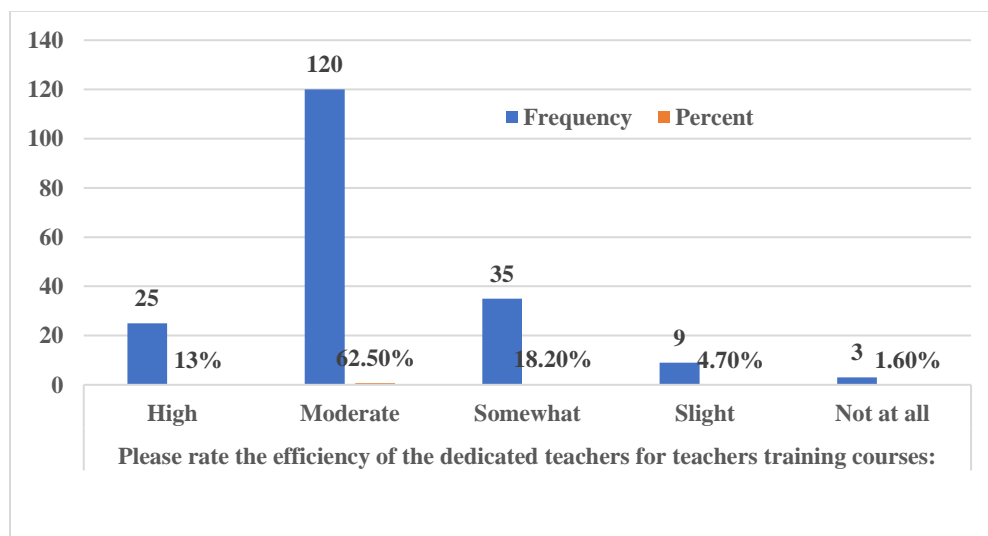
Table 1

Quality of PD Courses

	N	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error
Opinion about relevancy of the course content of professional training of Polytechnic teachers.	192	2.29	.830	.518	.175
Efficiency of the dedicated teachers for teachers training courses.	192	2.19	.779	1.060	.175

2.3 Stockholders' Lack of knowledge of PD

The challenges of professional development consist; lack of knowledge of the professional development stakeholders, lack of clearly defined policies and guidelines, and domination of traditional trends in the case of professional development(Komba & Mwakabenga, 2019). Again, the challenges of professional development are multifaceted, encompassing a lack of clearly defined policies and guidelines, a dominance of traditional trends, and a lack of knowledge among stakeholders(Leonardo Lago et al., 2023; Knapp, 2003). Our research aligns with the notion that two interrelated challenges hinder professional development for polytechnic teachers in Bangladesh. Firstly, the absence of clear policies and guidelines creates confusion and inconsistency in PD opportunities. Secondly, the continued dominance of traditional methods limits the effectiveness of professional development programs. Because our QS with polytechnic teachers suggests that a great number of teachers think that the stakeholders' knowledge of TPD is

moderate. In addition to that, the opinion of QS participants on the question of clearly defined policy and guidelines is as follows:

Figure 7

Existence of explicit policy on PD of polytechnic teachers
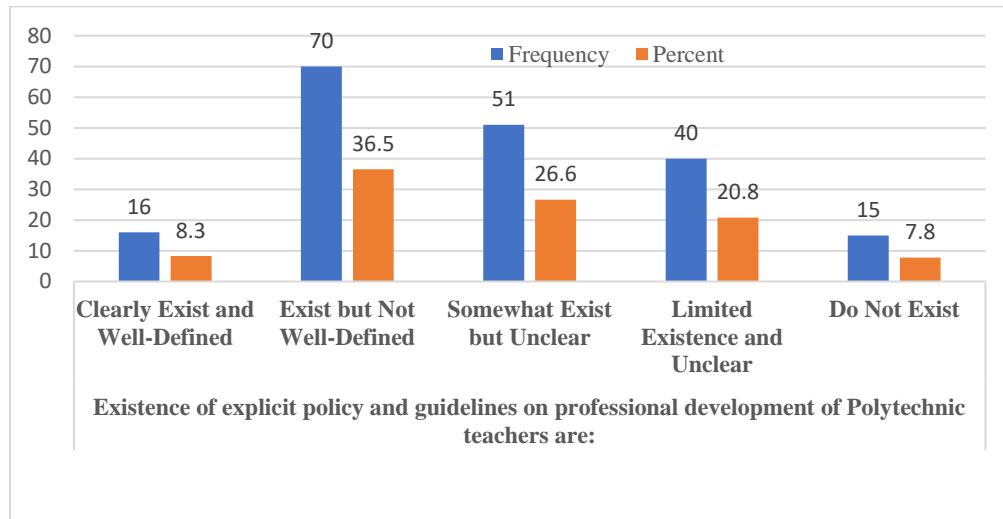
Furthermore, one of the FGD participants opined that

> "There is no training plan for the teachers, no item-wise training i.e.,
>
> no training technology-wise or recruitment batch-wise. Teachers' training
>
> should occur biennially or triennially. He also suggests post-training
>
> monitoring and measurement of student outcome."

This indicates that there are no explicit policies and guidelines for PD of polytechnic teachers in Bangladesh. Our survey result suggests that a large portion of people think that the traditional approach is dominant in the case of the professional development of polytechnic teachers in Bangladesh.

