PERCEPTIONS OF MATHEMATICS TEACHERS ON THEIR PROFESSIONAL

DEVELOPMENT AND ITS IMPACT: A NARRATIVE INQUIRY

Phurba Tamang

A Dissertation

Submitted to

School of Education

in Partial Fulfillment of the Requirement for the Degree of

Master of Education in Mathematics Education

Kathmandu University

Dhulikhel, Nepal

July, 2021

DECLARATION

I hereby declare that this dissertation has not been submitted earlier for the candidate for any other degree.

----------------------------   July 30, 2021

Phurba Tamang

Degree Candidate

DEDICATION

This dissertation is dedicated…

To my father Nagendra Bdr Tamang and mother Harimaya Tamang, who went through phases of struggle to bring me to this stage.

To my wife, who always stands beside me with continuous motivation, encouragement, and support.

To my relatives, friends, colleagues, and students who supported me directly and indirectly.

Master of Education in Education dissertation of Phurba Tamang entitled:

Perceptions of Mathematics Teachers on Their Professional Development and Its

Impact: A Narrative Inquiry" presented on July 30, 2021.

<div align="center">APPROVED</div>

------------------------------------   July 30, 2021

Asst. Prof. Binod Prasad Pant

Dissertation Supervisor/Acting HoD STEAM Education

------------------------------------   July 30, 2021

Deependra Budhathoki

External Examiner

------------------------------------   July 30, 2021

Prof. Mahesh Nath Parajuli, PhD

Dean/Chair of Research Committee

      I understand and agree that my dissertation will become a part of the

permanent collection of the Kathmandu University Library. My signature below

authorizes the release of my dissertation to any readers upon request for scholarly

purposes.

------------------------------   July 30, 2021

Phurba Tamang

Degree Candidate

ABSTRACT

An abstract of the dissertation of Phurba Tamang for the degree of Master of Education in Mathematics Education was presented at Kathmandu University School of Education on July 30, 2021.

Title: *Perceptions of Mathematics Teachers on Their Professional Development and Its Impact: A Narrative Inquiry*

Abstract Approved: ------------------------------
Asst. Prof. Binod Prasad Pant
Dissertation Supervisor

Ministry of Education (2015) reported that the average score of students' learning achievement is 35% in Mathematics where it is 41% in science to 48% in Nepali. Lacking the competencies of the teacher is one of the main reasons behind the low achievement in mathematics. Teacher professional development helps teachers to be competent. This study aimed to explore perceptions of mathematics teachers on their professional development based on its impact on their profession. I have considered Mezirow's transformative learning theory as a theoretical referent.

I chose interpretivism as my paradigm and narrative inquiry as a research method to understand and interpret the real-life experiences of teachers of the cultures of their workplace. I purposively selected three research participants from three schools in the Lalitpur district. I took in-depth interviews using interview questions based on research key questions with three participants and transcribed converting the audio recordings into textual narratives. I processed the transcription with the coding of the information and generating themes. I explored the transcribed data, field notes, developed significant themes and narratives during this process. I related major

themes with the literature for meaning making. I addressed my research questions to conclude the stories of participants who have experience participating in teacher professional development activities.

Teacher professional development as holistic ongoing development, much more than training, for continuous learning, way of doing better in the workplace, development of pedagogical manager and competency development are the major themes generated from the perception on TPD. Similarly, change in perception of teaching and teacher professional development, change in teaching methodology, change in student's behavior and performance, issues, and challenges during TPD are the major themes generated from the impact of TPD on their profession.

During the participation for a long time in TPD activities, they perceive that Teacher professional development is significant for mathematics teachers but only if it is practical, relevant, transferable, facilitated by experts, supported by the school, parents, and community.

This study serves teachers and teacher educators to motivate them for their PD and experts, school, school leaders, and curriculum planners to plan and conduct effective PD activities in school or any training centers. This study generally focuses on the mathematics teachers who have different perceptions of their PD. It will help such teachers to reflect on their perception once again and take the initiative for their PD. It inspires further research related to the TPD of mathematics teachers.

------------------------------   July 30, 2021

Phurba Tamang
Degree Candidate

ACKNOWLEDGEMENTS

I am very grateful to the Department of Mathematics Education KU, Hattiban for providing me an opportunity to do this wonderful dissertation on the topic 'Perception of mathematics teachers on their professional development and its impact: A narrative inquiry."

I would also like to express my sincere gratitude to my dissertation supervisor Asst. Prof. Mr. Binod Prasad Pant for his insightful, invaluable, continuous directions, suggestions, and support to accomplish my dissertation. This study would not have been possible without him. Similarly, I would like to extend my thankfulness to my co-supervisor Mr. Indra Mani Shrestha for motivating, guiding, and supporting me during this study. I would also like to thank my teacher Mr. Niroj Dhakal for his remarkable suggestions in completing this research.

I express my gratitude from the bottom of my heart to all the members of the Department of Mathematics, Kathmandu University; Hattiban, Lalitpur for showing keen interest and advising me to complete this research study.

I am equally indebted to all the teachers of three different schools of Lalitpur metropolitan city for their kind cooperation in providing the required data for the study.

Similarly, I would like to extend my appreciation to my colleagues for providing remarkable suggestions. I would like to thank Mr. Bijaya Chandra Karki for his valuable guidance and support throughout this research. At last, but not least I would like to extend my thankfulness and love to my family and relatives for their incessant support and assistance.

ABBREVIATIONS

AD	Anno Domini
BA	Bachelor in Arts
B.Ed	Bachelor in Education
B.Sc	Bachelor of Science
CDC	Curriculum Development Center
CEHRD	Centre for Education and Human Resource Development
CL	Collaborative Learning
NCED	National for Educational Development
TPD	Teacher Professional Development
ICT	Information and Communication Technology
KUSOED	Kathmandu University School of Education
MA	Master's in Arts
MOE	Ministry of Education
MEC	Mathematics Education Council
MEd	Master's in Education
MSc	Master of Science
NASA	National Assessment of Student Achievement
NELTA	National English Language Teachers' Association
NESP	National Education System Plan
NGO	Non-Government Organization
NMS	Nepal Mathematics Society
PABSON	Private and Boarding School's Organization Nepal

PCK	Pedagogical Content Knowledge
PD	Professional Development
SEE	Secondary Education Examination
SLC	School Leaving Certificate
SSDP	School Sector Development Plan
SSRP	School Sector Reform Plan
TU	Tribhuvan University
VVI	Very Very Important

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION TO THE STUDY

Chapter Overview

I believe everyone is lifelong learner, so teachers are. Teachers need to develop themselves professionally to be competent in their profession. In this chapter, I have discussed the need for professional development for novice to experienced teachers. Similarly, I have narrated the journey of my learning as a school student to university student, as a mathematics teacher with experience of teaching more than a decade and participating in different professional development activities, and as an apprentice facilitator working with mathematics teachers from different parts of Nepal. Also, I have stated the problem and purpose of my research study with two research questions.

No one is perfect in this world. We are learners from the time of our birth to death. Learning is an inherent part of being which enriches the individual with personal and professional development (Pant et al., 2020). Teachers in school are also learners. It has been accepted that only a good learner can be a good teacher (Ginsburg, 2012). We are in an era where everything is updated within a second of time. If the teachers are not updated, they cannot prepare their students for the future. Teachers can update and develop themselves by self-study, but it is limited. To be updated, teachers need motivation, updated knowledge skills, and attitude according to the changing environment, guidance, feedback, and other supports. Teachers get opportunities to experience these things when they engage themselves in their

professional development. Glatthorn (1995, as cited in Villegas-Reimers, 2003) defined Teachers Professional Development (TPD)as the growth of a teacher in his/her professional role as a result of gaining increased experience and examining his/her teaching systematically. The teachers who have spent many years teaching students in the school might think that they have little left to learn like farmers don't think they have any grains to collect from already harvested fields. But farmers also collect grains from the field if they visit it again. Similarly, experienced teachers also may find some treasures of knowledge if they are willing to look and learn (Richardson, 2000). So, not only the fresh teachers but the experienced teachers also need to engage themselves in learning.

My Journey of Learning as a Student

I still remember my parents telling a story of my admission to one of the private schools in my village. My relatives and neighbors congratulated my parents for getting my admission to a private school 28 years ago. I was the first child from my family and my whole Tamang community to study in a private school. I walked daily an hour to reach school and another one hour to return home in the evening with my father, who worked in an agricultural research center near my first school. That school was reputed in the district. The mathematics teachers were hardworking, but they worked hard only on solving the problems on the board, explaining them, asking us to copy them down in our exercise book, and similarly solving the remaining problems and correcting our classwork and homework. Our teacher solved the addition-related problem on the board, explaining carryover to the next digit. I learned how to carry over the digit without understanding why carryover. This teaching method of my teacher did not make me understand why to carry over to the next digit for many years. The same thing happened in the case of subtraction with

borrowing. I had to practice it until I learned how to carry over and borrow without knowing what it meant. One of those teachers asked us to memorize the multiplication tables from 2 to 10 when I was in grade 2. We were expected to be punished physically if we were not able to recite the table fluently. I memorized the tables in fear of getting punished, but I forgot it the next day when they asked me to recite them. I went blank at that moment. As I reflect on those days and compare the teaching of my math teachers with learning theories and practical skills I learned from universities and TPD activities, I realized that my teachers were guided by technical interest motivating us to rise instrumental knowledge (Habermas, 1972). My parents couldn't afford my school fee in an institutional school. So, I went to a public school nearby after completing primary level from my previous school for further study. It was a big school with around 1200 students. One day, our principal informed us our mathematics teacher had gone for teacher training organized by District Education Office and he asked us to study on our own. After he returned to school from the training, we did not find any change in his teaching methodology. He taught us mathematics in the same way he used to teach in the past. We didn't experience any newness in his teaching.

Two years later, I took additional mathematics as an optional subject in grade 9 which was taught by another mathematics teacher. He started trigonometry writing the formula of six trigonometrical ratios and asking us to memorize them at any cost. He provided us the tips '*Pandit Badri Prasad Hari Hari Bol*' to remember them easily.

$$\frac{Pandit}{hari} \qquad\qquad \frac{Badri}{hari} \qquad\qquad \frac{Prasad}{bol}$$

$$\mathrm{Sin}\theta = \frac{P}{h} \qquad\qquad \mathrm{Cos}\theta = \frac{b}{h} \qquad\qquad \mathrm{Tan}\theta = \frac{P}{b}$$

Here, the first letter was taken from each word. As a result, p, b, and h represent perpendicular, base, and hypotenuse of right-angled triangle respectively. These tips helped us remember the formula for a long time, but they did not help us develop a conceptual understanding of trigonometrical ratios.

Conceptual understanding is defined as comprehension of mathematical concepts, operations, and relations (Rittle-Johnson & Schneider, 2015). Here, the conceptual understanding of trigonometrical ratios means the comprehension of the mathematical concept of the relation of perpendicular, base, and hypotenuse of a right-angled triangle. To be honest, I did not know the concept of trigonometrical ratios during my student life and in the first few years of teaching mathematics as a teacher. I got the concept behind it only after teaching the same topic for several years.

After passing SLC with first division I got admission in Dhankuta Multiple Campus in science faculty. In those days, students who score first division in SLC were expected to study science in college, which was a matter of pride in my community. There, I noticed that teaching of mathematics was different than that of other subjects. All the other subject teachers taught theoretical part in class and took us to laboratories regularly for practical tasks, but our math teacher never gave us any practical assignments. He was always in a rush to complete the syllabus as soon as possible. He also solved one problem as an example on the board and asked us to do the remaining problems taking help from the example he gave. His teachings were very abstract to understand. When my classmate asked for help in frustration, the teacher gave the tips of mugging 'Very Very Important (VVI) problems and assured: *"Memorize at least these questions from these chapters. You will surely pass the exam".* Those VVI problems from some chapters were the most repeated problems in

the TU exam in the past. I stayed till 2 am, memorizing the answers with my hostel mates. The students who had patience spending time memorization did well in the exam. Out of 102 students from my batch, only six passed the board exam in the first year and 8 passed in the second year.

I went through similar learning experiences in my bachelor's study. Our teachers still taught in chalk and talk method which is a traditional method where basic tools of teachers are through chalk, blackboard, and walk and talk (Shah et al.,2017) and left us to memorize the problems and solutions recommended by the teachers and appeared the exams. I memorized all the theorems recommended without understanding them. Fortunately, I could pass the exams because many questions in the exams were those questions that I had memorized. My learning during student life could be better if my teachers were provided opportunities to be engaged in professional development activities.

My Journey of Learning as a Teacher

After college, I got an opportunity to work as a science and mathematics teacher in one of the public basic schools nearby my village. I was passionate about working with the students, but it lasted only for a few months. At the end of the day, I got very tired and exhausted from explaining, standing, and shouting the whole day at the students from the first to last. I did not have any knowledge of teaching strategies, classroom management, teaching materials, and other necessary skills those days. I had never seen my teachers teaching me in methods other than the traditional lecture method. I used the same lecture method of teaching that my teacher used to teach me when I was a student. Eventually, I was influenced by them, and my passion and energy level were going down. The famous quotation in those times was "*Sarkari kaam kahile jala gham (English translation: Employees waiting for office hours to*

end). Our colleagues who were the permanent teachers in that school sometimes used to visit the city for the training. When I asked one of the English teachers to share the learnings from the training, he demonstrated one of the puzzles they learned in training to us.

> *"Three boys wanted to buy a ball. They went to the stationary with Rs 30, collecting Rs 10 from each, and bought the ball for Rs 30. They returned home to plan to play another day. Later, the shopkeeper realized that those boys were his friends' children. He asked his staff to visit the boys' house and return their money. The staff returned 1/1 rupee to the boys and kept Rs 2 with him because he could not distribute it to three boys. If boys received Re 1 back each, it means they spent Rs 9 each out of Rs 10. So, three boys spent Rs 27 in total. Rs 2 is with the staff boy, which amounts to Rs 29. Where did Re 1 go?"*

I was surprised to know that an English teacher who attended mathematics training did not have any interest and platform to implement those learnings. On the other hand, this puzzle was meaningless and useless for me and even for my students in mathematics. After a year, I changed the school to a private school near my house. I got an opportunity to attend three days of training in the city of Dhankuta traveling almost 3 hours every day. The training gave me confidence in teaching, but I struggled a lot to implement the knowledge and skills gained from the training in the classroom. The training was interesting during those 3 days, but it was not relevant enough to the classroom setting. The knowledge and skills discussed in the training and workshops were doable in the classroom. However, I adapted the idea of training to teach trigonometry in grade 8. I divided my students into groups and provided the task to form the ratios using perpendicular, base, and hypotenuse of a right-angled triangle. I realize now that it was the idea of collaborative learning that led me to

conduct the group work. Collaborative Learning (CL) involves groups of learners working together to solve a problem, complete a task, or create a product (Laal, 2012). The students formed six ratios. Later I related it with the trigonometrical ratios. My students were very happy to derive the formula by themselves for the first time. As I realize now, I was unknowingly guided by practical interest (Habermas, 1972), which basic orientation is towards understanding and interaction.

Then, I came to Kathmandu for further study. I worked in several schools in Kathmandu as a mathematics teacher. This experience of teaching for more than 13 years as a mathematics teacher helped me to be familiar with the content of mathematics. I was confident to teach the lesson without using textbooks, but I was teaching in the same method in my 13th year of teaching that I was teaching in my first year. I thought my experience of teaching was $1+1+1+1+1+1+1+1+1+1+1+1+1$ equal to 13 years, but it was $1\times1\times1\times1\times1\times1\times1\times1\times1\times1\times1\times1\times1$ equal to 1 year.

In the meantime, I attended several training sessions, seminars, workshops, conferences organized by the local school, publications, Private and Boarding Schools' Organizations Nepal (PABSON), and Non-Government Organizations (NGOs), facilitated by experts, senior colleagues, and book authors but there was no one to assess the impact of training in my teaching. Nobody observed the implementation of training in my class. Nobody gave me the developmental feedback for the improvement. Therefore, those teacher development activities could not bring a significant impact on my teaching.

I always thought that it would be better to be in the classroom completing the syllabus in time instead of listening to the facilitators in the training hall. I didn't know about any learning theories, and I was happy with the traditional teaching style that I copied from my teachers. So, whenever any facilitator shared about learning

theories in any PD activities, I used to get bored. I was happy to teach my students in the same method as I was taught by my teachers (Pant, 2017). I did not think out of the box, work hard for new teaching methods and use teaching materials. I didn't want to come out of my comfort zone, and there was no one to encourage and motivate me to think out of the box. The school management expected me to make the students score a good percentage. I was trying my best using the lecture method shouting, repeating, revising, taking coaching classes, taking tests, and scolding students for their poor performance. There is a famous saying that '*Practice makes the man perfect* which I heard from people around me from my childhood. So, I made my students practice the same problem several times until they memorize it. I compelled my students to write the formula of trigonometrical ratios 500 times in their exercise book every day until they could not memorize all the formulae. Sometimes I got opportunities to attend a few training sessions and learn new knowledge and skills. But I did not have time to implement them in the classroom even though I tried my best to do it. I could do better If I was provided a proper environment of learning in my profession. Generally, mathematics teachers in Nepal are busy (Kaleli-Yilmaz, 2015) taking almost 6-8 standard periods in a day in the schools, mostly in private schools. They are accountable to the principal for the better academic performance of their students. They do not have leisure time to make a lesson plan, develop teaching materials, and involve in other professional development activities. But at the same time, those PD activities I was involved in inspired me to work on making my classroom interesting by singing songs, telling jokes, sharing interesting math facts, and involving students in different maths activities as a part of the fun, but I couldn't connect it with the curriculum. However, I was not interested in the training sessions and workshops organized.

