

# Perceptions and Practices of Science Teachers about Professional Development at Secondary School Level: A Phenomenological study

Rabia Aslam<sup>1</sup>, Dr. Najum Nisa<sup>2</sup>

<sup>1</sup>PhD- Educational Leadership and Management  
Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology  
Karachi, Pakistan  
rabee\_malik@hotmail.com

<sup>2</sup>HOD of Education Department  
Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology  
Karachi, Pakistan  
najmunnisa7@hotmail.com

**Abstract:** This study was done to know that how secondary school teachers of science interprets the experiences which they gained from professional development (PD) in Karachi. And also to know the teachers' awareness for sense making, and then professional development opportunities to bring changes in their teaching methodology by implementing the knowledge which they gained from PD. Data was collected through five secondary school science teachers of Karachi by purposive sampling technique. In-depth Semi-structured technique were used. After this, thematic analysis and coding method was done. After analysis of data, three main themes were generated. The sense making theme was related to the purpose of professional development with their understanding. The teachers' perceived experiences which they gained from PD activities was the second theme, and cultural and contextual factor that communicate professional development experiences was the third theme. The finding revealed the significant role of science teachers in professional development. It is recommended that the science teachers must be actively involved in the designing and also for the implementation of any PD related activity.

**Keywords:** Lived experiences, Professional learning and challenges, Professional development, Pakistani science teachers, Active learning, Reflective practices

## 1. INTRODUCTION

The global education scenario is largely characterized through the evident of an over increasing on subject of science and specially, science teaching. Teacher professional development (PD) refer to planned those programs related to PD programs that prepare teachers for better performance by improve their skills, motivation and knowledge to increase learning ability of all students (Melville & Yaxley, 2008). In science subject, PD intent to help science teaching with the purpose of betterment of student achievements (Whitworth & Chiu, 2015). Luneta, (2012). Stated that teachers is the focal person in the inception, implementation, and evaluation of PD to successful and sustained. Aspects of different PD program can be drawn by evaluating relationship between science teacher's experiences and learning with PD.

Science teacher' PD learning is describe as the operating involvement of science teachers in learning exercises provided by school management to improve their performances. According to Council (20016), it may happen in variety of situations that is outside & within the organization and in a range of structures. Meaningful professional learning depends on the individuality of teacher to think and work differently. It can be implemented through engaged in formal or informal PD programs or by becoming

an active member of professional development learning communities. (Hargreaves and Shirley, 2012). For the teachers who are in service, PD training offers different opportunities to provide space for informed decision making, transformation in their instructional practices and ultimately, student outcomes (Smith & Lindsay, 2016).

Many teachers of science (62%) in Pakistan were found uncomfortable in teaching the scientific concepts accurately (NEAS, 2014). The teachers have complexed pedagogy of science subject which transform in the traditional approach to education related to science. Whereas, in Europe and in the United State, they have some strategic designed frameworks for the promotion of science education. As Chinn (2016) stated in his study that in those countries, teachers have more positive aspects about scientific academic practices related knowledge rather than teachers of Asia in Professional development practices. The operationalized knowledge is needed to construct PD for Pakistan to extend the way of knowledge establishment, examination, authentication, and distribution. There is also need to audit the current literature of Western countries on designing and practices of PD to find the way to fix concern of Pakistani Professional Development courses.

To keep the particular objective in mind, the present research designed to search the comparative understanding of science subject teachers' Professional development

experiences and learning which they gain from training in Karachi, Pakistan. The research was conducted through literature review based on the PD training of science teachers and their exposure with the Western scenario. With the comparison of the current situation of Pakistani science teachers' practices of PD. By reviewing the literature in comparison context, it will surely bring critical questions that how to increase effectiveness of PD practices in Pakistan. The discussion focus for the Pakistani science teacher comparative view and important practices for future designing of PD program with their experiences.

### **1.1 Objectives of the Study:**

1. To find out the facilitating factors in teaching science at secondary level provided by organization.
2. To find the contextual factors that hinder science teachers' implementation of learned knowledge from PD.

### **1.2 Research Questions:**

1. What are the facilitating factors in teaching science at secondary level provided by organization?
2. What contextual factors are there that hinder science teachers' implementation of learned knowledge from PD?