2.4 Inaccessibility of ICT tools

If ICT tools as well as the Internet are not available to polytechnic teachers, they will not be able to keep pace with the latest trends in their field. Again, if the tools are available, but they are not able to use these tools efficiently then collaboration opportunities will be less effective. From a study, we found that various obstacles such as lack of knowledge, skill, and training as well as lack of available ICT tools and skilled manpower are creating challenges to the efficient use of ICTs in Bangladeshi polytechnic institutes(Shamim et al., 2013). Inadequate ICT skills hold back the teachers' development due to fear of failure and a lack of knowledge on integrating technology, resulting in low confidence while using these tools(Kamaljit Kaur, 2023). Our questionnaire survey suggests that the effect of insufficient knowledge, skill, training, and unavailability of ICT tools is significantly high. From descriptive analysis, the mean suggests the effects are between high and average. However, the negative skewness suggests the result is somewhat nearer to very high and high on the Likert scale. Thus, it supports the findings from the above literature thereby confirming trainers' shortage of knowledge and skill, unavailability of ICT tools and lack of knowledge of handling them efficiently are acute deficiencies.

Figure 8

Effect of insufficient knowledge, insufficient skill training and unavailability of ICT tools

Effect of insufficient knowledge, insufficient skill training and unavailability of ICT tools on teachers professional development.
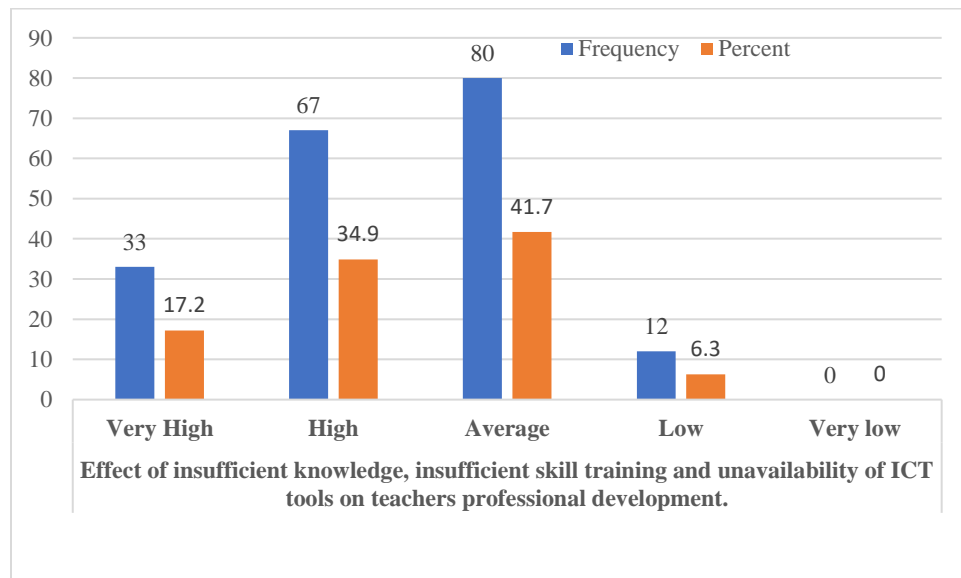
3.Opportunities of Professional Development

Polytechnic institutes play vital role in building skilled workforce that's why professional development of the polytechnic teachers is crucial. But the opportunities of professional development of polytechnic teachers in Bangladesh are scarce. Despite this limitation, leveraging digital environments and collaborating with existing professional development institutions hold significant promise for equipping teachers with the necessary skills and knowledge.

3.1Taking leverage of the digital environment

The digital age has ignited a revolution in professional development, offering a vast array of exciting new opportunities for polytechnic teachers in Bangladesh. A study finds that currently integration of educational space into the digital environment is the new trend(Alishev et al., 2020). Another study finds that Online training programs can become a way to explore new patterns of collaboration and creative teaching(Dinu, 2014). Online professional development may be most useful in certain situations(Bates et al., 2016). The use of online space and technological adaptability are crucial for the professional development of teachers(Turcsányi-Szabó, 2008). QS results suggest a positive view towards online learning spaces and teachers' perceived adaptability to technology.