My Journey of Learning as a Practitioner

After working for 13 years in different schools in different levels in Dhankuta, Kathmandu, and Lalitpur districts, I got an opportunity to work as an apprentice teacher trainer in one of the organizations in Lalitpur, working with different community and institutional schools. The program provided subject-specific training and general training to the school principals, teachers, and parents. We visited the teachers individually and worked closely with them. We observed their lessons, evaluated the implementation of training, provided the teachers with developmental feedback

I found some teachers genuinely passionate about teaching and they were always open to new ideas of teaching and learning. On the other hand, looking back to my teaching experience in different schools and working closely with the mathematics teachers, I came to know the lack of motivation in teachers to learn new skills and implement them, as I did. Those teachers seemed to have low confidence to apply skills and knowledge gained at the training despite involving in training sessions continuously, follow-ups with classroom observation, developmental feedback, etc. The teachers from public schools who were enrolled in TPD activities by the National Centre for Educational Development (NCED) sound good in theory, but they also are not able to implement the training in the classroom. Most of the mathematics teachers are not from education faculty, especially in institutional schools. They are from a science or humanities faculty with a degree in math and are unaware of pedagogical skills. Those mathematics teachers focus only on the algorithm, a predetermined sequence of actions that will lead to the correct answer when executed correctly (Rittle-Johnson & Schneider, 2015) due to the lack of awareness of knowledge of pedagogy.

From my experience of teaching for more than a decade, working in the field of teacher training for a couple of years, and interacting with various educational people, I came to know that mathematics teachers are not able to help students perform well in mathematics. MOE (2015) reported that the average score of students' learning achievement is only 35% in Mathematics which is very low achievement. I have observed that parents blame school management, school management blames math teachers, math teachers blame students and students blame themselves. The goal of mathematics is to empower the students with problem-solving skills, decision-making skills, and many other skills in their life. Still, instead, it is not able to empower the learners only because the teachers lack the knowledge, skills, and attitude needed (Panthi & Belbase, 2017)

Statement of Problems

I, as a mathematics teacher, used to worry a lot about my students' performance and results. Even though I revised and put my full effort into the classroom, the students' achievement in mathematics was the lowest amongst all the subjects. I had to face the comments of parents and school management *"Why only the result of mathematics is poor? You need to be more serious in your teaching, otherwise we have to think an alternative way!"*. Whenever I met my friends who also used to teach mathematics in other schools and share about the poor performance of students, they also echoed me. This is not only my own and my friends' problem in the profession of mathematics. Probably, every mathematics teacher from each part of Nepal has the same problem that I had.

Someone has well said 'If a teacher runs, the student walks but if the teacher walks students will sleep'. According to the National for Educational Development (2016), a teacher needs to possess eight competencies. They are (a) content

knowledge (b) Pedagogical knowledge (c) Knowledge about children/learners (d) Learning environment and classroom management (e) Communication and collaboration (f) Continuous learning and professional development (g) Legal bases and professional development (h) Information and communication technology. A mathematics teacher in Nepal is expected to have all eight competencies.

The competencies of 21st century teachers mentioned by Nessipbayeva (2012) are (a) Teachers demonstrate leadership (b) Teachers establish a respectful environment for a diverse population of students (c) Teachers know the content they teach (d) Teachers facilitate learning for their students (e) Teachers reflect on their practice. Gupta (2011) states that competency is knowledge, skills, attitudes, or behaviors that enable one to perform the activities of a given occupation or function to the standards expected in employment. According to this, teacher competencies can be defined as the set of knowledge, skills, attitudes, or behaviors that enable teachers to perform in the classroom to the standards expected in school. Gupta (1999) and Selvi (2010) state a competent teacher needs to have knowledge, skills, attitude, values, motivations, and beliefs teacher to be successful in teaching.

To be a competent teacher, he/she should update every day in the areas above mentioned. To make the teachers competent, NCED, NGOs, and local schools are conducting several professional development programs such as training sessions, workshops, seminars, follow-ups, and evaluations for the teachers these days, which requires more time, energy, and resources. Despite teachers' training professionally, their professional skills are not helping them improve the learning achievement of the students at school where they have been teaching for a long time. Even though I got some opportunities to attend a few teachers training, workshops, and seminars, I could not bring a visible impact on my students' learning. The time, resources, and

energy that I invested in the training did not bring significant change in my teaching and learning of the students. Also, when I observed some lessons of the teacher who attended the training I facilitated and interacted with students from those classrooms, I did not see any visible impact of my input. As I reflected on my professional development and observed the teachers' behavior and attitude during and after the training, I realized that we were not proactive in participating actively, learning more, and implementing them during and after our professional development. I was not ready to invest my time, energy, and resources. I lacked the motivation to be involved actively in my professional development, which would equip me with the expected competencies.

Teachers will be motivated only if their perception of their professional development is positive. Teachers may have a positive, negative, mixed, and neutral perception of professional development. Despite having any kind of perceptions, they might have been engaged in different professional development activities willingly unwillingly, or knowingly unknowingly. To know the perceptions of mathematics teachers that have a direct or direct influence on motivating them for their professional development, I would like to undertake my M.Ed. research on the title mentioned below.

Purpose of Research

The purpose of my research study was to explore the perceptions of mathematics teachers on their professional development and its impact on their teaching of mathematics teachers based on the reported narratives

Research Questions

- How do mathematics teachers perceive their professional development??
- How do teachers narrate the impact of PD on mathematics teachers?

Significance of Study

The findings of this research can be helpful to mathematics teachers, participant teachers, school management, mathematics teacher trainers, and researchers. This research will encourage mathematics teachers to adopt effective teaching approaches benefiting the students abundantly. Participant teachers will get an opportunity to reflect on their daily work, experience and think forward for their development. The reader teachers will learn about the perceptions of other mathematics teachers and its implication on their profession. The school management can plan for the professional development of their teachers for the quality education in their school and colleges after going through this research study. Researchers who want to do further research related to teachers' professional development will also find this research study helpful. Trainers in NCED, NGOs, local training centers, and school leaders can incorporate the learnings from this research in their training curriculums for the effective and relevant training program. Students, teachers, school, parents, researchers, trainers, and other academic personals will be directly and indirectly benefitted from this study.

Delimitation of the Study

My research objective was to discover the perception of mathematics teachers about their professional development and the impact seen in mathematics teachers after being involved in teachers' professional development activities. Mainly, my study was delimited to mathematics teachers who are teaching in three different schools in the Lalitpur district.

CHAPTER II

LITERATURE REVIEW

Chapter Overview

This chapter has explored some literature related to my research related to teachers' professional development. I have divided the literature review into three sections. I have done a thematic review in the first section on teacher professional development, professional development of mathematics teachers, and pedagogical content knowledge. In the second section, I have done a theoretical review using Mezirow's transformative learning theory. Similarly, the third section contains an empirical review where I have examined the previous five research studies related to teachers' perception of their professional development and derived the research gap on which my research is based.

Thematic Literature Review

This section constitutes the major theme of this research study. The first question of this study wants to explore the perceptions of mathematics on their professional development. On the other hand, the second research question asks us to explore the changes in mathematics teachers' performance after they get involved in any professional development programs. The major themes of this study are teachers' professional development and the professional development of mathematics teachers.

Teachers' Professional Development

We require more knowledge, skills, and attitude to be competent professionals, and this is possible only going through professional development.

Schlager and Fusco (2003) state that professional development is a process of learning helping to put knowledge into practice through engagement in practice within a community. It includes formal experiences and informal documentaries (Ganser, 2000; Hasan & Parvez,2017).

For years, training was taken as the only way of professional development in the past but professional development is broader than training. Training is just a part of professional development preparing teachers for their professional development (Bakhati,2014). Teachers usually perceive that teacher training and teacher professional development programs are synonymous (Bhujel, 2020). Bhujel believes that teacher training is the most popular approach to professional development but not interchangeable. Pokhrel and Behera (2016) also state that training is the most powerful option of TPD which is most commonly used in many countries, including Nepal. Training is just a part of TPD. We can say training is one of the activities among many activities of TPD. Richards and Farrell (2005) also suggest that TPD activities are workshops, self-monitoring, teacher support groups, keeping a teaching journal, peer observation, teaching portfolios, analyzing critical incidents, case analysis, peer coaching, team teaching, action research, attending conferences, reading professional publications, self-directed study, using distance learning materials, collaborative learning, etc.

Professional development is effective only if it is ongoing, includes training, practice, and feedback with adequate time and follow-up support which provides the teacher an opportunity to get involved in training, implement and practice in the workplace, get constructive feedback from experts (Peña-López, 2009).

According to Pokhrel and Behera (2016), the history of TPD in Nepal began when NESP declared academic and professional qualifications for the first time in

1971, which was initiated by providing training of ten months to the teachers. Then, NCED was established in 1993 under MOE as an apex body to provide TPD opportunity formally to the teachers as an in-service teacher training program which was able to provide 98.2% of teachers at public schools by the year 2009. So, School Sector Reform Program (2009-2015) recommended NCED to extend the horizon of training by conducting Teachers' Professional development (TPD) programs with 30 days of center-based training, project work in school, and developmental feedback by an expert for five years in three phases with ten days per phase. School Sector Development Plan (2016-2023) continues the TPD program incorporating the recommendation of SSRP, aiming to train 1,93,212 teachers within five years in two phases of fifteen days each. This TPD program aimed to train only community schoolteachers where teachers from institutional schools are expected to participate in the professional development programs organized by the local schools, training institutes, NGOs, educational forums, etc.

Professional Development of Mathematics Teachers

Teachers who teach mathematics in schools in Nepal seem to be very busy taking tuition classes, coaching classes, and extra classes. Especially, every year SLC/SEE candidates are busy attending mathematics coaching classes in different community and institutional schools in comparison with other subjects.

Many students in Nepali schools can solve basic mathematical problems, but they do not seem to be competent in critical thinking, reasoning, and problem-solving (MOE, 2015; Manandhar, 2018). As a result, some could score good marks or pass by writing the memorized knowledge in the exam. Those who could not memorize were declared weak and failed students. There is pressure on mathematics teachers. Suppose they are given the environment of professional development. In that case,

eventually, they will think out of the box, and they will be equipped with knowledge, skills, and attitude to teach mathematics effectively in the classroom. Students will find it meaningful in their life. It is possible only if they are provided with the environment of learning, practicing, and reflecting in their classroom with knowledge, skills, and attitude required for effective teaching. Such an environment can be provided only through teacher professional development.

Pedagogical Content Knowledge (PCK)

Pedagogical content knowledge was formally introduced by Lee. S. Shulman from Stanford university. It is one of the categories for the growth of knowledge for teachers (a) subject matter content knowledge (b) pedagogical content knowledge (c) curricular knowledge suggested by Shulman (1986). According to Shulman (1986), PCK is the knowledge needed to represent and formulate the specific subject to make it comprehensible to students. Shulman (1986) further explained PCK includes an understanding of what makes learning specific topics easy or difficult identifying conceptions, preconceptions, and misconceptions of learners, and knowledge of strategies to deal with it. It means that teachers should have deep knowledge of both subject matter and pedagogy knowing what, why, and how to teach.

Most mathematics teachers in Nepal either don't have deep knowledge of mathematics or don't know pedagogy. Most teachers who teach mathematics at the primary level didn't study mathematics as a major subject in university. So, they don't have deep knowledge of mathematics. They are expected to be ready to teach any subject according to the need of the school in Nepal. On the other hand, basic level and secondary level mathematics teachers in institutional schools have good knowledge of mathematics coming from humanity or science faculty. They do not come from a mathematics education background. So, mathematics teachers in Nepal

either don't have deep knowledge of mathematics or knowledge of pedagogy. Comparatively to the teachers of other subjects, mathematics teachers do not have the opportunity to study pedagogy or advanced mathematics due to a lack of time and motivation. Every day teachers work hard to teach mathematics, but they fail to do it effectively due to a lack of good knowledge of mathematics and pedagogy. Appropriately selected and implemented mathematical tasks lay the foundations for students' construction of knowledge and represent powerful learning opportunities (Krauss et al., 2008). Teacher professional development provides an environment for mathematics teachers to have PCK to teach mathematics effectively.

Theoretical Review

The theoretical literature review helped me to find those theoretical concepts which were used by different researchers previously in their dissertation/theses, journals, articles, books, and other documents. Using narrative inquiry as methodology, I explored the perceptions of mathematics teachers on their professional development and its impact on their teaching of mathematics teachers based on the reported narratives. In my research, I referred to transformative learning theory that describes how perception is shaped.

Transformative Learning Theory

Using narrative inquiry as a methodology, I explored how mathematics teachers perceive their professional development and how do they narrate the impact. In my research, I referred to Transformative learning theory that describes the frames of references, habits of mind, point of view, communicative learning, critical self-reflection, and discourse.

Many scholars have contributed to the field of transformative learning. I focused on the work of Jack Mezirow. Mezirow (1997) states that transformative

learning is the process of effective change in a frame of reference. Mezirow (2000) has defined transformative learning as the process by which individual transforms taken-for-granted frames of reference to make them more inclusive, discriminating, open, emotionally capable of change, and reflective. It helps the learner transform their frames of reference expanding them to welcome more new perspectives. A frame of reference is our mindset that filters how we engage with the world and make meaning (Bush, 2015). Mezirow (2000) elaborates frames of reference as the structures of assumptions and expectations through which we filter sense impressions that selectively shape and delimits perceptions, cognition, feelings, and disposition. These are the results of ways of interpreting our experience and are primarily the result of cultural assimilation and the idiosyncratic influences of primary caregivers.

Mezirow (1997) further explains that a frame of reference is composed of two dimensions, a habit of mind and a resulting point of view. A habit of mind is a set of assumptions – broad, generalized, orienting predispositions that act as a filter for interpreting the meaning of experience. Costa and Kallick (2000) also define that habit of mind having a disposition toward behaving intelligently when confronted with problems, the answers to which are not immediately known. The resulting point of view is the complex of negative feelings, beliefs, judgments, and attitudes regarding specific individuals or groups with characteristics different from our own (Illeris, 2018). Illeris echoes Mezirow that habits of mind become articulated in a specific point of view that shapes particular interpretations which are more accessible to feedback and awareness to others. The habit of mind becomes expressed as a point of view and more durable than the point of view.

As transformative learning is the process of effecting change in a frame of reference comprised of habits of mind and point of view. It is necessary to change the

structure of reference, specifically habits of mind and points of view. We transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based (Mezirow, 1997). Mezirow further explains we can become critically reflective of the assumptions we or others make when we learn to solve problems instrumentally or when we are involved in communicative learning. Here, Mezirow has mentioned two types of learning suggested by Habermas. Instrumental learning consists of the process of learning to manipulate or control the environment or other people learning and learning to understand the meaning of what is being communicated involving at least two persons striving to reach an understanding of the meaning of an interpretation or the justification for a belief reaching a consensus (Mezirow,1990). Communicative learning involves understanding purposes, values, beliefs, and feelings and is less amenable to empirical tests. Illeris (2018) mentions two major elements of transformative learning i.e., critical reflection and dialectical discourse.

Mezirow (1997) mentions four processes of learning: (a) elaborating existing frames of point of view, (b) establishing a new point of view, (c) transforming points of view, and (d) transforming habits of mind. I agree with Mezirow in his processes of learning. First, adult learners elaborate their point of view when seeking further evidence to support their initial bias regarding a group and expand the range or intensity of our point of view. Second, adult learners establish new points of view when encountering a new group and create new negative meaning schemes for them to establish new points of view when encountering a new group and create new negative meaning schemes by focusing on their perceived shortcomings as dictated by our propensity for ethnocentricity. Third, adult learner transforms their point of view with experience in another culture, critically reflecting on their misconceptions

of this group. Fourth, adult learner transforms their ethnocentric habit of mind by becoming aware and critically reflective of our generalized bias in the way we view groups other than our own.

A learner has to go through critical self-reflection and dialectic discourse during these four learning processes for transformative learning. Transformative learning involves participation in constructive discourse to use the experience of others to assess reasons justifying these assumptions and making an active decision based on the resulting insight (Mezirow, 2000). Constructive discourse is a process in which we have an active dialogue with others to better understand the meaning of experience. Mezirow has explained the need to go through the rational discourse in communicative learning to justify a problematic belief or understanding. It validates what is being communicated. In this, discourse allows us to engage in 'reflective learning in which we bracket our prior judgments, attempt to hold our biases in abeyance through a critical review of the evidence and arguments, decide about the justifiability of the expressed idea whose meaning is contested' (Mezirow, 1990).

Reflection in communicative learning is a critical assessment of this distinctive problem-solving process, checking to make sure that we have accurately identified the distinct patterns of similarity and have found metaphoric labels that give them coherence about a meaning perspective (Mezirow, 1990). During the discourse, we become critically reflective by challenging the established definition of a problem being addressed, habitual patterns of expectation, and meaning perspectives. We have made sense of our encounters with the world, others, and ourselves. In the beginning, it may ignite us to elaborate on our existing point of view, followed by establishing a new point of view. But as we spend more time in discourse, it will lead us to transform our point of view being critically reflective after

we get an opportunity to know the perspective of others and the logic and reason behind it. The more we get the opportunity to learn about the perspectives of others, the more our points of view get transformed, and eventually, our habits of mind and frames of reference get transformed. In this way, critical discourse, and self-reflection alongside slowly change our frames of reference for transformative learning.

Empirical Literature Review

This review allows us to revisit and review the research of other researchers on the same topic which will lead us to find the research gap. Here, I am researching the topic "Perception of mathematics teachers on their professional development and its impact". Now, I have explored a few research papers, articles, journals published on the same topic. Below is the empirical review of my research.

Bharati and Chalise (2017) researched "Teacher Development: Strategies and Perception". The main purpose of this study was to explore the perception of teachers on teacher development within the teachers at city schools. When the teachers were asked "what is teacher development?", 80% of the teachers chose 'improving their knowledge and performance regarding teaching', 15% of teachers chose 'teaching them what to do in the classroom' and one teacher chose 'working for their job security'. No teachers chose the distracter 'helping them to develop economically'. The teachers had different perceptions towards their PD where the majority of them perceived TPD as improving their knowledge and performance regarding teaching.

Kagoda and Ezati (2014) researched "Perception of the Concept of TPD in a Case Study of Teachers from Five Districts of Uganda". The main purpose of this study was to explore teachers' understanding of the concept "teacher professional development. During the questioning, 50 teachers replied "acquire knowledge and skills", 20 replied "Observing ethical code of conduct", 16 replied "Improve on

pedagogical code of conduct", 8 replied "Improve on qualifications", 6 said "Improvement: Socially, economically, cognitively, emotionally" 3 said "Efficiency and effectiveness in teaching and learning" and 2 said "Growth in experience". Almost fifty percent of teachers perceived TPD as acquiring knowledge and skills only. It was concluded that teachers have a narrow view and understanding of teacher professional development.