### **1.3 Purpose**

The aim of this research was to find the perception and their lived experiences of teachers teaching science which they gained from professional development training session in Pakistani context. It was also the objective to understand that how teachers achieve the maximum goals of PD and then change their practices in classroom through the implementation of obtained knowledge after getting session of PD in Karachi. The current study used purposive sampling technique to collect the data from five teachers teaching science subject in secondary school of Karachi, Pakistan.

## **2. LITERATURE REVIEW**

### **2.1 Theoretical foundations**

Planning and teaching any subject is a highly complex cognitive exercise in which the teacher has to apply knowledge from multiple domains (Magnusson, 1999). Teachers with differentiated and unified knowledge will have much more ability than those whose knowledge is limited and splintered, to plan an effective lesson that helps students to develop deep and integrated understandings. Competitive science teachers know how to best design and guide acquired experiences, under particular situation and constraints, to help students with diversity to develop scientific knowledge and an understanding of the scientific enterprise. These statements about the role of awareness in terms of knowledge in teaching is supported by a research documentation that science teachers' knowledge and beliefs

have a profound effect on all areas of their teaching. Sensual of this research was enclosed by conceptualizations formed by Shulman and his colleagues of the versatile knowledge domains that teachers use when planning and teaching (Wilson, Shulman & Richert, 1988). A major contribution of this configuration of the knowledge base for teaching was its acknowledgment of the priority of subject-specific knowledge in effective teaching. A revolutionary postulate of this study was the identification of a type of knowledge that was considered as unique to the profession of teachers. Pedagogical content knowledge is termed as teacher's understanding of how to help students understand specific subject content. It includes knowledge of how specific subject matter topics, problems, and issues can be arranged, represented, and adapted to the diverse interests and capabilities of students, and then represented for instruction. Pedagogical content knowledge (PCK), also known as subject specific or content specific pedagogical knowledge, is integral to active science teaching. Further understanding of this domain of knowledge and its influence on teachers' teaching is essential to foster the improvement of science teaching and science teacher's education (Halai, 2005).

Pakistan has continually been pointed out like several other countries, for its poor practices of PD and policies designed for teachers for their poor results in terms of student achievement. The average scores in achieving science subject students in the National Achievement Test were found 483 which is below than the average achievement scores of 500 (National Educational Assessment System [NEAS], 2014). In Pakistan, most of the science teachers could not get a chance for attending science content related courses. PD program with diversity contributes to the training of teachers for ground-teaching facts (United Nations Educational Scientific & Cultural Organization [UNESCO], 2003).

### **2.2 PD learning of science Teacher and Experiences in Western Context**

Science subject instructors' PD in an academic setting in the Western Countries, is observed as a continuing ongoing learning process which starts as the teachers enter into the classroom and experiences of their teaching and their professional career continues till the end of their life (Desimone, 2009). Specific seminar related to formal structured content specific seminar provided for PD training days, to every-day discussion done in staff-room among teachers of science subject about teaching techniques used in the teaching, covering the science teacher's daily routine. Similarly, PD is the one and only way for classroom practices to confirm the ongoing strengthening of the teachers in their teaching practices along with research objective to learn knowledge of problem solving & critical thinking, and also create these skills among students (Desimone, 2009). According to Buczynski & Henken (2010), the main objective of PD program is to bring effective change in the

trainees' professional life in a positive manner so that they can face the challenges of current century and can adjust easily in its reality.

### **2.3 Learning and Experiences of science teachers about PD in Pakistan.**

According to Ali (2011), it is observed that the recent practice of teaching science subject related Professional development courses in Pakistan are only given by a training. The teachers of public sector apply the traditional Cascade model to achieve maximum outcomes from PD. Mostly, more weightage are given to the PD programs that put stress to teacher on the technical aspects of their teaching profession.