Figure 9

Use of Online Space
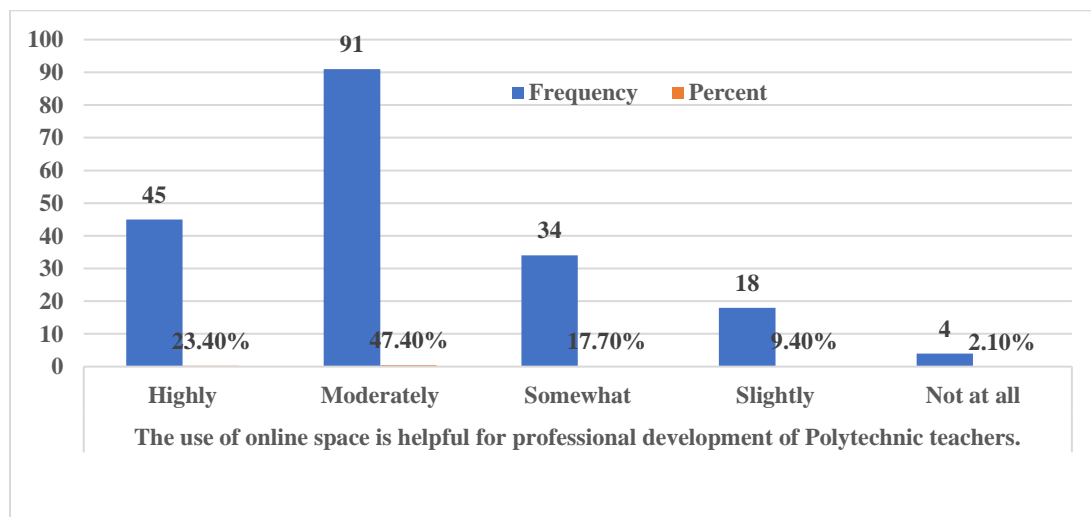
Figure 10

Technological Adaptability of Polytechnic Teachers
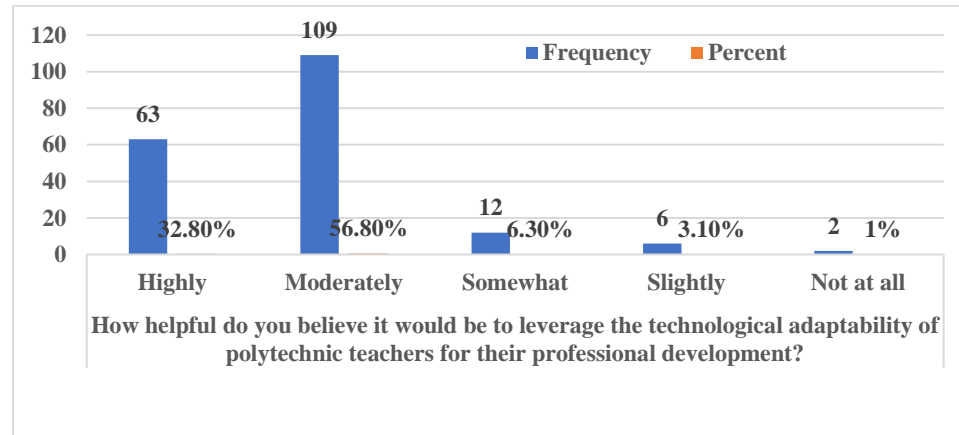
This aligns with FGD findings where teachers expressed interest in utilizing online platforms for PD. KIIs with experts further emphasized the potential of ICT applications within institutions, including smart labs and libraries. These findings collectively point towards a general receptiveness to leveraging technology for PD. KIIs offered a valuable additional insight: the potential of blended learning for collaboration. This approach could facilitate not only peer-to-peer learning among colleagues but also opportunities for higher education pursuits.

3.2Utilizing existing PD institutions

When the online environment has opened the door to numerous opportunities for PD, it's equally important to capitalize on existing resources. A network of established PD institutions, training providers, and facilities already exists, offering a wealth of knowledge and experience. By collaborating with these entities, polytechnic institutes can tap into this expertise and create a broader range of PD options for their faculty. Further strengthening the existing PD institutions as well as utilizing the PD providers across the country will promote professional development activities(Komba & Mwakabenga, 2019). Long-term professional development programs using

strategies like learning in networks, peer coaching, collaborative action research, and case studies can enhance teachers' practical knowledge and enhance successful reform implementation in science education(Driel et al., 2001). One participant in the FGD expressed the opinion that using DUET and IUT for teacher development will be advantageous. A different participant suggested that VTTI and TTTC be spread out to each divisional city. However, findings from a Questionnaire Survey (QS) with teachers suggest that existing trainings, such as foundation training, financial management training, in-service training, and procurement training, are perceived as insufficient or moderately sufficient. Teachers expressed a particular need for an increase in the number of in-service training opportunities.

4. Measures to strengthen PDT

Professional development in the 21st century has become more present-focused than ever. So, lifelong learning is crucial than anything else. To further strengthen the present situation of professional development activities in polytechnic institutes of Bangladesh, teachers should keep them up to date with their respective technological phenomena. On the other side, the authority should provide clear pathways for teacher's career progression so that they can remain motivated. Moreover, the long-term collaboration opportunity with peers as well as PD institutions would be fruitful for effective and continuous professional development.

4.1 Lifelong learning

To address the rapidly evolving professional landscape, TVET institutions must prioritize fostering technology adaptability, lifelong learning, and future-oriented competencies for their teachers(Jafar et al., 2020). The high percentage (62.5%) in table 3 strengthens the argument. From our QS the result is as follows:

Table 2

Lifelong learning

		Frequency	Percent
	Highly	120	62.5
How helpful do you think the trait of lifelong learning is for the professional development of polytechnic teachers?	Moderately	63	32.8
	Somewhat	6	3.1
	Slightly	3	1.6

Besides, a researcher argues that continuous professional development is urgent:

> "Continuous professional development of teachers is the need of the hour because the students have to face the ever-changing world. The knowledge domain, lifelong learning, pedagogy, information and communication technology, and communication are the core areas which should be addressed through professional development programmes of teachers."(Ahuja, 2015)

Our study also tries to establish lifelong learning as a key component of the professional development of polytechnic teachers. (See figure 11)