Kennedy (2017) also researched "Teacher Perceptions of School-Based and District Professional Development". The purpose of this study was to explore participants' perceptions of professional development experiences, opinions about the effectiveness of the professional development sessions, and factors that determine if professional development impacted how they collaborated with other teachers. The participants in this study perceived school-based and district-level professional development as necessary but in need of more personalization. They felt as though their recent experiences were beneficial when they were job-embedded and engaging. They felt as though professional development is effective when it is not top-down, and teachers have the opportunity to choose what they learn about. Similarly, the participants perceived professional development that inspired them as effective because they were more likely to implement the newly acquired information. Participants also felt empowered and excited about professional development that was specific to the needs of the professional learning community and applicable to their current situations.

Bicaj and Treska (2014) researched "The effect of teachers' professional development in raising the quality of teaching". The main purpose of this study was to explore the effects and benefits of professional advancement on creating new knowledge and improving the quality of teaching. 90% of 31 teachers thought that

professional development is useful for possession of new knowledge and for raising the quality of work. Only 7 % of the participants did not agree with it. 68% of participants think the program should continue but 22% do not want this program to continue. The majority of teachers perceived TPD useful.

Smith (2015) also researched "Math Teacher Perceptions of Professional Development and Student Mathematics Performance". The purpose of this study was to investigate math teachers' perceptions of the PD and its effectiveness in raising student scores on the end-of-course exams. 50% of the teachers felt confident with implemented questioning techniques and probing questions around whole group discussions, while others felt confident with sequencing content and standards around planning. 50% of the mathematics team did not feel confident with implementing structured math talk in the classroom; specifically, teachers discussed struggles with time management and student engagement when implementing structured math talk. 75% of the participating teachers felt confident with the use of public record, wait time, turn and talk, and private think time. The professional development improved the social climate in the classroom according to 75% of participating mathematics teachers. The mathematics team felt confident with implementing different instructional strategies learned from the professional development.

Research Gap

The research studies done by the researchers above were done in their own culture and context. They were directly related to the perception of professional development of teachers but not of perceptions and impacts of mathematics teachers on their professional development in the context of Nepal. After going through the empirical review, I planned to research the perception and impact of mathematics teachers on their professional development in the Lalitpur district. In the above

empirical review, the participants were found to have a mixed understanding of professional development but most of them believe it only in rich in knowledge or content as one-time training, seminars, and workshops.

Chapter Summary

In this section, I have done a literature review by taking the help of different articles, journals, books. First, I have done a thematical review connecting with the TPD, mathematics teacher's development, and PCK. Second, I have reviewed through the lens of transformative learning theory by Jack Mezirow. Then, I have done the empirical review of the few researchers who researched the past on a similar topic. The research gap I found is how do they understand professional development and how they are implementing it in their life.

CHAPTER III

RESEARCH METHODOLOGY

A researcher must be aware of the method of the research he/she is conducting. In this chapter, I have discussed the research paradigm, philosophical considerations, research method, the procedure of selecting participants, the procedure of collecting field notes, narratives, analysis and conclusion, quality standards, and ethical considerations.

Research Paradigm

A paradigm is a comprehensive belief system, world view, or framework that guides research and practice in a field (Taylor & Medina, 2011). So, the research paradigm guides the researcher in thinking and doing research. My study aimed to explore the perception of mathematics teachers on their professional development and the impact of professional development activities. Therefore, I chose the Interpretive paradigm, which enabled me to build rich local understandings of the life-world experiences of teachers and students and the cultures of classrooms, schools, and the communities they serve. As an interpretive researcher, I tried to build rich local understandings and interpret the real-life experiences of teachers of the cultures of their workplaces (Taylor & Medina, 2011). I could focus on the beliefs, stories, and teachers' professional development experiences from professional teacher programs during the interview with the participants. This interpretive paradigm facilitated me to engage in the field to understand my research participants' perceptions and attitudes towards their professional development.

Philosophical Consideration

In this section of philosophical consideration, I have described the ontological, epistemological, and axiological considerations about teachers' professional development.

Ontology

Ontology is a view of the nature of reality. Reality is different in different contexts and experiences. The ontology in this research is to form an assumed reality of teachers' professional development. Every reality of a teacher differs because teachers have multiple realities coming from different backgrounds (Guba & Lincoln, 1989; Kamal, 2019). Coming from different contexts, cultures, and environments, the realities of my participants differed. Therefore, I found multiple realities. The participants had different beliefs and values about TPD, which was true for them but may not be accurate for others. These realities were derived from their subjective interpretation based on their context and experiences of participating in professional development activities and going through the process of implementing them in their classroom. I collected different views of my different research participants which were with multiple realities for my research study.

Epistemology

Kamal (2019) explained epistemology as how the investigator comes to know the truth and reality or how do we know what we know? The generation of meanings could be influenced by many factors (Lincoln & Guba, 2013, p. 40; Kamal, 2019). So, the epistemology in this study is subjective. The subjective knowledge about TPD in teachers was constructed through pre-knowledge and experiences taking a long period from their first experience of participating in professional development activities. Being an interpretive researcher, I gave equal importance to these facets of

knowledge trying to understand their natural, social and cultural settings. I interacted with the participants and collected their subjective experiences rather than objective knowledge. Participants' narratives are the sources of knowledge. Everyone has lived with different experiences. They have different perceptions based on these experiences. I have generated subjective information through the engagement and interaction with teachers' experience in their professional development during their teaching career.

Axiology

Axiology deals with the theory of value and refers to what the researcher believes is valuable and ethical (Killam, 2013). The actions and behavior of a person are guided by the value present within themselves. The value is shaped by the culture and environment. The values of participants may differ from each other for coming from different cultures and environments. In this study, I valued the perceptions, ideas, and stories based on the experiences of every participant on TPD and its impact, equally taking them as their assets.

Research Method

The narrative is a way of organizing human experience since humans lead storied lives individually and socially (Kim, 2015). People shape their daily lives by stories of who they and others are and as they interpret their past in terms of these stories. I used narrative inquiry as my research methodology, adopting a particular view of experience as a phenomenon under study (Connelly & Clandinin, 2006; Kim, 2015). Narrative inquiry helped me to explore the participants' lived experiences in my study for the perceptions of professional development of mathematics teachers and its impact on them. Narrative inquiry helped me generate participants' stories concerning the perceptions of their professional development and analyze them.

Therefore, I chose narrative inquiry where I had to take interviews and collect stories and testimonials meeting them individually. Narrative inquiry provided in-depth information about the perceptions of teachers' professional development, their involvement in the professional development plan, the role of culture of continuous learning, the experience of applying the new learnings, challenges they faced, and the impact of their professional development.

Selection of Research Sites and Participants

Being a narrative inquiry researcher, I had to be wholly dependent on the research participants for the information for this study which could be collected from their stories and experiences. I used criterion-based purposeful sampling to select 3 teachers. The purposeful sampling is based on the assumption that the researcher can select elements that represent a 'typical sample' from the appropriate target population. The participants met 3 criteria (a) taught mathematics in school, (b) had 5 years or more of teaching experiences (c) had participated in professional development activities. To identify the participants who met these criteria, I had interviews with 6 teachers. Finally, I selected these 3 participants out of 6 candidates who could meet the criteria.

All three teachers are teaching in three different schools of Lalitpur municipality. I used pseudonym names for the participants to maintain their privacy. Shruti Dhakal is a female basic level math teacher in one of the public schools for seven years. She participated in several professional development programs organized by the government. Chhaya Tamang is a female teacher who is a grade teacher teaching in one of the institutional schools for more than five years. Rajeshwar Chaudhary is a male math teacher in one of the institutional schools who has experience teaching secondary level for a decade. I selected these three schools for

three participants so that I could easily reach the participants who could be available for the interviews according to the need of my research problem.

Data Collection Tools/Instruments

It is very important in my research to use data collection tools and instruments to find the findings. As a narrative inquirer, I had to conduct interviews in an informal conversational manner so that participants would be encouraged to share their stories openly.

To conduct an interview where views between two-person conversations are interchanged in a theme of mutual interest (Ennis & Chen, 2012), it is necessary to initiate and continue the conversation. I generated fifteen open-ended questions for the first interview. The questions were based on key research questions aiming to help the participants to share their stories, experiences, and ideas concerning the perception of teachers' professional development and its impact. Apart from these open-ended questions, I used field notes, field reports, audio recorder, voice recordings. After realizing the insufficiency of stories from the first interview, I generated more follow-up questions for the second interview based on the questions and sharing from the first interview hoping to explore more stories.

Interviewing Process

After getting the consent from the participants, I began interviews by posing clear and concise questions based on my key research questions. I asked them to share their stories and experiences freely without any hesitation at their own pace and listened to them carefully at the same. I had sound knowledge about the study as a researcher, familiar with the experiences and feelings as a mathematics teacher, and I could relate with learning theories as a teacher trainer. This knowledge helped me to dig the stories deeper whenever needed. I made the participants recall their past

experiences and compare them with the present situation. During the interview, I took notes of some interesting and important information because I thought that I may not notice them later.

After transcribing the audios, generating codes and themes, I realized that I need to conduct another round of interviews to explore more stories and experiences. It took six months to become normal to sit face to face without any fear of Corona. So, I called the participants after six months, requesting them for another round of interviews. Two participants agreed to meet face to face and give an interview, and the third participant agreed to give an interview over the phone call because she was not in the valley at that time. However, I recorded the interviews of both modes face-to-face and distance.

Meaning Making and Interpretation Process

Merriam (1998) stated that data analysis is a complex process that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation (as cited in Williams, 2014). During data analysis, I generated meaning from the data from the stories and experiences by describing the risk, negotiation, process, presentation, and conclusion associated with the narratives (Webstwer & Mertova, 2007).

Firstly, I organized and prepared the data and transcribed the audio recording and field notes into the text (Creswell, 2015). I rechecked playing audio, comparing it with the audio three times to not miss any important information in the transcribed text. This helped me to transcribe better. During transcribing, I could identify some codes I noted them down in a notebook so that I can use them during coding. Secondly, I explored and coded the data by exploring the general sense of the data. I

reduced a large amount of data into related themes. I was able to code all the individual transcripts and used them to construct the individual narratives.

Thirdly, I used the written transcripts to identify individual experiences. Reviewing the transcripts, I reordered the segments in a logical sequence. I constructed the narratives with a sequence of experiences and themes emerging from those experiences. I added accuracy by member checking with the participants.

The meaning-making process and interpretation in my research began from collecting data from the participants taking interviews, transcribing the audios and text, coding, thematizing, and constructing narratives.

Quality Standards

It was necessary to establish the quality standards to trust this research. Here, I generated the meanings based on the sharing of experiences by the participants. To ensure the accuracy and trustworthiness of the findings of this study and make it authentic, I maintained quality standards such as trustworthiness and authenticity (Guba & Lincon, 1989; Morrow, 2005)

Trustworthiness

To make the research findings trustworthy, the researcher needs to maintain quality by describing how the data were collected, how textual data were generated, how were they arranged in chronological order, and how the meaning was made. Further, I have discussed criteria for trustworthiness such as credibility, transferability, and pedagogical thoughtfulness.

Credibility makes the data credible, and the readers feel how trustworthy is the research. There are mostly five ways to produce credible data and interpretations: a prolonged period of engagement, persistent observation, triangulation, peer debriefing, and member checking (Lincoln & Guba, 1985; Pandey & Patnaik, 2014). I

had a prolonged period of engagement for more than six months with the participants wherein I could check misinformation and build trust by having frequent conversations over the phone. I conducted member checking by having participants review the transcript of interviews. I used my field notes during the interview, interview transcripts for triangulation of achieving triangulation of data.

Transferability is another source that helps the study to maintain accuracy and trustworthiness. The findings are considered transferable if the readers find them relevant and applicable to their contexts. Transferability is achieved by a "thick" description of a wide array of information from the data collected to make a transference (Lincoln & Guba, 1985; Pandey & Patnaik, 2014). During my research, I took authentic data, documents and verified them with my experience, and led the participants to self-reflection with sufficient rich description so that the readers can compare his/her own social context with the social setting of the research. This study created three narratives that aim to provide a thick description with experiences and perceptions regarding teachers' professional development to make it transference.

Pedagogical Thoughtfulness allows applying the research findings in teaching and learning in the classroom. During this research, I went through the process that included experience shared by the participants and literature review. The findings from this research will help the mathematics teachers to reflect on their pedagogical practice to improve the students' learning mathematics in the classroom (Van Manen, 2016).

Authenticity

Authenticity is the quality standard of the research that a researcher has to maintain the relationship with the participants throughout the research. The authenticity criteria focus on the ethics of the relationship established by the

researcher with his/her participants and include fairness, educative, catalytic, and tactical (Taylor & Medina, 2011). I carefully selected the participants so that they can provide real information for my research. The participants reflected on their own professional development with good success stories and somehow realized the challenges in their profession and plan how they can do better in the future. I valued and respected their beliefs during the interviews, and I did not impose or suggest them. I represented all the participants' beliefs and values. However, I verified their information using cross queries whenever it was necessary. Participants got an opportunity to reflect on their teaching and teacher professional development and identify where they succeeded and where they could have done better.

Ethical Consideration

Ethics makes the researcher honest to the participants and readers. It prevents illegal activities such as cheating, disclosing confidential things, etc. I researched adult participants who are in the respected status 'teacher'. After getting the participants' mobile numbers, I called them, explained to them about my research, and proposed them to be my research participant because they were the right participants who can contribute to my study find contextual findings. All three participants agreed to be my research participant when I proposed them. During the process of being a research participant, I also got their consent, convincing them that I respected them as I respect myself. The cornerstone of ethical research is informed consent (Denzin & Lincoln, 2017). I respected their experience and understandings which are their asset. I clarified the purpose of my research and ethical issues to the participants who need real information for the authentic result in the first meeting. So, I convinced the participants that being as an educator, their experience and understandings will be confidential between the participants and the researcher. All the information will be

destroyed after the research. I did not compel the participants to be part of my research physically or mentally instead I allowed them to quit the involvement in my research any time they want by making them feel free because they are helping me as a volunteer free of cost. I was not biased toward any of the participants. I took permission from the participants to record the audio of our interview for the evidence.

Chapter Summary

I have explained the methodology of my research in this section. I have defined the research paradigm i.e., interpretivism, with its ontological epistemological, and axiological point of view. Further, I have explained my research design i.e., narrative design, data and tool instruments, interviewing, selection of research sites and participants, meaning making, and interpretation as data analysis. I have explained how I maintained the quality standard of my research to make it trustworthy and authentic. At last, I have explained the ethical considerations I made in my research.

CHAPTER IV

PERCEPTION OF TEACHERS ON THEIR PROFESSIONAL DEVELOPMENT

In this chapter, I have discussed the family background of Shruti, Chhaya, and Rajeswar, the journey to their teaching career, and PD experiences. They shared their experiences of participating in PD programs in different resource centers, hubs, schools, universities, and forums. I analyzed their experiences of involving in PD activities and their implementations. I discussed how they perceived TPD. During the process, I developed themes addressing the key research questions which are based on the perception of mathematics teachers on their PD.

Shruti's Stories of her Perception on PD

I have explained how I approached Shruti to be my research participant and collected her stories of her family and education background, teaching, and teacher professional development. Then, I narrated her three narratives, generating the themes: TPD as an ongoing holistic development, TPD much more than training, and TPD for competency development and meaning making on each theme of narratives linking with related literature.

Approach to the Research Participant

After getting ready for the interview with interview questions based on my research questions, I approached Shruti and decided to have her as my research participant. She met the criteria of being a research participant of my study that I made for my research. I interviewed over the phone in both the first and second rounds of the interview and recorded the conversation for the evidence. She is a

community schoolteacher who has experience in different professional development activities provided by the Nepal government. She is also involved in one of the learning forums of mathematics teachers. She has been teaching since7 years. I wanted to explore her perception of teachers' professional development in comparison to other male and female participants. Moreover, she is a mother of two children who has to take care of her children and the whole family including her husband which comes under the practice of Nepali culture. She has to be very careful in managing family and professional life. Also, she recently completed her master's in mathematics education from Kathmandu University. I wanted to explore her perception of her professional development despite difficulties she had to manage time for family, profession, and study.

TPD as Ongoing Holistic Development

Shruti started her teaching career from 2065 BS as a part-time teacher in a school where she was doing her practice teaching conducted by her university. She did not have passion and maturity during the first year of her teaching. Those days, teaching was just a job for her, so she took the teaching profession very lightly and boring profession. However, she was obliged to teach the students for good results otherwise she had to face the school management. So, she worked very hard teaching in chalk and talk method, but it was all in vain. In the meantime, school management recommended her to attend training as a part of her professional development. When she came to know that she had to attend the training, she did not want to join it. She thought that she had already completed Bed and she was capable to teach effectively. She felt that she did not need any help to learn from anyone or training. She was prejudiced against professional development activities. She assumed that her academic qualification was enough, and she would get nothing from the training and

whatever she learned in the training will not be implemented, so it was just a waste of time.

Despite having all these thoughts, she was compelled to attend the training under the pressure of school. Unwillingly, she attended her first training which was about the game 'Bingo'. There she was given 5 days of training as induction for the new teachers from the government. It was about how to enter the classroom, how to grow and develop professionally. After a few years, NCED conducted a TPD program for the community schoolteachers in different training hubs. The whole program was split into three phases of three to five days. She participated in the program where she was instructed to prepare the report of her action research after implementing the learnings in the classroom. There, the facilitator gave the ideas of teaching using different teaching and learning techniques, using technologies and integrating ICT in the lessons.

When she attended these training sessions, she had many questions, but she hesitated to ask questions to the facilitators. She wanted to share her ideas and opinions based on her experiences in training, but she could not do it due to her hesitation. In one of the subject-specific mathematics training sessions, which was about using the abacus. She could not raise the questions to the facilitator due to her lack of confidence.