Professional learning outcomes in Pakistani context, can be obtained by different impacts like spirituals, socio economic & structures of an individual (Pardhaan, 2005). According to the researcher, to become a competitive of science subject in Pakistan, depends on the skills which reflect the pedagogical knowledge through a learning experienced get personally. Similarly, by identifying a key features, professional learning of science teacher can be explained. The learning needs of Pakistani science teacher can be designed by assessing the command on the content and the environment related circumstances in which teachers are serving. The PD training programs that are working in the Pakistan, are not enough effective to obtain the learning needs of a teacher which is the most appropriate type of program. It is identified by the literature related to science subject teacher's experiences and their learning in Pakistani context that science subject teacher's PD training courses do not have flexibility and do not consider the needs of teachers (Tajuddin & Khan, 2014).

Akhter, Nasser-Ud-Din & Shah (2011), by doing the critical analysis of the PD program that is related for science teachers at the secondary school of Pakistan, revealed that curriculum is not according to the need and demand of in-service teacher training. It is found that training programs are based on theory. Halai (2005) describe that the challenges faced by the teachers of PD program of science lies not only to develop curriculum but also to support teachers to execute their learning and refine their needs which is actually th needs of their students.

Another weakness was found by Aslam (2013) of PD practices that "there is not a proper activities which is transferred and also no proper follow up is designed to teaching in classroom" (p. 312). Similarly, it is also observed teacher is not capable to gained knowledge from her teaching and not competitive, they have a deeper, vigilant & reflective knowledge of their own teaching in contrast to others teachers (Halai & Khan, 2011). In short, such type of PD trainings, which improve the teachers' instructed reality. So, it is needed to brief the murmur & evaluation of Professional Development training traditionally occurring in the Pakistan. This is very much important for educational researcher to

explore the lived experiences of Pakistani science teachers by measuring their understanding and their experiences. Researcher also investigate to find out the structural policies that helped or create inference in their reflective and instructional practices in the organization. It is clarify that contextual characteristic is the facilitator which help to restrain the professional growth if science teachers and it could also be explored. The current study also create a linkage between the science teacher' teaching and learning practices with the PD experiences. This study is also helpful for the educational stakeholders of science subject to take step and improve the activities relate to PD in the private and public sector of Pakistan

## **3. METHODOLOGY**

### **3.1 Research Design and population**

To know the private secondary Pakistani school science teachers' lived experience about PD, Phenomenological approach was used. Secondary school science teacher of Karachi were the population of this study.

### **3.2 Inclusion Criteria**

The criteria selected for the teachers were: (a) private school science teachers (b) the teachers with at least two years' experience of PD and (c) volunteer participation of the teachers who wish their own.

### **3.3 Sampling Technique**

In the present study Purposive sampling technique was used.

### **3.4 Sampling size**

The participants in this study was five female science teachers with different professional backgrounds working in private schools of Karachi Region, Sindh.

### **3.5 Data Collection tool & Technique**

In depth Semi- structured interview was done with research participant.

### **3.6 Data Analysis**

Thematic analysis technique was used to analyse the data.

## **4. FINDING OF THE STUDY**

### **4.1 Theme 1: Facilitating Factor**

Facilitating factors is very important for any organization which help teachers to teach effectively particularly the science subject. The theme is further divided

into two categories; a) Organizational support and; b) Resource Material.

#### 4.1.1 Organizational support

Organization play a vital role to facilitate teachers to make their lesson effective and make students competitive. Organizational support can be in different form as the finding reveal that organization provide facilities of different professional development in service training which enable teachers to utilize in their teaching practices. These PD program is arranged by different institute and which is most of the time free of cost for the teacher but all the expensive is bearded by the school.

#### 4.1.2 Resource Material

One of the facilitating factor which help science teachers to teach in school is resource materials. Findings tell us that smart board, science laboratory, AV room are all those material which is present in the school and help students to get better understanding about science subject. But study also reveal that smart board and laboratory facilities are only available in morning shift not provided for the afternoon shift teachers, so teachers have to worker harder to make the concept clear.

### 4.2 Theme 2: Cultural and Contextual Factors

Essential features that impact on science teachers PD experiences are cultural and contextual factors. The participation are not only neglected but they also create challenges for accessing teaching needs & implementation process. This particular theme is further distribute into three categories; a) Need assessment experiences; b) Motivational and cultural factors; and c) The selection and access experiences.