Figure 11

Continuous Professional Development and training
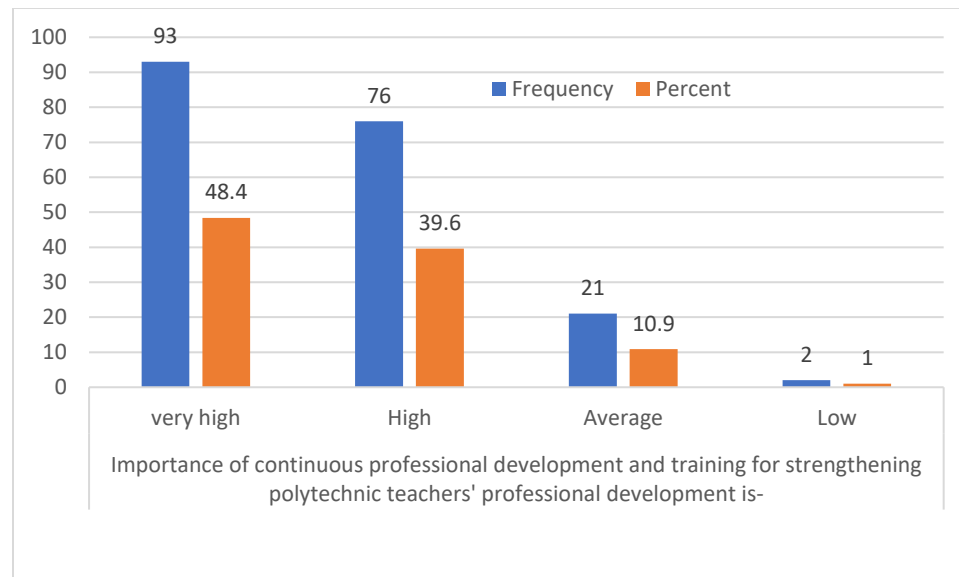
Studies using focus groups and key informant interviews underscore the crucial role of lifelong learning. Interestingly, one interviewee stressed the importance of a "learn-fail-act-relearn" cycle which is an iterative process and thus suggests continuous professional development for polytechnic teachers in Bangladesh. The findings also advocate for clear policies and ongoing professional development opportunities. One participant suggested involving teachers in research.

Additionally, focus group participants called for earlier career training, highlighting the need for continuous growth throughout a teacher's journey.

Figure 12

Establishing a clearly defined set of opportunities

Establishing a clearly defined set of competencies as a framework for the professional development of polytechnic teachers would be effective.
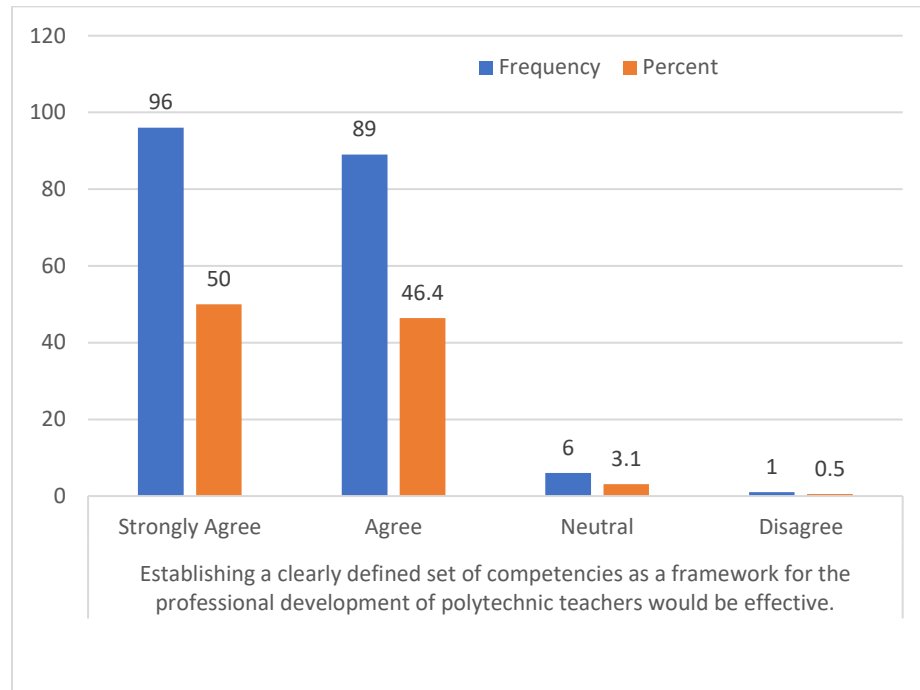
4.2Awareness on updates

To prepare teachers for a globalized world, the new era requires ongoing professional development that focuses on refreshing their knowledge, fostering diverse skillsets, and optimizing resource allocation(Zhou et al., 2019). To equip educators for continuous growth and practical change in a dynamic environment, we must cultivate awareness of evolving trends, modernize professional development methods, strengthen resource integration skills, and instill a culture of lifelong learning that transforms professional development into tangible improvements in teaching practices(Cui & Zhang, 2018). From the questionnaire survey, it emerged that a significant proportion of teachers (56% agreeing and 36% strongly agreeing) endorses the notion that updating professional development and training (PDT) activities would support the skills of polytechnic

teachers in Bangladesh. Furthermore, a striking cumulative percentage of 93% expresses agreement (either agree or strongly agree) with the idea of enhancing resource integration. Thus, our research aligns with the ideas above in the previous study. Moreover, during a focus group discussion (FGD), one participant expressed frustration over the inadequacy of modern equipment aligned with industry standards. Additionally, a key informant interviewee highlighted the necessity of funding from organizations like the World Bank (WB) and the Asian Development Bank (ADB) to modernize laboratory facilities and other infrastructure setups. These demands legalized the above concepts more strongly.