Slowly, she realized that she would not return empty hands from the training sessions. The training triggered her to think about how she can teach better. She was also motivated by the performance of other participants in such meetings. These training sessions motivated her and made them curious to learn more about those things which were discussed in the training sessions. She realized that everyone has space to learn. She started exploring the internet proactively for more profound

knowledge about what was discussed in training by the facilitator. This led her to look forward to the opportunities and participate in professional development activities such as training sessions, seminars, workshops, conferences, etc. These professional developmental activities made her aware of using ICT in the classroom with the maximum use of resources around us according to the 21st century. She started trying to implement the things she learned from professional development activities in her classroom.

She attended another training that aimed at developing skills to teach online classes effectively during this pandemic. There she learned many things that helped her to teach online classes effectively. After getting involved in those professional development activities, she changed her perception of teacher professional development. She started perceiving TPD as a development of teaching skills by changing teaching methodologies from traditional to recent methods such as child-friendly and ICT-friendly teaching and learning strategies and methods. By this time, she started believing that TPD is for the holistic development of teachers in knowledge, skills, competencies, and attitude. She also started believing that TPD is not only about obtaining an academic qualification but is an ongoing process of development for the personal and professional areas.

After going through her narratives, I developed ongoing holistic development as one of the themes to address my research question. This seems to be evident that teachers' professional development is taken as ongoing holistic development of the teacher. The narratives I explored of my research participant are based on the perception of teachers' professional development. It was revealed gradually that she didn't think that teachers need to develop their personal and professional skills and knowledge at the beginning of her teaching career. She was satisfied with the chalk

and duster method like most of the teachers in Nepal used to teach only with chalk and duster in the classroom (Acharya, 2014). As she participated in different professional developmental activities, she got the opportunity to learn many new things that she did not expect before and realized everyone has room to learn. She compared a teacher equipped with teaching methods with a soldier equipped with many weapons. Applying those learnings in the classroom, she felt that teachers need to go through processes and activities to develop professional knowledge, skills, and attitude to improve the learning of students (Guskey, 2000).

When I was a teacher many years ago, I had only the knowledge of the content but not skills of how to deliver it. After attending a couple of professional development activities, I was a proud teacher with few teaching methods. I did not have the certainty to continue teaching as my profession those days. I earned a positive attitude towards the teaching profession after going through several hurdles and up and down. I knew that teacher needs to possess the knowledge, skills, and attitudes of an educator.

Shruti also perceived from her experience that TPD is an ongoing process. The more she spent her time in professional development activities the more she learned and felt that learning is ongoing. Professional development of teachers is considered as "a long-term process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession" (Villegas-Reimers, 2003, p. 12). It acknowledges the fact that teachers learn over time. According to the teacher competency framework, continuous learning and professional development are the competencies of teachers of Nepal (MOE, 2016).

As a researcher, when I reflect on myself as a beginner and experienced teacher for more than a decade, I find myself learning new things every day. The more I spend time learning, the more I understand deeply. For me, TPD is an ongoing process until I have the will to learn.

TPD is Much More than Training

During the first years of her teaching, Shruti thought that she was fully professionally developed right after he/she obtained a certificate of academic qualification from the University. She thought that she had learned all necessary things such as learning theories with teaching and learning methods during her study in university. However, she was not able to apply those learning theories in the classroom. After some time of teaching, she found some of her colleagues talking about what they learned in the training and trying to implement the learnings. So, she thought a teacher also might can learn from training but still, she was a skeptic. After attending a few trainings, she understood that training is the only activity that helps teachers to develop themselves professionally. She thought she could learn only from training and facilitators and there are no other activities or sources where a teacher can learn from besides training.

As she went on participating in more training sessions, she realized that she was learning from other participants who were sharing their ideas and experience during the training sessions. She knew that there are also other sources besides training sessions for teachers to learn. In one of the training programs, the facilitator could not complete the topic due to the lack of time or lack of preparation. She was not satisfied with the incomplete knowledge from the training and facilitator. So, she started exploring the internet and libraries further and got complete knowledge of the

contents discussed in the training. She knew that one does not need to depend on only training and facilitator for the learning.

Moreover, she applied those learnings in the classroom. Some went well, and some did not. She started learning from her own experience by making mistakes and correcting them. In search of more learning, she enrolled herself in a Master's in Mathematics Education although she had already completed a master's in mathematics education from Tribhuvan University. Now, she knew that TPD occurs when teachers are proactively involved in learning from any platforms such as training sessions, seminars, workshops, conferences, colleagues, own experiences, self-study, etc.

I found that Shruti had little knowledge of TPD, which was limited to an academic qualification. After she started participating in academic meetings such as training sessions, seminars, workshops, and conferences, she understood that teachers could learn only from facilitators. Later, she learned that learning could also happen in collaboration, self-study, experience, etc. Finally, she came to know that TPD is much more than training. Shruti's new understanding of TPD was similar to that of Bhujel (2020), training and TPD are not synonymous and interchangeable, but training is the most powerful option of TPD (Pokhrel & Behera, 2016)

As a researcher, I also have a similar experience to Shruti. In my first year of teaching, I also used to think that one is professionally developed along with an expansion of academic qualification. After attending some professional development programs, I learned many new things. It motivated me to learn more. So, in search of new learning, I started exploring more libraries and other resources. I started learning from my colleagues. I realized that learning could happen any time anywhere anyplace. To develop professionally, a teacher has to involve in professional

development activities such as qualification programs, education conferences, training, seminars, workshops, collaborative learning, self-study, etc.

TPD for Competency Development

She thought she was already a competent teacher after graduating from university. But as she participated few training sessions, she realized that she needs to learn more to maintain her teaching competencies changing her teaching methodology from paper-pencil to recent teaching methods. As she started thinking out of the box, she knew why her students had poor performance even though she was teaching lessons with full energy. She used to think that she was equipped with almost all learning theories, but she realized that she lacked the practical skills to use the learning theories in teaching. She was motivated and curious to learn more about the things discussed in training. So, she actively started listening, thinking, consulting, and sharing in the meetings then onwards. She hesitated to speak in the meeting, but she gradually gained the confidence to share her opinions with others.

She started looking for more professional development activities, thinking that she would learn new things from the facilitator, other participants, or any other sources. She got exposure to many professional developmental activities where the facilitators aim to provide the best teaching methods. Among many methods, she thought ICT in teaching would help her students learn better. She was convinced that teaching using ICT is an interesting teaching method that would make her students enjoy and have fun and learn at the same time. To learn more about ICT and other best teaching methods, she joined Masters in Mathematics Education. She changed her teaching method from paper-pencil to child-centered teaching methods such as the use of ICT, use of teaching materials, use of games in her classroom, etc.

During this Covid-19 pandemic, she attended a training organized by Mathematics Council for Nepal for the teachers to help them teach through online classes. In training, the participants were sharing the ideas they used in their schools from their experience. Several teachers shared several ideas. She selected the best ideas and applied them in her classroom. In the same meeting, the facilitator advised the participants to explore the internet for the mathematical software. She explored and found one application Quizizz application and used it in the online classroom. During the same interval, her school organized training on the use of ICT during the time of the pandemic. This training was to help her colleagues to teach online classes effectively who were at home and struggling with online classes. She got an opportunity to share her learnings, ideas, and experiences with her colleagues in the school.

By this time, she knew that the students are capable of solving the problems by themselves if they are facilitated or guided with some hints, clues. She was equipped with many teaching strategies, classroom management, and evaluation skills, creating a learning environment, ICT integration, and many other skills. More than this, she was continuously learning from training programs, meetings, libraries, and colleagues to be competent and updated with new things to teach students new things. At the same time, some of her colleagues did not even know how to open a google account. They didn't show interest in learning about ICT skills before the pandemic when she attended professional development activities about ICT. So, they struggled a lot in teaching online classes, but it was easy for her during this pandemic. Her colleagues were obliged to learn ICT skills and apply them during the online classes. She learned that teachers should be updated to address the curiosity of young

learners. She learned the lesson that the teacher has to be a continuous learner so that he or she can be ready to teach in any situation.

From her narratives, it is clear that Shruti thought she was a competent teacher although she was not. Competence is an integrated form of knowledge, skill, attitude, and behavior (Bhujel, 2020). A competent teacher needs to have at least knowledge, skills, attitude in the teaching profession. Nessipbayeva (2012) states that teaching competency is an inherent element of an effective training process and teacher professional development. Teacher competency framework Nepal (MOE, 2015) expects the teachers in Nepal to have eight competencies mentioned in the thematic literature review section.

She gradually gained the competencies only after involving in professional development activities. She was equipped with pedagogical knowledge, a spirit of continuous learning, skills of using ICT in teaching, etc. Going through her narratives, I found her becoming a competent teacher.

When I was a teacher, I did not get any opportunities to participate in any professional developmental activities, I thought that I can teach better than others, there are not any better teaching methods than the lecture I was using, and I don't need to learn anymore. In my opinion those days, a teacher is competent who can solve all the problems from the textbook. Later, I realized that I was wrong after I got exposure to many training programs, companies of colleagues, exploring educational resources. These exposures made me aware of the need for the competencies I was lacking. At the same time, I learned about teaching and learning methods and the use of ICT skills in teaching. I learned about classroom management techniques. I started learning collaboratively from my senior or junior colleagues. I look for opportunities to learn new things for my continuous learning for professional development. Also, I

explore national and international level education policies and legal bases and education conduct from NCED, MOE, and other sources in Nepal. In this way, I am trying to be a competent teacher and practitioner as a part of my professional development. Therefore, the teachers must maintain the competencies possible only by involving in professional development activities.

Chhaya's Stories of Perception on her PD

In this section, I have explained how I approached Chhaya to be my research participant and collected stories of her family and education background, teaching, and teacher professional development. Then, I narrated her three narratives followed by generating the themes such as TPD as a holistic development, TPD for continuous learning, and TPD as a way of doing better in the workplace and meaning-making on each theme of narratives linking with related literature.

Approach to the Research Participant

After getting ready for the interview with interview questions, I approached Chhaya and decided to have her as my research participant. She met the criteria of research participant that I made for my research. I selected her as one of the participants for this study because I found her right participant who can help me to go deeper in my research by sharing her variety of experiences. I interviewed over the phone in the first round of interviews and recorded the audio for the evidence. In the second round of follow-up interviews, I visited her house and conducted face to face interview. She is a teacher from an institutional school who has experience in different professional development activities. She is an experienced teacher teaching for about more than 6 years when I asked for her interview. I wanted to explore how her perception of teachers' professional development in comparison to other male and female participants. She is also an energetic lady who just got married. I wanted to

explore her perception of her professional development despite difficulties she had to manage time from her busy schedule for her professional development.

TPD for Holistic Development of Teacher

Chhaya grew up in a children's home. She completed her bachelor's degree and joined a school nearby in the role of teacher. In the beginning, she thought teaching was a very easy job where the teacher just has to go to the classroom and explain or deliver the contents to be taught. She felt a lack of teaching skills and realized she needs to develop them, but she thought that she could develop those things independently. She thought that she had done her best and there was no use in training. She was doing best, and she can do best. Her understanding was that one can develop the teaching skills as much as he or she spends time teaching. So, she could not grow well professionally in the first years. In the meantime, school management planned to send some teachers for teacher training in one of the teacher training organizations in Kathmandu in 2016 AD. She was also selected in the group who were expected to attend the class every evening. It was a 3-month intensive course as professional development of teachers. She thought that she should not go and waste her precious time. Although she was not interested in the training, she had to attend the training under the pressure of school management. Otherwise, she would not be an eligible teacher from the view of the school leadership team. So, she somehow convinced herself to attend the training. The training was about child-centered teaching. The facilitator discussed the games such as Bingo, classroom management strategies, language teaching skills, generating and using teaching materials, preparing job charts, birthday charts, etc. This was new learning for her. After two years in 2018 AD, her school organized a tour to Singapore for some selected teachers in the school. During the visit to Singapore, they were planned to attend an

educational leadership training. Then, they also were told to join one of the training centers for a couple of days for their professional development. The trainers used to visit her school, observe her lesson how well she implemented the training, and provide development feedback. Every year, the school organized training, seminar, and workshops in school inviting the national and international trainers, experts, and scholars at the end of the academic session to utilize the leisure time of teachers.

During the involvement in those professional development activities organized by different organizations, colleagues, and experiences, she slowly learned many things that helped her think out of the box. She was equipped with some skills for her teaching. Moreover, involvement in professional developmental activities changed her attitude towards teaching. Over the years of participating in different professional development activities, she learned how to teach better, manage the classroom and be an example for her students. She gained the confidence to speak in front of the mass. During the implementation of training skills, she experienced many successes and failures. She learned many things from her own mistakes. She realized that there are many things that we cannot learn from only training, we learn from observing and experience, we learned from mistakes, from our colleagues, exploring new things on the internet, libraries, and other sources.

She realized that teachers' job is not only to teach but also to help the students develop holistically. She said *"Professional doesn't mean only related to education, but it requires the development of personality, behavior, and attitude that we carry as a teacher because we are role models. Student imitates teachers by observing the teachers not what we teach but how we behave."* She realized that teacher developing only in knowledge and skills is not

sufficient, but teachers need to develop their personality, behavior, and attitude. She believed that teachers could develop the students only if the teachers are developed holistically.

A few years ago, it was free time in her class, and she was busy checking the classwork of students. She noticed that few girls from her class were acting teaching their friends like she taught her students. She knew that her students noticed how she walked, how she spoke, what dress she wore, etc. They were imitating her ditto. She realized student imitates teachers by observing the teachers not what we teach but how we behave. So, teachers need to be very sensitive in presenting themselves in the classroom and require the teachers to develop themselves in overall areas such as knowledge, skills, attitude, personality, behavior, etc. The professional development of a teacher is the holistic development of a teacher.

From Chhaya's narrative above, I developed TPD as holistic development of the teacher as one of the themes addressing my research questions which are based on the perception of TPD. At the beginning of her teaching career, she thought TPD was not important. As she went on participating in different professional development activities such as training sessions, seminars, workshops, learning from her experiences, learning from colleagues, and exploring from internet, libraries, and other sources, she realized that TPD is a development of teachers in overall areas which can also be said as holistic development.

Holistic education aims for the fullest possible human development enabling a person to become the very best or finest (Forbes, 2003, as cited in Mahmoudi et al., 2012). Chhaya was convinced that teacher is a role model for the students who are expected to be having everything that students knowingly or unknowingly imitate. A teacher is a role model if he/she is attentive towards students' academic growth and

gives equal importance to their personal growth (Bashir et al., 2014). As a passionate teacher to impact her students' lives, she was professionally developing day by day holistically to help her students develop holistically.

As a researcher when I remember my past, I also have similar experiences to Mrs. Tamang. After teaching the same topic for the same class for more than 5 years, I was familiar with all the contents, units, chapters, exercises along with answer keys by this time. I did not need the textbook. I was so much confident that I used to teach without looking at textbooks, but I taught in the same way my teacher taught me i.e., lecture method. I did not have any teaching strategies. I did not know how students learn. Despite being familiar with the content of mathematics, I was not performing well, and I was not satisfied with myself. So, I was looking for a better opportunity for jobs in other sectors. I slowly grew holistically as I spent my time in professional developmental activities, implementation, reflection, and incorporating the learnings again in day-to-day life.

TPD for Continuous Learning

In the beginning, Ms. Tamang thought that she was doing well, and she can do better by herself even without getting involved in PD activities. As she participated in training sessions, seminars and workshops, and many other academic meetings, she realized slowly that she needs to learn more. She learned many things about child-centered learning from those PD activities. She mainly learned that games also can be used in teaching any subject and she tried it in her classroom. She learned about demonstrating models in science, involving students in learning, assigning them in group work, generating teaching materials, and participating students more in activities. Before and during the training, she was very afraid to speak in front of people.

She used to hesitate to ask questions during the meeting and training sessions. These platforms provided her to open up, raise questions for solutions, and learn new things. Slowly she gained the confidence to speak in front of the mass. When her colleagues observed her class for peer observation, they affirmed her for her confidence. It motivated her to learn more. So, she started looking for more opportunities to attend training sessions, seminars, and workshops. The more she participated in the professional development activities, the more she learned and felt more knowledgeable and competent. She knew that one has to get involved in PD activities. She was continuously learning and knowing the importance of continuous at the same time. She said "*TPD has made me realize that there are many things to learn. If a teacher doesn't learn new things, he/she cannot teach students new things. So, teachers need to learn continuously.*" One cannot know their strength or weakness and areas to improve, things to learn more until and unless they get involved in professional development activities. In the meantime, she went through many challenges during the implementation of training. It was not that easy to implement the training programs. She had to struggle to come out of her comfort zone and change her teaching methods. She made lots of mistakes, but she did not give up. Instead of giving up, she learned from her mistakes and move on. She thought that being a teacher, she must learn how to make students learn. She tried her best to overcome those challenges as a responsible teacher without giving and learning how to deal with those problems.

She wanted to learn more, but she could not attend all the meetings such as training programs, seminars, and workshops due to the lack of time and training sessions. So, she started exploring what other sources of learning other than training are. She came to know that teachers cannot learn everything from training sessions.

She knew that if a teacher is proactive for learning, there are many other ways of learning available around us. She also realized that one should be proactive in sharing problems and learning from colleagues, other sources such as the internet. She started welcoming her colleagues to observe her classroom and give feedback. She started sharing her problems with her colleagues and collected ideas from them. She started visiting libraries in her school and exploring the internet for better ideas for teaching. She knew that if the teachers have a teachable heart there are many sources to learn from such as taking help from trained and experienced teachers, inviting professionals in school for sharing, learning from senior or junior colleagues, using technologies, exploring the internet for videos, articles, and other sites.

She realized that professional development is very important for all levels of teachers from beginner to experienced. It is an ongoing process. Until the time of the interview, she said she was watching videos on YouTube and books and articles on google to explore the ways of warm-up activities, teaching techniques, engaging students in the classroom. She had a wish to learn more about how to speak more confidently in front of people. She also wanted to continue her master's as a further study, but she could not do it due to some problems. She was always ready to participate in any professional development activities to learn more for continuous learning. She thought herself a continuous learner and still looking for professional development activities that will help her explore her weakness.