#### 4.2.1 The Access and Selection Experiences

Mostly participant teachers did not have a good experience regarding the selection or access procedure for training of PD. According to the participant, PD activities are compulsory to attend for them and they did not have any choice regarding to decide either to participate or not in such types of activities. They were usually nominated by the departmental procedure for PD training, so they are bound to follow the authoritarian recommendation. As Ms. Fatima said,

*“Science teachers do not have a liberty to choose training related to PD by their own. PD trainings are compulsory for all. The principal nominates, and for the training we have to be present physically.”*

Mostly teachers expressed their feelings expressed their feeling that they had to attend the very common and

nonspecific types of PD. Mostly trainers and teachers were selected by routine procedure. Sometimes, PD is not according to the teacher’s particular subject and pedagogical requirements. Teacher experienced that hidden procedure for participant’s selection for PD creates so many issues for those who wants to participate actively. MS Savera shared her experience:

*“As I have a background of pre medical but once I was taking PD, trainer moved us to mathematic content, as from begning we had not studied mathematics after matriculation. So that PD session was boring for me and I couldn’t understand that what is going on. It was really useless to teach such content which is not related to us.”*

Finding achieved from the study revealed that closeness of the sites was also interlink with determining factor for many teachers as it helps them to take decision of participation. Those teachers whose residence are near to PD training site has more opportunity to avail to participate as compared with those who live away. (e.g. Ms Narmeen Ms Sadia & Ms Kanwal) exposed that they usually get more chance to peruse those PD training session in contrast of those who live away from the training venue.

Ms. Sadia & Ms Narmeen expressed their view as:

*“I live in Garden East but usually the training sites are in Karim Abad, which is far away from my residence, so it is very difficult for me to arrange pick and drop as I am not allowed to go alone, and I usually avoid to participate in such PD session unless or until the session is not compulsory”.*

#### 4.2.2 Assessment Need Experiences

Teacher’s shared their views about the determination of training needs by the training institution. Participants thought that teachers usually do not get domain from which the PD training is needed. There is also not a proper mechanisms for teachers to participate and make them involved actively in designing and planning activities related to PD. They suffered a lot to keep their motivational level high while feeling that their voice will not be considered while organizing PD session. Ms. Sadia share:

*“We are not asked by any one for the training related to their PD needs, I myself proceed a lot to make them relies that TNA must be conducted, but I really don’t know why they don’t consider this. May be they don’t know the importance of it. Furthermore, trainee never checked back again by any one that either they are implementation whatever they have learnt from PD or not.”*

The evaluation of PD trainee’s needs in a pedagogical area or in content of PD participants’ always be a process of problem. Miss Kanwal, for example, expressed that

*“Teachers of science should be based on technology in which participant can learn that how to utilize technology in their teaching practices. She also revealed that generalized types of PD session do not fulfill their teaching needs.”*

Practical activities and specific content based on PD must be designed accordingly to fulfill their needs in a better way. The participants also thought that PD training provider institute first took note on teacher’s educational background and professional. They should be known that how the trainee were nominated, evaluated and treated during the PD session. The PD trainers must work on PDs relevant to their school scenario.

#### 4.2.3 Motivational and Cultural Factors

The factors should be considered with those aspect of PD’s culture that interlinked with individual learning experiences of participants and affect their instructional practices. The PD providing institution’s culture is influenced strongly on the rate of participant’s success as it is the job of PD trainer and provider to lift participant’s motivational level up and also lift up the performance of science teacher during PD sessions.

The mostly participant involved in the present study revealed that whenever they get a chance for a PD training related session, they will become motivated & excited to actively participate in that exercising. The participant believed that such type of exposure itself create motivation for them. Ms. Savera disclose *“when we have an exposure of training so we get many chances to learn and to share the new knowledge.”* One more teacher discussed her feeling *“I feel myself motivated through the PD course as I always believe that this will enhance my knowledge”*. Similarly, Ms. Fatima discussed the impact of this motivational positive factor as:

*“I am willing to go for any PD and also find myself motivated. I always motivated. I always said to my principal please recommend my nomination in any PD related activity too. PD session also provide a chance to explore different environment and make a new friends after interacting with the new people. We learn the new techniques and when we also designed the same session for our school’s other colleagues and get them train, by this we also get fresh.”*

The role of trainers is also appreciated by the majority of the participant for providing them opportunity to build a good environment for training. Trainers motivated trainee by designing some activities for them & also build the session of discussion with trainee. Mostly master-trainers designed practically applicable activities for trainee teachers. The PD trainer also tried to build healthy environment through designing healthy activities for them which directly impacted on participant’s personality, behaviour and knowledge.