4.3Opportunities for career progression

Teachers' professional development can be supported through various means, including dedicated work time, funding, salary incentives, promotion requirements, and national policy initiatives(McKenzie et al., 2005). Effective teacher professional development programs include career incentives, specific subject focus, lesson enactment, and initial face-to-face training, while most at-scale programs lack these features(Popova et al., 2018). If the teacher can foresee their career progression in teaching, then they will automatically be motivated to take further education. One of the KII participants from BTEB opined that polytechnic teachers will take higher study or training willingly if they can be promoted or their salary increased. Another FGD participant from IUT said that if any teacher performs well in training or higher study or any kind of professional development activity then he/she should get promoted in the DG Office. Besides, Questionnaire survey results also suggest that 73% of the teachers are aligned with the theme that paid working time, salary progression and promotion will be a catalyst to the professional development of polytechnic teachers. Overall, the desire for promotion linked to successful PD aligns with the identified need for career progression. Again, according to a study, The LIA(Lecturers Industrial Attachment) program fosters lecturer competency in their specialization, both pedagogically and

technically(Ahmad & Rashid, 2011). One of the KII interviewees wished to run a teaching factory concept. He further explained that polytechnic institutes should be like medical colleges where teachers will apply their knowledge in the attached industry then acquired practical knowledge will be applied in the classroom. These findings suggest that a national policy for the building of industry attached to polytechnic institutes could help strengthen professional development.

4.4 Long-term Collaboration

Successful professional development rely on factors like collaboration opportunities, dedicated time, sustained commitment, and access to resources(Macià & Garcia, 2016). This emphasizes collaboration opportunities as crucial for successful PD. According to QS results the collaboration opportunities with other colleagues and fellow institutions are not satisfactory. While the survey results suggest that long-term institutional commitment to supporting professional development (PD) is either high or moderate (See Figure 13), findings from FGDs and KIIs reveal a different reality. These interviews indicate that there is almost no consistent commitment to PD activities within any institution, including Technical Teacher Training Colleges (TTTC) and Vocational Teachers Training Institute (VTTI). Hence the dissatisfaction with less availability of collaboration opportunities among colleagues and institutions suggests a missed chance for growth of PD for polytechnic teachers in Bangladesh.

Figure 13

Collaboration opportunities with colleagues and institutions
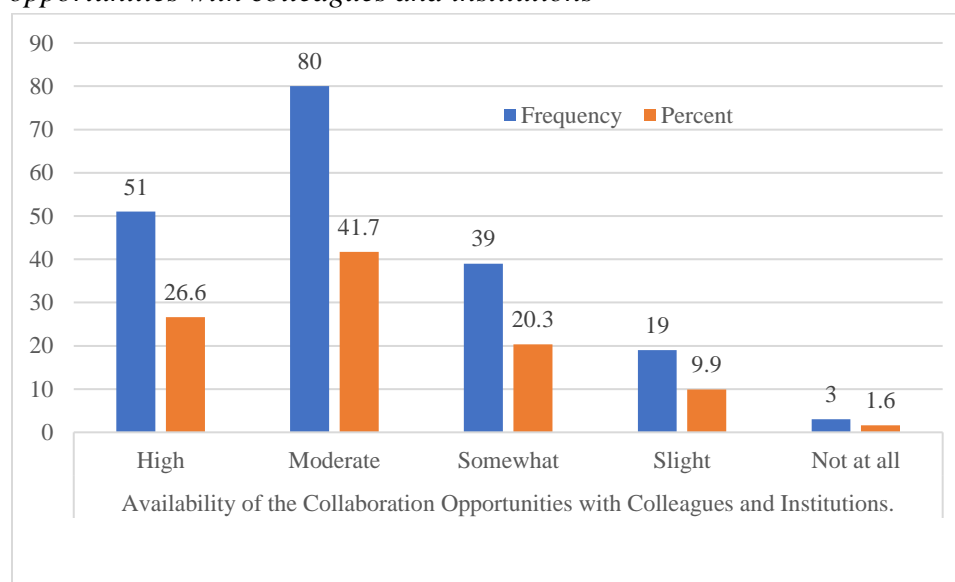
From another study we found that Collaborating with international agencies, NGOs, and professionals from higher education institutions in their respective fields helps teachers learn communities, advance their professional development(Akinyemi & Nkonki, 2020). This suggests that collaboration with external partners like NGOs and international agencies could help boost teachers' development. FGD findings suggest that even in dedicated institutions like TTTC and VTTI, training for polytechnic teachers is sometimes cancelled due to funding shortages or other unspecified reasons. One of the KII participants from TMED reported that financial support is not yet sufficient but money flow is increasing than past. Another participant suggests looking for funding support from international lenders like JICA, ADB, WB, etc. to bridge the gap. Therefore, it is obvious that exploring long-term partnerships with universities, dedicated PD providers, NGOs, and international lenders could facilitate secured funding and smooth PD programs for polytechnic teachers in Bangladesh.

5.Conclusion

This study examined the present situation of professional development (PD) polytechnic teachers in Bangladesh; its barriers and prevailing opportunities that could be taken as leverage or could be enhanced further. It also explored some potential tactics to promote PD activities and ensure the continuity of PD for polytechnic teachers in Bangladesh. The findings of barriers highlight the discontinuity of occurrence of training, mixed attitude towards taking PD among teachers, no pin-point PD courses, no roadmap of PD, lack of ICT tools and shortage of ICT skill among teachers etc. Beside these, financial constraints have been identified as a major barrier to flourish PD for polytechnic teachers. Along with the barriers, we have explored some opportunities that exist such as digital environment, existing training institutes, existing PD providers and training facilities etc. This study has some potential measures to implement in future such as adoption of lifelong learning by the teachers, the complete roadmap of implementing PD, upgradation of course material time to time, adoption of policy for career progression of teachers, enhanced collaboration among peers, institutions, industries even with TVET universities available in the country. And last but not least, adequate financial support for converting the proposals into reality.