After going through Chhaya's narrative above, I developed TPD for continuous learning as one of the themes addressing the research key questions based on teachers' professional development. In the beginning, she was not positive to put extra effort into more learning. During her experience of teaching and participating in the professional developmental activities alongside, she realized the importance of

continuous learning for her further development. The more she continued participating in professional developmental activities more she found herself confident in teaching. She saw change in herself and students' performance. She was motivated to learn more from those professional development activities. Continuous learning is one of the competencies of the teacher competencies framework in Nepal (MOE, 2015). She knew that teachers should be continuous learners to be able to teach students at any time anywhere any situation. She also understood that teachers need to be proactive in continuous learning and teachers will knowingly or unknowingly develop themselves gradually. She always looks forward to opportunities to learn more and new things whether it is formal, non-formal, or informal professional developmental activities. Sinha (2015) asserted that one of the TPD characteristics is long-term processes as it acknowledges the fact that teachers learn over time. The professional developmental activities made her learn to learn continuously.

As a researcher, I was also not proactive in learning when I was a newcomer in the teaching profession. I was motivated to learn more and more only when I started participating the professional development activities such as training sessions, workshops, and seminars. I wanted to learn more when I learned many things from those academic meetings. I wanted to perform better in my class. This motivation led me to participate in training sessions, seminars, workshops, conferences, learn from colleagues, explore the internet and book libraries. I did not know I was developing myself in knowledge, skills, and attitude. Now, I realize I was a continuous learner.

TPD as a way of Doing Better in Workplace

At the beginning of her teaching career, Chhaya struggled a lot in her classroom. She could not grow professionally well due to the lack of confidence. She

was not satisfied with her performance. She wanted to give the best of her teaching so that her students would understand clearly, but it was not happening. She taught in the same way her teacher taught her. After attending professional development activities and learning the things a teacher needs to acquire, she got confidence. She learned many things from the training sessions, school colleagues, from her own experiences, and other sources. She could correct herself, realize her weaknesses and improve her teaching. She changed her teaching techniques. She felt she was equipping herself when she was participating in professional development activities. She thought that TPD is the way of doing better in our workplace. The professional development activities helped her to think about how she can equip herself, teach her students better and improve her teaching to make it child centered.

A few years ago, her students were struggling with the multiplication table. She generated the idea of group work from her experience and applied it to her students. In her mathematics class, she provided each desk of students with two tables of multiplication. Then, she asked her students to recite the multiplication table of their group and leave it at home every day. The next day, the pair of multiplication tables were rotated to another desk, and students were asked to recite the multiplication table of their group and leave to home again. Her students knew all the multiplication tables after the complete rotation. In this way, she helped her students learn the multiplication table easily. Both students and parents were very happy.

When she invited her colleagues to observe her classroom, they affirmed her new teaching techniques many times. She was very motivated by the encouragement of her colleagues with positive words. Sometimes she used to receive complaints from parents. Since she is very sensitive, she did not want to receive any complaints from either school, students, or parents. So, she wanted to do better.

Many times, she used to struggle in planning lessons with content, teaching materials, and teaching techniques. To make her lesson effective, she often took help from another mathematics teacher during the lesson planning. During the ongoing professional development process, she also knew that students would learn if teachers can touch their lives by being a role model for them. So, she started interacting, making a good relationship with students, getting attached emotionally to them, and looking after their overall development rather than only focusing on the academic part. She went on trying to give her best to her students. Finally, she was awarded the title of the best teacher in her school a couple of times. It has encouraged her a lot.

After going through Chhaya's narrative above, I developed the TPD as a way of doing better in the workplace as one of the themes of my research addressing my research key questions based on teacher professional development. From the narrative above, I explored that she could not perform well in her first years of teaching. She hadn't learned about learning theories, and she did not have teaching practice experience in school. She didn't have any idea of what she was doing and how can she do better. She wanted to give her best to her students, but it was not happening.

As she started participating in professional development activities, she learned many new things that are useful in the classroom. Slowly, she gained confidence and she was equipped with some teaching skills. She realized her weaknesses and tried to implement the learnings in the classroom. TPD is defined as a process of improving both the teacher's academic standing as well as the acquisition of greater competence and efficiency in discharging her/his professional obligations in and outside the classroom (Pokhrel & Behera, 2016). Those professional development activities helped her to grow and perform better than in previous years the past. Looking at her performance, school management awarded her with the best teacher award in her

school. Teachers' professional development concerns the growth and development of teachers in their professional roles so that they can perform at their best. In other words, the process of making teachers competent at applying the knowledge and skills they have acquired in the classroom practice is Teacher professional development (Bharati & Chalise, 2017). She was professionally developing herself and was able to better in her workplace. It was possible only with her passion for learning more from TPD activities. Pokhrel and Behera (2016) state that teachers are made rather they are born. History shows that several teachers are developed from the initial phase to better and then excellent teachers. The change of teachers' existing way of teaching in the class has been realized in the context of Nepal.

As a researcher, I also was able to improve my teaching when I was in school after participating in PD activities. Those PD activities motivated me to try to do better in my workplace. I was appreciated by students and school management.

Rajeshwar's Stories of his Perception on PD

In this section, I have explained how I approached Rajeshwar and collected stories of his family and education background, teaching, and teacher professional development. Then, I have narrated his three narratives followed by generating the themes TPD as the development of manager, TPD much more than training, and TPD for competency development and meaning-making on each theme of narratives linking with related literature.

Approach to the Research Participant

After getting ready for the interview with interview questions based on my research key questions and I approached Rajeswar and decided to have him as my research participant. Like other participants, he also met the criteria of research participant that I made for my research. I interviewed over the phone in the first round

of interviews and recorded the audio for the evidence. In the second round of follow-up interviews, I visited his school and conducted a face-to-face interview. Rajeswar is a secondary-level mathematics teacher in an institutional school at Lalitpur. He teaches mathematics from grade six to twelve. He is 35 years old. He has experience teaching in many schools for more than a decade. I selected him as my research participant because I felt that he was the right person who can provide me with sufficient stories for my research. He is a secondary-level math teacher who has experience in teaching high school students. He is a teacher from an institutional school who may have different stories of professional development than community schoolteachers. He is a male teacher who has the stories from different perspectives in comparison to female teachers.

TPD as Development of Teacher as Pedagogical Manager

When Rajeshwar was a student, he used to hear about his teachers going to attend training sessions in the past. Along with his classmates, he used to think about what they would do in training. Many years later, he learned theoretically about teaching and learning in college as a student. There he experienced teaching for the first-time during practice teaching in schools. He and his friends had to observe each other's classroom and fill up the peer observation form with the best things they noticed and areas to improve during the lesson. They learned many things about teaching from each other during this time of practice teaching. However, it was for a short time. He learned about teaching mathematics in his college but only about theoretical knowledge.

In the meantime, he joined teaching in one of the institutional schools in Kathmandu. Even though he was familiar with learning theories, he taught his students in the same way his teachers taught him making his students copy the

formula of the particular topic. He only taught the books in his classroom. He taught in this traditional method for a long time which brought no good results. His students failed and he received lots of complaints from the administration and parents. He was frustrated with his performance. He was curious to know why he was not performing well even though he knew almost all the teaching methods in Nepal which he learned from college and worked hard.

Then, he was asked by the school management to attend training for his professional development. By this time, he did not have any awareness of professional development. TPD was new terminology for him. He also thought he knew everything, and he did not need any help from others. When he attended the training for the first time, he felt why he was wasting time in that training. He had a prejudice about the trainer that he would be talking about no new things. He had this prejudice due to a lack of exposure to participating in professional development activities. He attended the training in Nuwakot for the first time which was organized by a math practice book publication and the facilitator was an author of the book. He discussed how to use his math practice books with many teaching strategies. This triggered his mind to think differently. Then, he got another opportunity of attending a training about curriculum in Jorpati for two days during years when the syllabus changed in grades 9 and 10. A few years ago, he also got involved in professional development activities facilitated by one of the organizations. Similarly, he participated in many other professional developments organized in school. At the beginning of participating in those professional developmental activities, he had an inferior complex with other participants in training that he may be seen as less knowledgeable than others. Neither he could share his experiences and ideas, nor he could raise any questions. However, he was learning many things at the same time.

From those training programs, he learned about teaching strategies, the use of resources in teaching, classroom management, evaluation, and many other practical skills of teaching. He perceived teaching as the art of presenting the knowledge of the content which requires a teacher to manage all the things such as students, resources, content, time, teaching techniques, etc. He tried to teach managing all these things in the classroom. After these classes, his students liked his lesson and requested him to teach introducing the topic explicitly by using examples, illustrations and making the participants in the discussion. They also assured him that they will do the remaining part by themselves if he teaches them in the same way in the future.

After getting involved in several professional developmental activities over the years, he realized that a TPD is a development of a teacher, which makes the teacher manage every necessary thing well and present them effectively to the students. TPD helps the teacher to be a good manager.

After going through Rajeshwar's narrative, I developed TPD as the development of the teacher as manager as one of the themes addressing key research questions based on teacher's professional development. Although he had learned learning theories in universities and did not have any awareness of TPD at the beginning of his teaching, he gradually came to know about it as he participated in those development activities. He had a passion for teaching, knowledge of learning theories, a classroom with students as a platform, and time to invest but he was not able to manage them.

Management is a social process designed to ensure cooperation, participation, intervention, and involvement of others in the effective achievement of given or predetermined objectives (Bukhari, 2008; Malik & Ghazi, 2011). Similarly, educational management is also a press of validating purposes and allocating

resources to achieve the maximum attainment of purposes with the minimum allocation of resources. It means Rajeshwar could not allocate the resources he had in the past. He could not manage his knowledge of learning theories, classroom, students, time, etc.

Gujjar and Noreen (2009) state that the teacher as a manager can create environments that provide opportunities to learn and change in behavior in which pupils are well managed and motivated for learning. It is the teacher who plays the main role in planning, organizing procedures and resources, arranging the environment to maximize efficiency, monitoring students' progress, anticipating potential problems These professional development activities helped him to manage the content, students, teaching techniques, teaching materials, and classroom environment. He could develop himself into a good manager.

The role of an effective manager is to create a climate that welcomes, supports and rewards innovative thinking and problem solving (Ramsey, 1999; Murtaza et al., 2012). Similarly, the role of an effective teacher is to manage the classroom, students, content, teaching strategies, teaching materials, etc. creating a climate that welcomes support and rewards innovative things and problem-solving of students in the classroom.

As a researcher, I echo with Rajeshwar when I remember my past working as a teacher. I was good at the knowledge of the content. After having teaching experience of more than 5 years, I knew all the units, chapters, exercises, and problems but I couldn't present them effectively. I did not have any idea of teaching strategies and using teaching resources. Some schools I worked at were always ready to invest in an effective classroom, but I couldn't manage it. It happened due to a lack of managing skills. Later, I learned about curriculum, classroom management,

teaching strategies, characteristics of students, evaluation, etc. Then only I started managing all these things which led me to teach effectively after I got involved in professional development activities. A teacher who can manage his or her class, students, resources, time, and lesson easily can teach effectively. So, TPD is also the development of the teacher as manager.

TPD is broader than the expansion of academic qualification and training

Rajeswar perceived TPD as an academic qualification in the beginning. He attended his first training in Nuwakot, he got ideas of how to use the practice books effectively. He attended the training about the changed curriculum of grades 9 and 10 in Jorpati. There he learned about how to deal with the newly changed curriculum and teach accordingly for effective teaching. The training sessions organized by the school also helped him to think out of the box. He was motivated to explore more. So, he utilized his spare time regularly in reading books from different publications in libraries and markets. He explored videos on YouTube related to teaching strategies from scholars. He collected ideas from those books and videos and presented himself in the classroom, incorporating those ideas. For his professional development, he also visited different websites on the internet, exploring the ideas of new content in the curriculum which are being changed according to the situation by CDC Nepal.

A few years ago, the topic continuity was added to the curriculum of mathematics in grade ten. So, all the teachers were expected to teach continuity. To teach effectively, he explored videos related to this new topic on the websites on the internet from the Nepal government to learn how they provide a concept of the topic and how do they teach it. He also watched the videos of the demonstration of lessons from senior experts so that he can learn more about how to teach better. Realizing teaching and learning is a lifelong process, he read different books related to teaching

and learning. He explored the market in search of new books of new innovating teaching strategies according to the current situation. He regularly checked educational magazines timely to explore the announcements of notice of training sessions, seminars, and other subject-related training programs. He also explored academic articles about teaching and learning written by experts.

He believed that teachers need to be proactive in looking for the opportunity of attending training sessions, seminars, and other academic meetings as much as possible to sharpen teachers teaching skills. It was not possible to learn always from academic meetings such as training sessions and seminars, so he proactively engaged himself in learning from his colleagues. When he was in Nuwakot, he learned many ideas of teaching from his senior experienced colleagues. They corrected him by telling him the right way and ideas of teaching whenever he made mistakes. When he was in Kathmandu, he learned from a retired TU professor. He had guided him on how to work, how to handle and draw the attention of students for learning. He was proactive in getting help from his colleagues.

During this year of the Covid-19 pandemic, he had to teach online classes using zoom. He attended the online training organized by the school on how to use zoom effectively in online classes. Similarly, he also attended another training facilitated by one of the trainers of a training organization in Lalitpur on how to use google classroom for virtual classes. In this way, he learned many things for effective teaching from professional development activities such as participating in academic meetings such as training sessions, seminars, workshops, exploring books, magazines, articles in bookstores and libraries, exploring videos and articles on the internet, learning from colleagues, learning from experience from success stories and mistakes, etc. He knew TPD is broader than academic qualifications and training sessions.

From the narrative above, I developed an understanding that TPD is more than an expansion of academic qualification and training as one of the themes addressing research key questions based on teacher professional development. Rajeswar thought that obtained academic qualification is TPD which made him passive in participating in professional development activities. After attending a few training sessions, he started thinking TPD is to participate in training sessions. For years, 'staff development' or 'in-service training, workshops, short term training courses' were only considered as the form of professional development (Sinha, 2015).

As he got the opportunity to participate in more training which motivated him to learn from anywhere any person any situation. He learned from his experience, colleagues, videos, and articles on the internet, new books related to teaching different publications in the bookstores, etc. He realized that learning occurs beyond academic meetings such as training, seminars, and workshops and no one has to wait for any training organization to organize such professional development activities. Bakhati (2014) has kept training as a part of teacher professional development.

As a result of the current transition from 'teacher training' to 'teacher professional development', pre-service education and in-service education are two categories adopted (Villegas-Reimers, 2003). Both categories of education prepare teachers for effective teaching. In the case of Rajeswar, he did not have the opportunity to involve in pre-service education, but he had a lot of opportunities for in-service education during his teaching. Peña-López (2009) defines teacher professional development as comprising courses/workshops, education conferences or seminars, qualification program, observation visits to other schools, participation in a network of teachers, individual or collaborative research, mentoring and/or peer observation and coaching, reading professional literature and engaging in informal

dialogue with peers. Rajeswar could unknowingly involve himself in some of the activities such as training sessions, education conferences, qualification programs, individual research, mentoring/coaching, and reading professional literature.

As a researcher, I also thought teachers can develop on their own without participating in any professional development activities. I was just dependent on my self-study, but I didn't have enough books. After attending some training programs, I also knew that a teacher needs to attend training to learn new things. I could not think out of the box. Slowly, I started learning from other sources and came to realize that learning can happen in any place from any source. Finally, I realized that TPD is much wider than teacher training.

TPD for Competency Development

Rajeshwar's students were not performing well before he participated in professional development activities. So, he received complaints from school management and parents. He thought he was a competent teacher to know the content. As he began participating in the teacher's professional development activities, he realized that the teacher is not competent, only knowing content. During the professional development activities, he also knew that if we teach our students in the same method that our teacher taught us, it is not going to work but teachers need to update their knowledge of content day to day and explore the updated things according to the situation from government and non-government sources. It requires a teacher to develop in many areas.

He knew that teachers should know how to present the content effectively and interestingly which requires different child-centered teaching strategies. Teachers should have the art of delivering the content. He also came to know that teachers should know how students learn and identify their learning styles, interest, abilities,

and work accordingly. Moreover, teachers need to have skills in classroom management so that teachers can teach without any disturbance. Also, teachers need to be aware and updated with communication and technologies. Furthermore, he learned about lesson planning, the use of teaching materials, evaluation. Teachers' professional development activities helped him to learn how to use that theoretical knowledge practically, how to present us with content in the classroom, what are the ups and downs and the challenges seen in the classroom, and what are the best ways to address those classroom problems, how to achieve the objectives of the lesson.

Although he was a master's degree holder, he realized that he was theoretically sound but lacked practical skills. He felt that theoretical knowledge only would not work until and unless we have practical knowledge and skills of teaching in the classroom. The training helped him to utilize those theoretical things practically in the classroom. These learnings gave him the confidence to teach better. He realized the reason behind his student's poor performance in the exam was the lack of skills mentioned above in him. He was motivated and equipped with skills to deal with classroom problems, control and manage a classroom, and act according to adverse situations. He started preparing for the lesson for teaching before going to the classroom, using interactive teaching strategies and teaching materials, and checking the understanding of students properly.

Once he was teaching profit and loss in grade 9. Previously he used to teach writing the formula of profit and loss on the board directly and explain and teach from a deductive method. But after TPD activities, he started teaching, explaining how the formula was derived using different real-life examples of profit and loss, then only he entered the practical use of the formula. This made his students understand clearly. His students said that the chapter profit and loss were easier than they

expected. They were very excited to learn that the formula is derived from the inductive method by using sufficient examples. In this way, he started developing his competencies slowly.

Sometimes he also helped his colleagues. One of his female colleagues who taught in lower grades came to him and asked him to help with ideas to tackle the problems they faced in their classroom. He helped her by telling them the right way to teach according to his learnings from professional development activities. While implementing learnings from that professional development, he could not do it as expected. He adapted the teaching strategy as per the situation in the classroom. After a few years of professional development activities, he realized he should be a continuous learner and proactive in learning. He realized he should be a continuous learner and proactive in learning to be a competent teacher. It has given him the confidence to teach in any good or bad situation.

 In this way, the professional development activities helped him to build his competencies being a teacher slowly. Now, he is a competent teacher with good knowledge of content, collection of practical skills of using teaching strategies, teaching materials, the spirit of a continuous learner, use of ICT in teaching, knowledge about how students learn, etc.