Participated teachers also believed that PD trainings played a vital role for their professional growth.

The problem of willingness & motivation to gain knowledge from PD also related to other variables as well, like Participant; s own experience to learn new knowledge which can be gained through PD. It has found that if trainee don’t find new knowledge and techniques, so trainee will never motivate themselves to participate or attend in that PD session.

#### 4.3 Discussion

The present study was done to address the question that how secondary school science teachers in Pakistan do shared their lived perception of PD. An academic enlargement related in the form of sub-question was, “How did science teachers implement their knowledge which they gained from PD and how did it work for them?”

The present study chiefly examined the perception of secondary science teachers from Karachi, Pakistan. The current study also uncovered several bitter sides of the current practices of PD in the Karachi. One of the preliminary issue which was discussed in the current study that the participant are not aware completely about the importance of PD, and its outcome learning objective and the total impact of the training session on trainee which they gained through active participation. The finding of this study also co-relate with the criterion and pre-existing research finding on PD that was done in Pakistani context (for example, Kanu, 2005; Westbrook et al., 2009; Haider & Ali, 2012) and also in other context of Africa & Asia (for instance, Jihson & Monk, 2000; El-Hani & Greca, 2013; Kayulili, 2013; Riandi, 2012; Widodo & Petras, Jamil & Mohammad, 2012). The first implement that was originated from the result from the current study suggested that the any subject teachers are the focal person in PDs training, so the PD program must be revised with them before taken on the board for their personal growth. With previous argument, it is confirmed that there is a deficiency in the follow-up program. Last, such PD programs may be the necessary element and the basic need of the science instructor. This current research is not the one who is high lightening the concern above but in the nearest past, some other researches had also done which suggested that teachers’ perception should be include in the planning of PD related training Modules (e.g. Desimone, 2009; Allen & Peenuel, 2015; Mokhele & Jita, 2010; Saka, 2013; Luneta, 2012).

#### 5. CONCLUSION

The current research was initiated to gain understanding about the prefixes of science teachers’ lived experiences of about the diverse PD practices. Teachers considered those PD experiences as supporting to meet some challenge in class room teaching-methodology but also unable to answer the requirements of development & problems of competency. The barrier which exist in different form of PD

learning commonly interlink with institutional and administrative procedure in the selection and access of participation.

The participant were given an exposure of diverse PD programs but still they felt that they are not been practically applicable in their instructional practices on the daily basis. They believed that the PD program must be related to their specific need. They also stated that school based need program develop their skills, self-efficacy and knowledge through stronger outcomes of PD. The participant also believed that the PD learning will took place when their will be factors like motivational factors, contextual and cultural factors. They also revealed that there is also a problem with feedback mechanism in assessing that PD program and get a meaningful experience. Due to this lacking, the participant has to suffer from many types of learning struggle.

The finding study also argument that PD needs reform in Pakistan. The PD organizer must consider the contextual reality and learning needs of their environment. Likewise based on the facilities and sources availability, PD experiences could be planned systematically and can be related to participant's motivation factor. After relating the present study with literature review, all participant found their active participation as the most meaningful PD exposure in these program.

It can be concluded on the basis of their lived shared experiences that the PD practices of science teachers of secondary school Karachi need reform. Particularly, they need relevant, site-based and continuous PD opportunities which support their teaching and learning. The participant should be supported by making policies designing structures and off course the resources which help them to implement the gained knowledge from PD. They also need to get more opportunities for feedback and active participation. The finding of this research can be interlinked with the objective of PD trainer to be more sustainable, collaborative and logical effect on science subject teacher learning needs and bring positive alter in their teaching methodology.

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