This research offers valuable insights that can inform policy changes and practical actions to cultivate a flourishing professional development (PD) environment for polytechnic teachers in Bangladesh. In a nutshell, our recommendations is to create short-term, long-term, and life-long policies and guidelines by the policymakers and other stakeholders for pin-point, market-demand-based PD programs for polytechnic teachers in Bangladesh.

Besides, to publish the annual calendar for PD programs and ensure their timely execution for polytechnic teachers in Bangladesh by the PD institutes, PD institutions should offer workshops on ICT skill training for polytechnic teachers in Bangladesh. Moreover, to establish PD institutes

like TTTC, and VTTI in the divisional cities. Along with these, to elaborate collaboration among teachers, and institutions; among institutions and industries, etc.

On the other hand, teachers should be selected considering their enthusiasm and capability for taking PD programs i.e., appropriate PD programs should be chosen according to years in job and achievements. At the same time, their performance appraisals should be integrated maintaining transparency.

While this research offers valuable policy and practical recommendations, there's room for further exploration. Future studies could dive deeper into the impact of professional development (PD) on student learning outcomes, examining how PD improves student performance. Additionally, research on the effectiveness of ICT tools in PD delivery would be beneficial. Furthermore, investigating which country's model is followed by Bangladesh and how it can be modified to better serve the PD programs of Bangladesh could be found. Finally, future studies could explore how collaboration among teachers, and collaboration among PD institutes as well as TVET universities can enhance both student outcomes and the development of high-performing teaching teams.

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Appendix A

<u>Questionnaire for Teachers</u>

Title: **Professional Development of polytechnic teachers in Bangladesh: Barriers, Opportunities and Measures**

<div>

<u>Letter of Identity and Consent:</u>

Sample Number: Gender of Respondent: 1. Male 2. Female

Types of Respondents: 1. Teacher

Area of Survey: 1. Dhaka   2. Chattogram 3. Khulna   4. Rajshahi

                5. Sylhet   6. Barishal   7. Rangpur   8. Mymensingh

The purpose of this research has been told to respondents or not? A. Yes   B. No

Consent of respondent has been taken or not? A. Yes   B. No

Date of Interview: Signature of respondent: …………………………

</div>

Personal & Work Place related Information:	
Name:	**Age:**
Designation:	**Department:**
Name of Institute:	
Mobile No.:	**Duration of Teaching (Years):**

Ch.1 Challenges of Polytechnic Teachers' Professional Development	
1. Which are the elements of professional development?	a. Workshops and Seminars b. In-Service Training c. Conferences and Conventions d. Online Courses e. Collaborative Learning Communities f. Mentoring and Coaching g. Peer Observation h. Others (specify)……
1.1 Are the previously mentioned programs available?	a. Yes b. No
1.1.1 Prevailing in-service training for Professional Development. of Polytechnic teachers are-	(a)Always available (b)Frequently available (c)Occasionally available (d)Rarely available (e)Not available
1.1.2 Polytechnic teachers' attitude towards in-service training-	(a) Strongly positive(b) Positive(c) neutral. (d) Negative. (e) Strongly negative.
1.1.3 Please rate the challenges posed by lack of time for professional development of polytechnic teachers.	(a) significant (b) Major (c) Moderate (d) Minor (e) Not at all
1.1.4 Effect of family commitment on teachers' Professional development.	(a)Very high (b)High (c) Average (d) Low (e) Very low
1.1.5 Effect of physical and psychological well-being.	(a)Very high (b)High (c) Average (d) Low (e) Very low

1.1.6(a) For being quality teachers (tech), to achieve pedagogical expertise, PGDTE and M.Sc. in TE are required-	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
1.1.6(b) For being quality teachers (non-tech), to achieve pedagogical expertise, M.Ed., M. Phil., Ph.D., Post-Doctoral degree are required-	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
1.1.7 Teachers' readiness and eagerness to be a quality teacher is-	(a)Strong (b)Moderate (c)Somewhat (d)Slight (e)Not at all
1.1.8 Teachers are ready to co-opt with the changing trend due to technological revolution-	(a)Strong (b)Moderate (c)Somewhat (d)Slight (e)Not at all
1.2.1 What is your opinion about relevancy of the course content of professional training of Polytechnic teachers.?	(a) High (b) Moderate (c) Somewhat (d) Slight (e) Not at all
1.2.2 Please rate the efficiency of the dedicated teachers for teachers training courses-	(a) High (b) Moderate (c) Somewhat (d) Slight (e) Not at all
1.3.1 Knowledge of Professional development and training by the stakeholders is-	(a) Very High (b) High (c) Moderate (d) Low (e) Very Low
1.3.2 Existence of explicit policy and guidelines on professional development of Polytechnic teachers are:	(a) Clearly Exist and Well-Defined (b) Exist but Not Well-Defined (c) Somewhat Exist but Unclear (d) Limited Existence and Unclear (e) Do Not Exist
1.3.3 Dominance of traditional approach on professional development and training is.	(a)Very high (b)High (c) Average (d) Low (e) Very low
1.4.2 Effect of insufficient knowledge, insufficient skill training and unavailability of ICT tools on teachers professional development.	(a)Very high (b)High (c) Average (d) Low (e) Very low
1.5 Do you have anything else to say? If yes, then please mention.	