After going through the narrative above, I developed TPD for teacher competency development as one of the themes addressing research key questions based on professional development. Even though Rajeshwar had knowledge of learning theories, he was not performing well in the classroom. His students were not performing well in terminal exams, and he was receiving complaints from school management and parents.

Rajeswar was lacking the competencies of 21st-century teachers mentioned by Nessipbayeva (2012) and the teacher competency framework for Nepali teachers by MOE(2015). He was equipped with only competency of knowledge of the content of mathematics. Gupta (1999) and Selvi (2010) state a competent teacher needs to have knowledge, skills, attitude, values, motivations, and beliefs teacher to be successful in teaching. Rajeswar did not have the set of knowledge, skills, attitudes, or behaviors that enable one to perform well in the workplace (Gupta, 2011).

As Rajeswar proactively participated in learning professional development activities, he realized his weakness and started working on it. He learned about how students learn, how to teach using techniques, how to evaluate, manage the classroom, use materials, use ICT, etc. He has experienced himself developing as a competent teacher.

As a researcher, I was not aware of these teacher competencies. I also had the same competency that Rajeshwar had. I also used to receive complaints from school management and parents for my student's poor performance. I realized I was lacking the remaining competencies when I participated in TPD activities where the facilitator explained we are not successful in our teaching. I find myself more competent and equipped with teaching skills when I get a chance to learn more from professional development activities. I have an experience that TPD helps the teacher to be competent in teaching equipping with all the eight competencies mentioned by the teacher competency framework Nepal.

Chapter Summary

In this chapter, I have discussed my three research participants' family background, educational background, and the lived experience of participating in TPD. I have narrated their stories before, during, and after their involvement in their

TPD based on the themes generated according to their perception of TPD. I did meaning making of the themes of each narrative linking with works of literature related to TPD. All three participants had the experience of participating in TPD formally or informally. This experience helped them to shape their perception of their TPD.

Based on Shruti's experience of TPD activities, she perceived TPD as an ongoing holistic development, more than training and a platform for the teachers for competency development. Similarly, based on Chhaya's experience of TPD activities, she perceived TPD as holistic development preparing the teacher as a role model for the students, a platform to engage for continuous learning, and a better way of doing it in the workplace. Based on Rajshwar's experience of TPD activities, he perceived TPD as the development of a teacher as a pedagogical manager, much wider and broader than the expansion of academic qualifications and training and a platform for competency development.

CHAPTER V

IMPACT OF TEACHER PROFESSIONAL DEVELOPMENT

In this chapter, I discussed and analyzed narratives of Shruti, Chhaya, and Rajeshwar based on their experience of impact during and after the professional development over the years. These narratives were based on their first narratives, which were based on the perceptions of teachers on their professional development. Therefore, some events were repeated for different purposes. I developed the themes based on the second research question of my research and tried to link them with the TPD and transformative learning theory. I tried to make meaning by linking the themes with some literature and my own experiences of the impact of teachers' professional development in my teaching career.

Impact of TPD on Shruti's Teaching

In this section, I narrated three narratives of the impact of TPD on Shruti's profession. The themes I generated from the narratives are changes in perception of teaching, professional development and instructional practices, changes in behavior and performance of students' performances, and issues and challenges during and after professional development activities. After generating the themes, I have done meaning-making linking with related literature.

Change in Perception on Teaching, TPD, and Teaching Methodology

As discussed in chapter four, she did not have a passion for teaching in the beginning and she was uncertain to continue teaching as her career. She took teaching as a dull profession and TPD activities as a waste of time. However, she was teaching

and participating in TPD activities unwillingly. Those PD activities triggered her to think out of the box and view teaching and teacher's professional development differently than before. She was motivated to change her teaching methodology. She started involving students knowing they are also capable of solving the problems by themselves if given some clue, hints, or guidance. She realized that teachers' role is to scaffold students. She conducted games such as Bingo in the classroom. Recognizing the need for a 21st-century education, she used ICT in teaching mathematics by using GeoGebra and Quizizz. She used teaching materials in teaching mathematics. Once she used duster as teaching material to teach cubes and cuboids, her students were surprised to see the duster used as source learning. She also involved her students in generating teaching materials for their classrooms. In this way, she changed her teaching methodology from teacher-centered to child-centered.

She also explored the internet, libraries, meeting with experts and colleagues for more learning. This helped her develop a habit of learning. She was unknown about her new habit of learning. She was learning and teaching at the same time. She was confident in herself. She started involved in academic meetings and math forums where she didn't miss the opportunities to share her learning with other participants and colleagues. She is more inclined towards the use of ICT in teaching. She shared her experience of learning and using ICT in teaching mathematics in the math forum of mathematics teachers, where she is also one of the active members.

She was already familiar with ICT skills such as using Google, zoom, power point slides, GeoGebra, Quizizz, etc. She learned them from professional developmental activities from NCED, Kathmandu University, and other organizations. It made her very easy to teach online classes during this covid

pandemic while some of her colleagues were struggling a lot. Her participation in continuous professional development activities made her teaching effective.

Her perception towards teaching and TPD was changed by the time of this interview. Teaching was the only boring job for her, but later she started taking it as a passion with great responsibility. She started enjoying and having fun during teaching. Similarly, her perception of TPD was also changed. Previously, she used to think these training kinds of stuff are not implementable, but she realized she was wrong when she was able to apply some of the learnings. She came to know TPD is not only achieving an academic qualification, but it is to refine teachers themselves for their better performance in the teaching profession.

After going through the narrative above, I developed a change in attitude, behavior, and performance of teachers as one of the themes that address my research key questions which are based on the impact of professional development on teachers. She was not positive towards teaching in the beginning. She was not sure about continuing teaching as a career as a teaching career is not taken as a prestigious job, and teachers are not highly motivated (Pant, 2017).

She thought she was already developed, and she could develop on her own if it was necessary. After she participated in professional development activities over the years, her perception changed from negative to positive and she realized she was a raw teacher who can teach effectively only after learning and implementing from professional development activities. She was in the process of transformation transforming her frames of reference making them more inclusive, open, and reflective (Mezirow, 1997). She claimed herself as a transformed teacher who perceives teaching and TPD as very important and interrelated.

As a researcher, I started teaching, believing it was a prestigious job. People in my village respected the teaching profession a lot. Teachers are often considered 'good people' and in the context of Nepal, especially in the rural areas; it is the teacher who is often consulted for any important work in the community (Gautam, 2016). But I also had some prejudice towards TPD activities due to my ignorance. Slowly, my prejudice was wiped away after I spent time in professional development activities.

According to Shruti, her transformation led her to change her day-to-day instructional practices in the classroom from traditional practices to new practices. Teachers feel empowered to try new things in the classroom because of the new information they gain in the community (Henson, 2001, as cited in Piedrahita, 2018). She adopted her practices to instructional practices in her classroom, including students in discussion, games, ICT integration, etc.

Change in Performance of Students

Shruti tried to implement the learnings from professional development activities into her teaching as much as possible. She learned about the use of the Bingo game in teaching in her first training and used it in the classroom. She conducted a Bingo game by preparing and using different questions and answers at the end of the lesson. Her students enjoyed it a lot. They requested her to conduct Bingo at the end of every lesson. She started using teaching materials in the classroom.

Moreover, she encouraged her students to collect and generate the teaching materials for the lesson. In the beginning, they were not comfortable with teaching materials, but they slowly got familiar with it. Her students were very excited to

generate teaching materials by themselves. They were curious to see how the materials generated by them would be used in teaching.

Over the years, during professional development, she learned many ideas of teaching using ICT. She learned the use of GeoGebra when she was studying at Kathmandu University. She used GeoGebra to teach transformation in grades 8 and 9. Previously she could not draw figures of exact shape and size on the board. She could demonstrate the exact transformation of figures using GeoGebra. Firstly, she explained basic things about transformation such as rotation in class. Then, she took her students to the computer lab and showed them the different rotations she prepared in GeoGebra on the projector screen.

During Covid-19, she also taught transformation using GeoGebra in zoom. She also taught congruent triangles online using GeoGebra. Previously, she used to make many triangles on the board in face-to-face class and she was sure where those pairs of triangles are exactly congruent with accurate sides and angles or not. Still, she could use exact pair of congruent triangles to teach congruency with GeoGebra. Her students said that they were not allowed to go outside their house due to lockdown, and they did not have to go to stationery shops to buy graph copy when they were taught using GeoGebra. They sent their homework of transformation using GeoGebra. Except for some students who could not join online classes due to internet problems and devices, other students did very well with GeoGebra. Her students learn very easily with interest. Now, she cannot imagine teaching geometry and transformation without GeoGebra.

Similarly, she knew about Quizizz in one of the training last year. She conducted Quizizz games during online classes. She prepared math questions and answers to fill in the blanks, and multiple choice answers setting up a time limit. She

used it to check the understanding of students properly. It was challenging to ask questions to individual students and check all the students' work at a time. She could do it very effectively using ICT. She also used Quizizz to prepare questions for the online first terminal exam during this pandemic. She did not have to struggle with typing, printing, and distributing. All students participated actively in responding to the questions with interest. Previously, she could not address all the students in the classroom. She could provide equal opportunity for all the students in the classroom of all learning styles. She found her students' interest increased in mathematics and taking it as easier than before. They started positively taking mathematics. They were motivated to learn more with new teaching methods that she adopted. They started doing well in exams.

After going through the narrative above, I developed change in students' behavior and performance as one of the themes of my research that address my second research key questions based on the impact of teachers' professional development. In the narrative above, Shruti started teaching her students by applying student-centered strategies such as using games, teaching materials, and ICT from her professional development activities. Guthrie (2004) discussed that teachers described their teaching activities learned during professional development have effectively improved reading. Her students enjoyed her teaching and had positive thinking towards learning. They were motivated to learn more. This maximum time students got the opportunity to involve in learning. There was improving academic performance in her students although there was not a drastic change.

Darling-Hammond et al. (2017) state that effective professional development is structured professional learning that results in changes to teacher knowledge and practices, and improvements in student learning outcomes. Ultimately, the main aim

of TPD is to benefit the students. The learnings from professional development should be applied to improve students' learning.

As a researcher, I remember my past, I tried to implement the learnings from training sessions in teaching some of the topics of mathematics. I took grade 9 students on the ground to teach height and distance. I explained how to find the length of unknown sides and made them find the height, base, or hypotenuse using a pole, rope, big protractor, and measuring tapes. My students were curious to learn more. Most of them did well in exams also except few students. My perception of teaching

Issues and Challenges during Professional Development

Shruti implemented several learnings from the professional development activities she participated in her classroom. However, many academic meetings were not fruitful for her. After she was appointed as a permanent teacher in a public school, she had to participate in the TPD program organized by NCED as a lower secondary math teacher. But the training only addressed the general issues of the classroom rather than dealing with subject-specific problems. It was too general, not subject-specific. Sometimes, the training had to be wrapped up in a rush due to lack of time. She could not learn how she can teach mathematics and apply them in her day-to-day classroom settings. They did not seem to be as effective and beneficial as it was expected for her due to the lack of subject-specific trainers.

In other training sessions, the facilitator explained the use of teaching materials in mathematics. He explained what and why about the use of materials in teaching materials but not about how to apply them in the classroom. The facilitators explained what geoboard is and its importance, but they did not explain how it can be used in all the areas of mathematics. She could not use geoboard properly in the classroom.

Similarly, she attended a training where the facilitator discussed clinometer to how to deal with height and distance, but she could not learn how to use a clinometer to teach height and distance. She did not know the actual use of the clinometer. She also learned about the abacus. The facilitator only discussed its use in teaching addition and subtraction. The training could not help the teachers to use abacus more than addition and subtraction. So, she struggled a lot in applying the use of these materials in the classroom. The training also discussed generating teaching materials by teachers and students themselves. It was a great challenge for her to arrange teaching materials and mobilize students to generate teaching materials. Although she could arrange or generate teaching materials mobilizing her students, there was not sufficient space in the classroom to store and demonstrate them while teaching. She had to show those materials spreading on the table in front of the class where students from the last bench could not see and understand properly.

In the meantime, she also learned ICT skills and applied them in the classroom. There were not sufficient ICT devices in her school and with her students. So, she couldn't use ICT effectively as she expected. Also, ICT could not address all the topics of mathematics. CDC Nepal has added a 'limit' in the curriculum of grades 9 and 10. She did not have any idea of teaching such a topic using ICT. When she taught rotation, she took her students to the computer lab to teach using GeoGebra shown on the projector screen. During this transition, students were distracted and engaged with other friends rather than concentrating on the lesson.

When she tried to teach using new teaching methods in the classroom, her students struggled, in the beginning, to adjust to the new teaching methods. They used to laugh and make fun when she used ICT and teaching materials in teaching. However, they get familiar with them over time. Sometimes, they felt our teaching

was irrelevant and complained when she was not able to connect her teaching with daily life applications. Students were distracted, and she had to put extra effort to manage her classroom for effective learning. She also felt that she could not address all the students of different learning styles from the teaching method she applied.

She had to go through several challenges during learning in training and implementing them in the classroom. She felt many professional development activities were impractical, more theoretical, irrelevant, and unimplementable. She realized this happened due to the lack of expert trainers, resources, and support from people around her. However, she did not give up, but she overcame those challenges and was determined to move on whatever the situation will be.

After going through the narrative above, I developed challenges during TPD as one of the themes that address my second research key questions which are based on the impact of teachers' professional development. The narrative above clearly tells that Shruti had to face lots of challenges during professional development. Here, I have considered teachers' professional development as an ongoing process that begins from new learnings number of implementation cycles and learnings.

She could not learn from some of the professional development activities which she felt those trainings were irrelevant and impractical. Gautam (2016) suggests that the training goes to class if the teachers receive what they need to improve their classroom practices. It could be the content knowledge and/or the pedagogical skills that teachers might want the training to address. Thus, the TPD should be based on the needs of the teachers rather than what the trainers feel the need (Pokhrel & Behera, 2016). Therefore, she could not replicate the learnings from the training.

She expected math expert trainers, but non-mathematics trainers facilitated the training programs. One of the most serious problems is the lack of subject teachers. It is difficult to get mathematics teachers at the school level who have a specialization in mathematics. This did not let her develop professionally. She tried to implement the learnings from professional development activities, but she could not do it due to a lack of resources for teaching materials, infrastructure, ICT equipment, and time. The availability of collaboration, time, long-term commitment, and resources are important for the successful implementation of professional development (Macià & García, 2016). Shruti struggled to manage time, arrange resources and ICT devices, and could not perform well as she planned and expected. These issues are related to classroom management, ethnicity, lack of trained teachers, inequity, lack of teaching aids and materials, lack of textbooks, lack of time for students, lack of clear objectives, gender issues, and issues of mathematical contents and pedagogy (Panthi & Belbase, 2017).

As a researcher and teacher, I also had to face many challenges in applying the learnings from professional development activities in the classroom. Some of my learnings were not relevant to my classroom. They were not applicable. I couldn't manage the time to generate resources and use them in the classroom. Once I learned how to teach to prove the formula of algebraic expression by using papers and scissors i.e. $(a+b)^2$, $(a-b)^2$, & (a^2-b^2). It was time-consuming, and I could not arrange papers and scissors for all students. There are many other issues and challenges teachers face during the implementation of learnings from professional development.

Impact of TPD on Chhaya's Profession

In this section, I narrated three narratives of the impact of TPD on Chhaya's profession. Change in perception of teaching and professional development, change in teaching methodology and its impact on students' performance, and issues and challenges during and after professional are the themes I generated from the narratives. After generating the themes, I have done meaning-making linking with related literature.

Change in Perception of Teaching and Professional Development.

Before coming to the teaching profession, Chhaya used to think that teaching is an easy job where the teacher just has to go classroom and simply teach. She was happy in teaching in a traditional method. In the meantime, her school sent her to attend training as a part of her professional development. As she went on attending several training programs, her perception got changed. Her conception of teaching changed after attending professional development activities where she understood that teacher's job is not only to teach students but also to focus on the holistic development of students.

Similarly, she also changed her perception towards her professional development that she needs external help of a learning environment for her development to do better in her workplace. But it was not that easy for her to change her perception. She went through a process. She struggled to change her teaching method to implement the learnings since she had to come out of her comfort zone for her transformation. This helped her to be more confident than before. Her colleagues in school affirmed her many times when they saw her speaking confidently in front of them. In this way, she changed her perception of teaching and professional development. She said *"It was difficult for me to change my perception. It was not*

easy to transform myself. It was not easy to implement the training. I was happy in teaching in the way I was teaching. But my perception towards teaching and PD activities changed slowly as I participated in several PD activities, learned many new things, and implemented them in the classroom"

After going through Chhaya's narrative above, I developed a change in perception towards teaching and teacher's professional development as one of the themes of my research that addresses my second requestions, which is based on the impact of teachers' professional development. From the narrative above, I explored that she took teaching as an easy job before participating in professional development activities. She also thought participating in professional development activities is not beneficial. Her perception towards both teaching and TPD got changed throughout participation in professional development activities.

Nugent (2007) stated that teachers who participated in longer on-going professional development activities were more likely to experience the full impact of the activity. It is clear that if any teacher utilizes time over a long time for PD, they will surely have the cognitive and affective impact of professional development. In the case of Chhaya, she had a significant effect on her professional development on the perception towards teaching and teacher professional development. She was a transformative learner whose frame of reference changed over the period (Mezirow, 1997). Her frame of reference changed from a narrow understanding of teaching and professional development to a wider understanding.

As a researcher and teacher, I had to teach shouting eight periods in the schools I taught in my first years. I used to be exhausted by the end of the day. However, my students did not improve their performance. I thought teaching was not easy as people think about it, but my colleagues used to take it easy. They were not

serious about students learning. However, I learned many skills of teaching from professional development. Those skills made my teaching effective, but it still required my hard work and patience. Regarding teacher professional development, I tried to avoid participating in training sessions and other activities. Gradually, I became positive from negative towards teacher professional development. I started advocating for the importance of professional development programs for principals and teachers.

Change in Teaching Methodology and its impact on Students' Performance

Chhaya tried to implement the learnings from her professional development activities. She used strategies of classroom management, making job charts, and birthday charts. She started using group works and games in the classroom. She created teaching materials by writing numbers on the number cards and fraction cards and teaching basic operations of numbers and fractions.