Ch.2 Opportunities of Polytechnic Teachers' Professional Development	
2(a) Is there any opportunity which we can take leverage to promote Polytechnic Teachers' Professional Development	a. Yes b. No
2(b) If yes, which are they?	(a) Online space (b) technological adaptability of polytechnic teachers (c) existing institutions dedicated to the professional development (i.e., Training centers) (d) various professional development program providers (i.e., Training providers/authority) (e)others(specify)………
2.1.1 The use of online space is helpful for professional development of Polytechnic teachers.	(a) Highly (b) Moderately (c) Somewhat (d) Slightly (e) Not at all
2.1.2 How helpful do you believe it would be to leverage the technological adaptability of polytechnic teachers for their professional development?	(a) Highly (b) Moderately (c) Somewhat (d)Slightly (e) Not at all
2.2.1 How helpful do you believe it would be to strengthen the existing institutions dedicated to the professional development of polytechnic teachers in Bangladesh?	(a) Highly (b) Moderately (c) Somewhat (d)Slightly (e) Not at all
2.2.2 How effective do you believe it would be to utilize various professional development program providers for teachers in Bangladesh?	(a) Highly (b)Somewhat (c)Neutral (d) Less (e)Not at all
2.2.3(a) Foundation training for professional development of polytechnic teachers are	(a) Enough(b) Moderate (c) Minimum (d) Not sufficient (e) Not sufficient at all
2.2.3(b) Three step procurement training for professional development of polytechnic teachers are-	(a) Enough(b) Moderate (c) Minimum (d) Not sufficient (e) Not sufficient at all
2.2.3(c) Financial management training for professional development of polytechnic teachers are	(a) Enough(b) Moderate (c) Minimum (d) Not sufficient (e) Not sufficient at all
2.2.3(d) In-house training for professional development of polytechnic teachers are	(a) Enough(b) Moderate (c) Minimum (d) Not sufficient (e) Not sufficient at all
2.2.3(e) Subjective and skills trainings for professional development of polytechnic teachers are	(a) Enough(b) Moderate (c) Minimum (d) Not sufficient (e) Not sufficient at all
2.3 Do you have anything else to say? If yes, then please mention.	

Ch.3 Measures to strengthen Polytechnic Teachers' Professional Development

3(a) Do you think it is possible to strengthen Polytechnic Teachers' Professional Development in Bangladesh?	a. Yes b. No
3(b) If yes, then which measures should be taken according to your view?	(a) Lifelong learning (b) Clearly defined set of competencies (c) Continuous professional development and training (d) Updating the ways of PDT (e) Others(specify)………
3.1.1 How helpful do you think the trait of lifelong learning is for the professional development of polytechnic teachers?	(a) Highly (b) Moderately (c) Somewhat (d)Slightly (e) Not at all
3.1.2 Establishing a clearly defined set of competencies as a framework for the professional development of polytechnic teachers would be effective.	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.1.3 Importance of continuous professional development and training for strengthening polytechnic teachers' professional development is-	(a)Very high (b)High (c) Average (d) Low (e) Very low
3.2.1 Indicate your level of agreement with the effectiveness of updating the ways of PDT in enhancing polytechnic teachers' professional development	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.2.2 Indicate your level of agreement with the effectiveness of enhancing resource integration in enhancing polytechnic teachers' professional development.	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.2.3 Indicate your level of agreement with the effectiveness of renewal of the idea of PD in enhancing polytechnic teachers' professional development.	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.3.1 Please rate the effectiveness of paid working time in strengthening Polytechnic teachers' professional development.	(a)Strong (b)Moderate (c)Somewhat (d)Slight (e)Not at all
3.3.2 Please rate the effectiveness of salary incentives in strengthening Polytechnic teachers' professional development.	(a)Strong (b)Moderate (c)Somewhat (d)Slight (e)Not at all

3.3.3 Please rate the effectiveness of salary progression and promotion in strengthening Polytechnic teachers' professional development	(a)Strong (b)Moderate (c)Somewhat (d)Slight (e)Not at all
3.3.4 Idea of Teachers Industrial Attachment Program will strengthen polytechnic teachers' professional development:	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.3.5 National policies and campaigns that support professional development of Polytechnic teachers are readily available and accessible.	(a) Strongly Agree (b)Agree (c)Neutral (d)Disagree (e)Strongly Disagree
3.4.1 Please rate the availability of collaboration opportunities with colleagues and institutions.	(a)High (b) Moderate (c)Somewhat (d) Slight (e) Not at all
3.4.2 Please rate the availability of long-term commitment from the institution to support professional development.	(a)High (b) Moderate (c)Somewhat (d) Slight (e) Not at all
3.4.3 Please rate the availability of Adequate financial and resource support for professional development activities.	(a)High (b) Moderate (c)Somewhat (d) Slight (e) Not at all
3.5 Do you have anything else to say? If yes, then please mention.	

The end

Appendix B

<u>Focus Group Discussion (FGD) Checklist for Trainers</u>

Title: **Professional Development of polytechnic teachers in Bangladesh: Barriers, Opportunities and Measures**

Date	
Category of participants	
Venue/ Location	
Number of participants	
Start Time	
End Time (Each discussion should not last for more than 1 hours)	
Facilitator	
Note Taker	

Introduction and Consent

*Thank you for coming and we are grateful for your time. Our names are _____. We are coming from the Barishal Polytechnic Institute-Directorate of Technical Education, to conduct research on '**Professional Development of polytechnic teachers in Bangladesh: Barriers, Opportunities and Measures'**. The aim of the study is to understand the context of Professional Development of polytechnic teachers in Bangladesh and regarding barriers, opportunities and measures to strengthen this. During this Focus Group Discussion (FGD) the goal is to understand your thinking on Professional Development situation and identify the barriers, opportunities and measures to strengthen this, as well as collect your valuable opinion, and experience in this regard. The information collected will help designing programs for the most vulnerable groups considering their needs, as well as pointing out the areas of interventions in future. Moreover, it should be clear that participation in the meeting does not mean that assistance will automatically be delivered to you, or you will be targeted for support.*

Information that you share with us will be kept absolutely confidential and no one other than concerned people will have access to this information. The discussion should not carry any risks or discomfort for you, except your time taken to participate. We do hope that you will participate as your opinions and experiences are very important to us. However, you are free to choose whether or not to participate in the discussion. We will take 1 to 1.5 hours for the discussion.