As she tried to apply the learnings in her classroom, her students were excited to see her teaching in a new way. They were also curious to learn new things from new teaching methods. They took it easy. When she used group work in the teaching multiplication table, her students enjoyed a lot of learning in the play method. They were learning very quickly ad remembering for a long time. They did not forget, and they solved all questions in the exam easily.

Her students' parents were also very happy to see their children performing well in the exam. They compared their children's performance with their last year's performance. In this way, she changed her teaching method from a traditional way to an interactive class where both teachers and students were active in teaching and learning. Her students and parents acknowledged her, and her school management awarded her with the best teacher award.

After going through the narrative above, I developed a change in teaching methodology and its impact on students' performance as one of the themes of my research that addresses my second requestions which is based on the impact of teacher's professional development. From the narrative above of Chhaya, I explored that she changed her teaching methodology from the way she was teaching in the past. She started teaching using classroom management strategies, teaching materials, and student-centered techniques. TPD means teachers' learning, how they learn to learn, and how they apply their knowledge in practice to support pupil learning (Avalos, 2011). She used the knowledge gained from training programs in the classroom.

As a result, her colleagues appreciated her performance. Her students were excited and curious to learn from her new teaching method. They enjoyed and were involved in learning actively. They did well in the exam. Parents affirmed her for their children's improving performance. PD is ongoing, job-embedded, and related to classroom instruction improving professional practices and student learning (Tienken & Achilles, 2003; Wright, 2019). Her learnings from professional development activities resulted in improvement in her instructional practices and her students' learning.

I, as a researcher, also have a similar experience to Chhaya. After learning from professional development activities, I implemented teaching techniques such as group work and games. Many of my students were very excited and active during the lesson. They were motivated to learn. They used to remind me to use similar methods in other lessons. They also improved their learning. Similarly, Chhaya noticed many of her students positive towards new teaching methods and performing well in the exam.

Issues and Challenges during Professional Development

During the implementation of her learnings in the classroom, she had to go through some challenges. She attended many training sessions which discussed the knowledge already she knew. She felt that she also could deliver such training sessions. One of the facilitators in one of the trainings did not explain 'how to teach' clearly. He gave notes and hands out and asked the participants only to read. She did not like the method of the trainer. She thought that trainer was a lazy person. She learned about the Bingo game in teaching word meaning in the same training. She struggled a lot to implement in the classroom. Her students got confused when she used Bingo teaching across the subjects. Similarly, they learned a way of composing the poem where one participant made one sentence and passed it to another participant. That participant added another sentence on the same topic. In this way, a poem was composed with a collection of sentences from different participants. They enjoyed a lot reading the composed poem in the training. She was so excited to apply this method in her classroom, but she could not apply it in the classroom. It was interesting activity in training but not applicable in the classroom.

In another training, the facilitator was objective specific and to the point during the training. For example, he was diverted from the main point and continuously talked only about himself. She thought the training was meaningless and boring. She also learned about some teaching skills in Singapore training. She felt that it is difficult to contextualize and implement such learnings from international platforms in the Nepali context. She realized that all the learnings from professional development activities are not possible to be implemented. However, she tried her best to implement her learnings as much as she could. She also realized that all students do not have the same learning styles from many backgrounds, and they

cannot learn from one teaching method. She realized this during the time of using the Bingo game and other engaging activities in the classroom.

Students and parents struggled to accept the new teaching method they applied. She was very disappointed to face those complaints from the parents. She was emotionally hurt to receive such complaints from parents and others since she is very sensitive. She was always serious to work out incorporating their suggestions. In this way, some of the professional development activities were irrelevant and impractical facilitated by an amateur facilitator led her to face challenges from herself, students, and parents.

After going through the narrative above, I developed issues during professional development as one of the themes of my research that addresses my second requestions which is based on the impact of teachers' professional development. From the narrative, I explored that Chhaya also went through some challenges during the involvement in her professional development. She felt one of the training sessions was very surficial and useless. She noticed the trainer was not professional and prepared. In another training, she felt some of the techniques she learned were irrelevant, not practical, and not transferable in the classroom. Those activities were only enjoyable in the training but not in the classroom.

There is a lack of relevance of many of the training components to the real need of the teachers and the demands of the actual classroom situations they might face, (Thapa, 2007; Gautam, 2016). Chhaya felt the training was superficial, irrelevant, impractical, and not applicable due to the lack of expert trainers and proper planning. She was not motivated to involve herself in such professional development activities. Due to a lack of training addressing teachers' real problems, using appropriate teaching methods, and continuous supervision (Bhujel, 2020), she was

demotivated. Her students remained confused when she tried some of the teaching

techniques. At the same time, she had to adjust her teaching. Some parents

complained about her new teaching method. They expected to teach their students in

the previous method. Since she is an emotional person, she was hurt because of those

complaints.

As a researcher and a teacher with teaching experience for more than a

decade, I also had to attend some professional developmental activities. They were

superficial, ineffective, irrelevant, and not transferable to the classroom. Long back, I

attended a seminar on the psychology of children. It was more theoretical. It had no

connection with pedagogy. I felt the seminar was useless. Similarly, Chhaya faced

several challenges during her professional development.

Impact of TPD on Rajeswar's Profession

In this section, I narrated three narratives of the impact of TPD on Rajeswar's

profession. The themes I generated from the narratives change in perception of

teacher's professional development, teaching methodology and its impact on

students' performance, and issues and challenges during and after professional. After

generating the themes, I did meaning-making linking with related literature.

Change in Perception on Teacher Professional Development

A decade ago, Mr. Chaudhary did not perceive professional development

positively. He thought obtaining good academic qualifications from universities is

professional development and knew everything about teaching. He was not happy

when he had to attend training sessions in the beginning. He thought he was wasting

time in the training programs. After he participated in some training programs. His

perception of professional development changed when he saw the facilitator

delivering the training practically with practical skills. There he learned about how to

teach with relevant teaching methods, how to use teaching materials, evaluate students, deal with issues in the classroom, teach practically in an activity-based way, etc.

This exposure to professional development activities helped him to think about teaching from a different perspective. It made him aware that he was teaching in a traditional method that was not bringing good results even though he was experienced and knowledgeable of learning theories. He used to teach making students copy the formula and asking them to memorize them. As a result, most of his students failed. He was receiving complaints from school management. He was frustrated with his performance. He was curious to know the reason behind his poor performance. These professional development activities helped him to realize his weakness and the reason behind his poor performance. Then, he realized he lacked practical skills although he had theoretical knowledge. He understood that teaching is the art of presenting the content knowledge interestingly in front of students which requires teaching strategies, skills of classroom management, and ICT skills according to the ability of students.

In this way, his perception towards his professional development also got changed. TPD changed his perception of itself. Before participating in professional development activities, he had a narrow understanding of professional development activities, but he became positive towards professional development activities later. He compared himself and evaluated his teaching then and now. He saw a drastic change in him.

After going through the narrative above of Rajeswar, I developed a change in perception of teachers' professional development as one of the themes for my research that address my second research questions, which is based on the impact of

professional development. From the narrative above, I explored that he had little understanding of TPD and its importance in the beginning. He thought he was wasting his time when he attended the training sessions for the first time. He was receiving complaints from school management for his student's poor academic performance even though he worked hard in the classroom. In search of the reason behind this, he participated in professional development activities, which led to a change in his perception of professional development over time.

PD can bring changes in cognition such as movement in teachers' knowledge, skills, attitudes, or beliefs and changes in behavior such as using instructional skills in the classroom (Cho, 2014). Rajeswar experienced the first change in cognition, such as movement in his knowledge, skills, and attitude, or beliefs about his professional development. This is the process of transformative learning, which is effecting change in a frame of reference (Mezirow, 1997). His frame of reference of TPD changed slowly to the actual understanding.

As a researcher and teacher, I was not aware of its importance. I thought it's jargon that was out of our ability. When I was recommended to participate in training and seminars, I was prejudiced and hesitant to participate in those professional developmental activities. After I got involved in those activities over the years, slowly I started perceiving TPD as a very essential part of a teacher. I knew that only teachers' professional development can make teachers positive towards their professional development.

Change in teaching Methodology and its impact on Students' Performance

As a result of the changes in perception of teaching and professional development, he started preparing lessons before going to the classroom, used teaching materials, checked the understanding of students, managed the classroom,

mobilized students during activity, and involved students in learning. He started teaching using real examples, involving the students in sharing their experiences and ideas using teaching materials. After he started training with new methods, he saw significant changes in students. His students requested him to teach in the same way and they will do the remaining things proactively by themselves and he doesn't need to follow them.

Once he taught profit and loss in grade 9. He explained how the formula was derived step by step using basic things with real-life examples of profit and loss and involving students in sharing and discussion from the inductive method using chart paper. Then, he led his students to the real application of profit and loss instead of directly writing formulas. His students affirmed him saying that it was easier than they expected. They were surprised to see that the formula was derived using real examples. They said that math will not be difficult for them if they are taught in the same method in the future. They also said if he teaches them in the same method using teaching materials, they will be proficient in mathematics. But he assured them he would try his best to teach in the same way if they have sufficient time.

He found some of his attentive students did very well in the exam. Other average students also improved. No one failed in his class. The result was satisfactory after he presented himself with training skills in the classroom. There were no more complaints from parents and school management. His students were scoring good marks in the exam. In this way, his students improved their performance due to changing teaching methodology from lecture method to interactive teaching method.

After going through Rajeswar's narrative above, I observed a change in teaching methodology and its impact on students' performance as one of the themes for my research that address my second research questions which are based on the

impact of professional development. From the narrative above, I explored Rajeswar tried to implement the learnings from professional development activities in the classroom. He tried to plan ahead to manage classrooms, use materials, use teaching techniques, and evaluate. PD should help the teacher to expand their knowledge and skill with the primary purpose to improve classroom practice and learning outcomes (Guskey, 2002; Wright, 2019). TPD provided Rajeswar with the knowledge and skills which helped him to change his classroom practice.

His effort to change in his instructional practice created such a learning environment that his students also appreciated him. They requested him to teach in the same way in other classes also. Most of them improved their learning. He was receiving no more complaints from school management and parents. Focusing on PD and practices will impact increasing student achievement (Zaidi et al., 2018). His learnings from professional development made an impact on improving student achievement.

As a researcher and teacher, I also have a similar experience to Rajeswar. I changed my teaching methodology in the classroom. My students appreciated new teaching methods and were involved in learning. I learned about using games in one of the training sessions. I conducted the circle game in teaching multiples, even, odd, square, and cube numbers in grade 5. My students enjoyed the game and learned the numbers at the same time. I implemented many other techniques in teaching mathematics. As a result, maximum students improved their mathematics.

Issues and Challenges during and after Professional Development

Despite many success stories during the professional development of Rajeswar, he faced many challenges when he tried to apply the learnings from his professional development. He could not fulfill all the expectations of the curriculum

when he applied the training due to the lack of time. He was not able to complete the syllabus prescribed by CDC Nepal. He was expected to complete the syllabus in time. Sometimes he had to revise the lesson again and again. His students reacted as if that lesson was not taught, although it was already taught until he revised it again.

He struggled to apply the training skills due to the lack of resources and proper support from school management. There were other challenges such as classroom size, infrastructure, layout, and the number of students. Generally, there were 30 students on average in the classes he taught. The classrooms were not spacious to conduct participatory activity involving students. They cannot move from one place to another inside the classroom. He struggled to plan with new teaching methods learned during the training for involving and mobilizing a maximum number of students.

It was time-consuming to use new teaching methods, but his students looked for a shortcut way in solving math problems. Sometimes, students were distracted when taught

with a new teaching methodology when it was introduced for the first couple of times in the classroom. They thought that he was teaching useless things and they would learn better. They were taught in the shortcut method. He could not apply all the things we learned as it is in the classroom. His students got confused when he taught explaining explicitly using new teaching methods. His students sometimes felt bored and struggled to accept newness when he suddenly taught the lesson using the new teaching method. His students struggled to adjust to the new teaching method. In that situation, he felt that he might not have been taught properly.

As a result, he had to guide students individually to make students understand properly. He realized that it is challenging to introduce and apply new teaching

methods in the classroom. It was also challenging to manage and arrange teaching

materials. He had to buy them. He tried to collect no cost low-cost materials from

locally available resources. In one of the lessons of grade 8, he spent more time

arranging the chart paper and preparing it for teaching profit and loss. In this way, he

struggled to plan a lesson with teaching strategies he learned and implement in the

classroom. He had to go through many challenges.

After going through Rajeswar's narrative above, I developed issues and

challenges during and after professional development as one of the themes for my

research that address my second research questions which are based on the impact of

professional development. From the narrative above, I explored the issues and

challenges Rajeswar faced during his professional development. He struggled to

apply some of the learnings in the classroom due to lack of time, resources,

infrastructure, lack of trained teachers, inequity, lack of teaching aids and materials,

lack of textbooks, lack of time for students (Panthi & Belbase, 2017).

His students struggled to accept new teaching methods. Some methods made

the students bore, and they were expecting short-cut methods from him. They took

time to adjust to new teaching methods. In some cases, he adjusted his teaching

methods. Teachers perceive that professional learning enhances classroom instruction

and student achievement (Wright, 2019). His learning from professional development

was supposed to enhance students' achievement but his students were distracted with

his new teaching methods. It was time-consuming.

As a researcher and teacher, I went through several issues and challenges

during my involvement in professional development. I wanted to implement the

learnings from training programs and seminars but there were barriers such as

finance, time, support from the school, etc. It made me demotivated to work hard for

more learning. However, I overcame this situation somehow. Rajeswar would perform well if he did not have to face such barriers.

Chapter Summary

In this Chapter, I narrated the stories of the impact of TPD on three research participants based on their experiences. I did meaning-making of themes of each narrative linking with the literature related to the impact of TPD.

Shruti's perception of teaching and TPD changed from negative to positive, teaching methodology changed from chalk and duster method to student-centered method. She experienced her students being proactive in learning with improving performance. However, she had to go through some issues and challenges such as irrelevancy and impracticality of TPD. Chhaya's perception of teaching and TPD changed from negative to positive which led her to change her day-to-day instructional practices resulting in students improved academic performance of students. However, she went to through some issues and challenges such as irrelevant, impractical, the struggle of students, and complaints from parents. Rajeswar's perception towards TPD got changed from negative to positive, changed his teaching methodology with students increased in behavior and performance. However, he struggled to manage resources, time and implement the learnings as it is in the classroom.

CHAPTER VI

REFLECTION AND CONCLUSIONS

In this chapter, I tried to do a critical reflection and conclusion of my research. I reflected on the process of my research and presented what I have learned after concluding my research study. I explained my research agenda and questions, how I constructed the methodological map, and how I responded to my research questions. I have also presented implications and conclusions.

Envisaging My Research Agenda

The purpose of my research study was to explore the perception of mathematics teachers on their professional development according to their experience of professional development activities and its impact to date. Being raised in a village and studying in both institutional and community schools, I was taught by teachers from different backgrounds. Our mathematics teachers always taught us to chalk and talk methods.

After many years, I started teaching in my village school as a mathematics teacher. For the first few years, I taught in the same way my teacher taught. I started to reflect on myself when my students had not any significant improvement even after I was teaching in the same class for many years. In the meantime, I participate in the training where I learned that I have room to learn more and still I need to develop.

After I came to Kathmandu to pursue a bright future, I joined one of the schools in Kathmandu as a math teacher. I had the same experience of struggle in teaching math effectively. Our school invited professionals for the seminar so that we

could improve our teaching. These seminars were not very effective, but they motivated me for more learning. Those PD activities motivated me to participate in more math sessions. The training programs, seminars, conferences, and academic meetings I attended were not subject-specific. Then, I started visiting libraries and learning from colleagues. It helped me a lot.

By this time, I was already teaching for more than a decade in a few schools in Kathmandu. Then, I got an opportunity to work in one of the training organizations in the Lalitpur district as a practitioner facilitator. As a facilitator, I had to work closely with mathematics teachers for their professional development. There, I realized I was still lacking many things that a facilitator should have about teacher professional development. So, I explored a lot about child learning, adult learning, and teacher professional development. My perception towards TPD became wider and more positive and started working accordingly for my professional development as a facilitator.

I have envisaged TPD as a very crucial part of a teacher's life. To be a competent teacher in this 21st-century who can address the voices of students, a teacher should be mandatorily involved in his/her professional development. Teachers have no option for teacher professional development. But as I remembered my past, I did not have a good perception towards teacher professional development. It took a long time to realize the importance of TPD and being involved in it. I wish I would have involved myself in my professional development from my first years of teaching. I thought about my friends who are mathematics teachers, they also had mixed views for TPD according to their experience of participation in TPD. To explore the perception based on their experience, I visualized that I would conduct

my research with my narrative inquiry with the mathematics teacher's experience who are participating in TPD activities from the past to present.

Formulation of My Research Problem

I needed a research question that would guide me to focus on the area of my study. It was not an easy task for me to select my research questions in the beginning. To select relevant and meaningful questions, I reflected on my experiences of learning from PD activities and their effect on my teaching career. I questioned myself about what would help me to be a competent teacher. I concluded that I would be teaching effectively if I had the knowledge, skills, and attitude of a competent teacher. I would not take so long to develop professionally, and I would not waste my time, energy, and resources for many years initially. At the same time, I remembered my prejudice and ignorance towards the role of TPD in my teaching career.

Keeping all these things in my mind, I developed two research questions under the supervisor's guidance of my research. How do mathematics teachers perceive their professional development? How do teachers narrate the impact of PD on their mathematics profession? I prepared these two research questions to explore the narratives of the experience of involvement in the professional development activities of three research participants and their impact on them.

Flashback of My Theoretical Perspective

After I developed two key research questions, I went through the theoretical reference so that I could use those theories in my research. To find the right theoretical references, I explored lots of articles, papers, and dissertations. While exploring available literature, I got an opportunity to go through researching multiple natures with different theories. Finally, I chose transformative learning theory as the theoretical perspective in my research. Mezirow's transformative learning theory

helped me understand the real story of teachers' experience perceiving TPD for their profession. In this way, this theory guided me to narrate how teachers' experience of perceiving their PD according to its impact from the beginning of their teaching to now.