[If appropriate ask participants to introduce themselves and emphasize that during the discussion they should not speak only on their own behalf, but should reflect the situation of the majority of households in their area and as they know it].

Participant's profile:

Name (Optional)	Sex	Age	Occupation	Institute
1.				
2.				
3.				

Name (Optional)	Sex	Age	Occupation	Institute
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Introductory Questions:

1.To start, could you share any recent experiences or initiatives related to professional development for polytechnic teachers in Bangladesh?

2. According to your view, what are the primary objectives and goals of professional development for polytechnic educators in this context?

Transition Questions:

1. From your experiences, what are the most significant barriers or challenges that polytechnic teachers' in Bangladesh face in accessing and benefiting from professional development opportunities? (For example,)

- Prevailing in-service training
- Teacher's attitude towards in-service training
- Lack of time for training
- Family commitments of teachers'
- Physical and psychological well-being of teachers'
- Pedagogical expertise
- Teacher's readiness and eagerness
- Teacher's readiness to co-opt with the changing trend due to technological revolution
- Relevancy of course content
- Efficiency of teachers' of training courses
- Lack of accountability for PDT activities
- Knowledge on PD by the stakeholders
- Existence of explicit policy and guidelines on PD
- Dominance of traditional approach

- Lack of skill of using ICT tools efficiently

2. Are there any unique opportunities or advantages that exist in Bangladesh's polytechnic education system when it comes to professional development? (For example,)

- Using online space
- Technological adaptability of teachers'
- Existing PD institution
- Utilizing PD providers
- Increasing the number of existing trainings.

Key Questions:

1. How do you perceive the specific needs and priorities of polytechnic teachers in Bangladesh in comparison to those in other countries or educational settings?

2. Can you identify any professional development strategies or programs that have proven effective particularly for polytechnic teachers in Bangladesh, and what factors contribute to their success?

Ending Questions:

1. In your opinion, what are the top three measures or strategies that could significantly enhance the professional development of polytechnic teachers in Bangladesh? (For example,)

- Lifelong learning
- Clearly defined set of opportunities
- Continuous PD opportunities
- Updating the ways of PD
- Enhancing resource integration
- Renewal of the idea of PD

2. What recommendations would you offer to policymakers, educational institutions, and stakeholders to improve the professional development landscape for polytechnic educators in the country? (For example,)

- Paid working time
- Salary incentives
- Salary progression and promotion
- Idea of teacher's industrial attachment
- National policies and campaigns
- Collaboration with colleagues and institutions
- Long-term commitment from the institution to support PD
- Adequate financial and resource support for PD

Thank you

Appendix C

<u>KII with Policymakers</u>

Title: **Professional Development of polytechnic teachers in Bangladesh: Barriers,
Opportunities and Measures**

Introduction:

1.1 What is your current position? (WRITE THE RESPONSE BELOW)

1.2 What is your current place of work or institution? (WRITE THE RESPONSE BELOW)

1.3 Are you a representative of ....: (READ THE RESPONSES BELOW
AND CHECK ALL THAT APPLY)

	1.TMED
	2.DTE
	3.TRAINER
	4.TEACHER
	5.Other (specify)…………………

Professional Development Barriers:

2.1 What do you see as the barriers to professional development for polytechnic teachers? (e.g.,
Relevancy of course content, Heavy workload and shortness of time, Lack of rigid policy,
Unfavorable family environment and financial problem)

2.2 Are there any institutional or organizational barriers that hinder professional development
opportunities for polytechnic teachers? (e.g., Limited knowledge on course content, Predominance
of traditional approach, Ineffectiveness of organization, financial problem)

Opportunities for Professional Development:

3.1 What professional development opportunities are currently available for polytechnic teachers?
(e.g., Continuity of Professional Development (PD), Active uptake of learning opportunities,
Building awareness on changes in the world, Integration of ICT resources)

3.2 Are there any specific programs or initiatives that have been particularly effective in supporting polytechnic teacher development? (e.g. ASSET, TTF)

Measures and Strategies:

4.1 What strategies or measures do you think can be implemented to overcome the barriers to professional development for polytechnic teachers? (e.g., Paid working time, Salary incentives, Teachers' Industrial Attachment Program, National Policies and Campaigns)

4.2 Are there any best practices or successful approaches from other institutions that could be adopted to improve professional development in your context?

4.3 How can institutions and policymakers better support the professional growth of polytechnic teachers? (e.g., Collaboration, Long-term commitment and resources, Updating the ways of PD, Establishing the concept of lifelong learning)

Personal Experiences:

5.1 Can you share a specific example from your own professional development journey which is somehow related to PDT of Polytechnic teachers? (i.e., Particularly impactful or challenging)

Future Outlook:

6.1 What trends or changes do you foresee in the field of polytechnic education and its impact on the professional development of teachers?

6.2 What recommendations do you have for policymakers, institutions, and teachers themselves to improve professional development in the future?

Closing Thoughts:

7.1 Is there anything else you would like to add or any important aspects of professional development for polytechnic teachers that we haven't discussed?

Thank you