Reflecting on My Methodological Map

My research study was based on interpretivism. I selected three schools: one community and two institutional schools from the Lalitpur district. I chose three research participants purposively. I explained briefly about my research topic and its objectives and requested them to be helpful in my research by giving them valuable time to share their experience, stories, and views followed by the ethical considerations that I was supposed to follow during the research over the phone. All the research participants willingly accepted to be research participants in this research study.

I applied narrative inquiry as a research method in my research study. I conducted two in-depth interviews to collect the teachers' experiences of learning from TPD activities and apply them in their classrooms with my research participants. I took the first round of interviews using the interview questions based on the two research questions on three different days for three participants over the phone, respectively. I did the audio recording of their in-depth interviews following ethical considerations. Then, I generated themes based on the narratives of participants based on research questions. I felt the lack of stories, so I generated follow-up interview questions for the second round of interviews according to the suggestion of my research supervisor. After that, I took another round of interviews with my research participants and collected more narratives. My supervisor suggested me to develop more themes and write individual narratives of each participant. Finally, I analyzed

and interpreted the meaning of each narrative using Mezirow's Transformative Learning theory.

<div align="center">Responding to research Questions</div>

This section answered my research questions based on the theoretical perspectives that guided this entire inquiry. During this process, I collected stories of the three research participants, two female and one male teacher from three different schools. Then, I transcribed the stories of my research participants into narrative form and developed them into two chapters. I put narratives of background, approach, and perception of mathematics teachers on their teacher's professional development of three participants in chapter four and the narratives of the impact of TPD on their profession in chapter five. Based on the narratives from these two chapters, here I have discussed different perceptions shaped by the different impacts of TPD of the participants separately aiming to address the research key questions.

<div align="center">Responding to First Research Question</div>

In this section, I tried to put the consolidated response based on the narratives of three individual participants of the first research questions i.e., How do mathematics teachers perceive their professional development?

Shruti's Perception on TPD as Ongoing Holistic Development

From the sharing of Shruti, I consider her perception of TPD as ongoing holistic development. The sharing of Shruti from past to present reflected that, she got an opportunity to participate in several PD activities. In the beginning, she was not positive towards teaching and TPD. She thought the teaching profession was not her career. Expanding qualifications and training sessions are TPD. She learned many things about classroom management, the use of teaching strategies and materials, ICT in the classroom, etc. She explored for more learning in different sources such as

libraries, the internet, colleagues, and academic meetings and tried to adjust her teaching. This motivated her to continuously learn.

She understood that learning can happen anywhere from any source, and TPD is more than academic qualification and meetings such as training, seminars, and workshops. Although she was not satisfied with all the PD activities, she learned many things from them. She realized that participating in TPD was always beneficial for her, at least in terms of knowledge. However, she was not satisfied with this much. She had knowledge of the content and some learning theories she learned from universities. She learned how to use those learning theories practically in the classroom. At the same time, she also realized that teachers need to have good towards their profession, students, and school. In this way, she concluded that teachers should develop holistically at least in knowledge, skills, and attitude. Throughout her experience of continuous involvement in TPD activities, she started perceiving TPD very positively. She was learning many necessary things that were helping her to teach effectively in her classroom. The more she participated in TPD more she became positive towards teaching.

Chhaya's Perception on TPD as Holistic Development

From the sharing of Chhaya, I considered her perception of TPD as holistic development. Her sharing from her past to present reflected that she could participate in several PD activities. She took teaching as an easy job before she started teaching. However, she did not have the confidence to speak in front of a mass of people. As she started teaching, she did not want to participate in any TPD activities. After she got some opportunities from school to participate in some training sessions, she did not enjoy the training in the beginning. Slowly she started learning from the TPD

activities, which helped her to teach effectively. She started gaining confidence in teaching.

She noticed her students imitating her every activity. This made her realize that teachers should be role models in front of students and teachers need to have good knowledge, skills, attitude, behavior, personality. These things can be acquired only from participating in TPD. In this way, her perception of TPD changed. She perceived TPD as holistic development of teachers that platform for the teachers that motivates to engage them for continuous learning. She was awarded the best teacher award in her school. Similarly, she perceived TPD as a better way of doing it in the workplace. So, she is always looking to participate in PD activities, thinking that she will learn new things.

Rajeswar's Perception on TPD as Development of Teacher as a Manager

From the sharing of Rajeswar, I considered his perception of TPD as the development of the teacher as a manager who can manage all the things such as content, teaching strategies, time, teaching materials, students, and classroom for effective teaching. From the beginning of his teaching career to the present, his sharing reflected that he got opportunities to participate in several PD activities. Before and at the beginning of his teaching, he thought TPD is not necessary for him, and his learning about learning theories is sufficient for him to teach effectively. But things were not happening as he was thinking. He was not performing well at his workplace, and his students were also not doing well in the exam. He received complaints from school management and parents. He was frustrated and curious to know the reason behind his poor performance.

As he participated in several training programs, seminars, and workshops, he learned many things he lacked for his effective teaching. Then, he started preparing

the lesson plans, using teaching materials, teaching strategies, and managing the classroom. He realized that if a teacher can teach effectively if he well manages the time, teaching materials, students, and classroom. He started perceiving TPD as a platform for the teacher to develop themself as a manager who can manage content, teaching strategies, students, time, and resources. He also perceived TPD as much wider and broader than academic qualifications and training. He perceived that TPD is for the development of competency of teachers.

Responding to Second Research Questions

In this section, I tried to put the consolidated response based on the narratives of three individual participants of the second research question, i.e., How do teachers narrate the impact of Professional development on mathematics teachers?

Shruti's Perception Changed on Teaching and Instructional Practices Resulting Improved Students' Performance but with Some Challenges

During and after participating in TPD activities, Shruti tried her best to apply these things in her classroom. Some worked well, where some did not. When she used games, ICT, teaching materials, etc to teach mathematics in the classroom, her students reacted and responded very well. They participated actively in learning to improve learning achievement. However, some PD activities she attended were not relevant, subject-specific, practical, and transferable to the classroom. When she struggled to apply the learnings in the classroom, her students also struggled to work to accept new teaching methods. She couldn't manage teaching materials properly. She couldn't address students of all learning styles. She didn't give up on these challenges.

Chhaya's Perception Changed on Teaching and TPD Resulting Students' Improved Performance but with Some Challenges

During and after participating in TPD activities, Chhaya tried to implement the learnings in her classroom. She used games, group work, teaching materials, and classroom management strategies in the school. Most of her students enjoyed her class. They also did well in the exam. However, she couldn't implement all learnings effectively from training in her classroom. Those TPD activities were not relevant and practical. Some of the activities in PD were good-looking only during the PD time. When she tried to implement those learning in the classroom, some students struggled with teaching new methods. Their parents complained to her and asked to continue teaching in the traditional method.

Rajeswar's Perception Changed on TPD and Teaching Methodology Resulting Improved Students' Performance but with Some Challenges.

During and after participating in TPD activities, Rajeswar tried to implement the learnings in her classroom. His students appreciated him a lot when he taught in a new method. They requested him to teach the same way and assured him that they would surely improve their mathematics. They improved their academic performance. He received no more complaints. However, he also struggled to implement some of the learnings from the PD activities. He couldn't address the whole class with one teaching method. He could not arrange teaching materials. He couldn't manage time to complete the syllabus. He struggled to mobilize students during activities in class due to a lack of enough space in the classroom. However, he adjusted his teaching strategy right away and completed the lesson.

All three participants had a common perception of TPD at the beginning of their teaching careers. They had a negative perception of TPD. They hesitated to participate in TPD activities. They thought that they can teach best on their own learning from university. Also, they didn't want to come out of their comfort zone. As

they participated in PD activities with many academic exposures, their perception changed slowly.

As a result of participating in PD activities and implementing the learnings in the classrooms, all the three participants narrated that they experienced a change in the perception of their teaching and teacher professional development over time after getting involved in TPD activities. They also narrated that they experienced positive changes in the academic performance of students from the classes they implemented the learning from PD activities. Also, they narrated their experience of challenges and issues such as lack of experts for relevant and practical PD activities, proper planning, resources, time, finance, etc they faced during and after the TPD activities.

These impacts of TPD on my research participants helped them to change their perception of TPD. By the time of this interview, Shruti and Chhaya perceived TPD as holistic development that helps the teacher to grow in knowledge, skills, attitude, personality, and behavior. Shruti and Chhaya perceived TPD as continuous learning till the last day of their career. Shruti and Rajeshwar perceived TPD more than academic qualification and training but also workshops, self-monitoring, teacher support groups, keeping a teaching journal, peer observation, teaching portfolios, analyzing critical incidents, case analysis, peer coaching, team teaching, action research, attending conferences, reading professional publications, self-directed study, using distance learning materials, collaborative learning, etc. Shruti and Rajeswar perceived TPD as competency development that helps the teacher to be competent in front of students and colleagues in the 21st century. Chhaya perceived TPD as a way of doing better in the workplace. Rajeshwar perceived TPD as the development of a pedagogical manager that helps teachers to manage all the things

such as content, teaching materials, classroom, students, time, required for effective teaching in the classroom.

These perceptions of the participants were cumulatively formed and changed over the years. During these years, the participants went through both successful and struggling moments in the classroom. Successful stories motivated them to have a positive perception towards PD whereas challenges and barriers they faced during and after professional development demotivated them to have a negative perception towards PD. Overall, they have perceived that professional development was important for teachers.

Transformative Learning during the Professional Development of Teachers

My research was based on narrative inquiry. During this research, I learned various lessons from the stories and experiences of all three research participants. Each of them had different stories of the beginning of their career, the environment of the school, opportunities for participation in TPD and motivation, and stories of success and challenges they experienced in their workplace.

According to the narratives of research participants, Shruti had a long process of getting her perception changed from negative to positive towards TPD. TPD itself provided her environment to go through that long process. Chhaya's negative perception of TPD changed to positive only after she spent her long time in TPD. Rajeswar also changed his perception from negative to positive towards TPD only after he involved himself in formal or informal TPD activities for a long time. All three participants were transformative learners.

TPD activities such as training, seminars, workshops, conferences, and learning from self-study and colleagues helped the research participants develop themselves professionally. These activities change the perception of participants over

time. This allows participants to go through the process of transformative learning. Transformative learning is the process of effecting change in a frame of reference The frames of reference are the structures of assumptions through which we understand our experiences that selectively shape and delimit expectations, perceptions, cognitions, and feelings (Mezirow, 1997). My research participants' frames of reference on TPD were narrow due to lack of exposure and fixed mindset. They were comfortable with their habit of mind. Their point of view towards TPD was judgmental and unnecessary in the beginning. As they got involved in TPD activities, they got the opportunity to learn from the facilitator, other participants, colleagues, self-study, etc. Mostly the opportunities to share and hear about the experience of challenges and success stories within academic meetings and collecting ideas of facilitators motivated them to participate proactively. Specially PD activities such as training, seminars, workshops, and conferences allow participants to engage in discourse. During the dialectical discourse in teacher professional development, they got the opportunity to reflect critically on their own assumptions towards TPD. According to Mezirow, we transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based. From the narratives of my research participants, it is clear that PD activities created the environment of critical reflection on the false assumption upon TPD. According to their narratives, they elaborated their existing negative perceptions towards TPD during the first few TPD activities. As they invested more time in TPD, they realized its importance and transformed their point of view and habit of mind eventually. They went through several discourses and critical self-reflection during the process of transformative learning. The PD activities in my research participants participated were not all beneficial. Some of them were

impractical, irrelevant, and not transferable to the classroom. However, my research participants could learn something from the weakness of training and facilitators. As a result, all three research participants realized the importance of TPD in teachers' careers. In this way, they transformed from a narrow-minded teacher to an open-minded teacher towards TPD like a larva to a butterfly.

Conclusion

During my research study, I collected the stories with experience and views of my participants through their narratives to understand how they have been perceiving TPD based on the experience of its impact throughout their teaching career. I have analyzed the perception they had from the lens of transformative learning perspective.

It can be concluded that most novice teachers tend to have either negative or neutral perceptions towards their PD until they involve themselves in PD for a long time. They assume their knowledge from university is enough for them to teach their students effectively, but they will be lacking pedagogical content knowledge. Teachers who participate in PD activities continuously find these activities meaningful and helpful to do better in their workplace.

It can be concluded that TPD is a platform for teachers to grow holistically in knowledge, skills, attitude, behavior, and personality so that teachers can be role models in front of students. TPD is not synonymous with academic qualification and training, but it is broader. TPD is workshops, self-monitoring, teacher support groups, keeping a teaching journal, peer observation, teaching portfolios, analyzing critical incidents, case analysis, peer coaching, team teaching, action research, attending conferences, reading professional publications, self-directed study, using distance learning materials, collaborative learning, etc. TPD is not just for once, but it is ongoing till the last day of our career. Teachers who don't involve themselves in

continuous learning will be outdated and incompetent. TPD equips the teachers with all the competencies required to teach twenty-first-century students. TPD develops the teacher as a pedagogical manager who can manage a classroom, resources, content, students, time, teaching strategies, etc. TPD empowers teachers to do better in their workplace.

TPD helps the teachers to change the perception of teaching and itself from negative to positive, but it requires teachers to involve in PD for a long time. TPD helps the teachers to change their teaching methodology for effective teaching and learning in the classroom. TPD helps the teachers to help students to have meaningful learning and improve their academic performances. Taking TPD seriously will help the teachers in their transformation to a comp

However, all TPD activities may not be effective as expected due to several technical problems such as lack of experts, proper planning, resources, time, finance, etc. The essence of TPD can be fulfilled only if it is practical, relevant, transferable, facilitated by experts, supports by the school, parents, and community. However, teachers who participate in such TPD activities will not return empty hands. They learn from sharing and hearing stories, experiences, and ideas from other participants during the discourse. Therefore, teachers who have experienced participating in TPD for a long time are found to be experiencing more positive impact with less negative impact and have a positive perception of TPD. Therefore, TPD is an inseparable part of teachers' profession.

Implications

As a practitioner, I have to work with many mathematics teachers, but I have experienced some of the math teachers struggling and hesitating. Some are proactive during their participation in their PD. From the participants' narratives above, I

realized that the teachers need to feel that they are not wasting time in any PD activities but having meaningful learning for their classroom. This will gradually make their perception positive towards their PD and be more motivated to overcome the challenges they face during their PD. This study serves teachers and teacher educators to motivate them for their PD and experts, school leaders, and curriculum planners to plan and conduct effective PD activities in school or any training centers. This study generally focuses on the mathematics teachers who have different perceptions of their PD. It will help such teachers to reflect on their perception once again and take initiative for their PD. It inspires further research related to TPD of mathematics teachers.

REFERENCES

Acharya, C. P. (2014). Use of ICT/web tools in ELT in Nepal. *Journal of NELTA*, *19*(1-2), 1–16.

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and teacher education*, *27*(1), 10-20. http://repositorio.uchile.cl/bitstream/handle/2250/124416/Avalos_Beatrice.pdf?seq

Badri, M., Alnuaimi, A., Mohaidat, J., Yang, G., & Al Rashedi, A. (2016). Perception of teachers' professional development needs, impacts, and barriers: The Abu Dhabi case. *SAGE Open*, *6*(3). https://doi.org/2158244016662901

Bakhati, P. (2014). Interrelation between teacher training, teacher professional development and action research. *Teacher Education*, *20*(71), 30-36.

Bashir, S., Bajwa, M., & Rana, S. (2014). Teacher as a role model and its impact on the life of female students. *International Journal of Research-Granthaalayah*, *1*(1), 9-20. https://www.granthaalayahpublication.org/journals/index.php/granthaalayah/article/download/IJRG14_A07_03/2962

Bharati, P. L., & Chalise, S. (2017). Teacher development: Strategies and perception. *Saptagandaki Journal*, *8*, 69-78. https://www.nepjol.info/index.php/sj/article/view/18464/15037

Bhujel, K. (2020). The impact and challenges of teachers' professional development training of mathematics at primary school level in Nepal. *NUE Journal of International Educational Cooperation*, *13*, 39-46.

https://naruto.repo.nii.ac.jp/?action=repository_action_common_download&item_id=28548&item_no=1&attribute_id=25&file_no=1

Bicaj, A., & Treska, T. (2014). The effect of teacher professional development in raising the quality of teaching (pilot research). *Academic Journal of Interdisciplinary Studies*, *3*(6), 369-378. https://doi.org/10.5901/ajis.2014.v3n6p369

Bush, P. L. (2015). *The matter of morality: Examining moral-ethics as a tenet of transformative learning* [Conference presentation abstract]. *Adult Education Research Conference*. https://newprairiepress.org/aerc/2015/roundtables/3

Cho, J. H. (2014). *Teachers' perceptions of changes to teaching practice and the influence of professional development: Experienced EFL teachers in South Korea* [Master's dissertation]. https://researcharchive.vuw.ac.nz/xmlui/bitstream/handle/10063/3434/thesis.pdf?sequence=2

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). *Routledge.*

Costa, A. L., &Kallick, B. (2000). Describing 16 habits of mind. *Habits of Mind: A Developmental Series. ASCD.*

Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* University of Nebraska-Lincoln.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. https://files.eric.ed.gov/fulltext/ED606743.pdf

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2017). *The Sage handbook of qualitative research*. Sage publications.

Department of Education [DOE]. (2016). *School level educational statistics of Nepal, Consolidated report* 2015 (2072). Department of Education.

Dirkx, J. M., Mezirow, J., &Cranton, P. (2006). Musings and reflections on the meaning, context, and process of transformative learning: A dialogue between John M. Dirkx and Jack Mezirow. *Journal of transformative education*, *4*(2), 123-139.

Education Review Office [ERO]. (2018): *Main Report (Report on the National Assessment of Student Achievement in Mathematics and Nepali for Grade 5)*

Ennis, C. D., & Chen, S. (2012). Interviews and focus groups: Catherine D. Ennis and Senlin Chen. In *Research methods in physical education and youth sport* (pp. 220-239). Routledge.

Gautam, G. R. (2016). Teacher training in Nepal: Issues and challenges. *Tribhuvan University Journal*, *30*(2), 43-56.

Ginsburg, M. (2012). Teachers as learners. In *The world bank and education* (pp. 83-93). SensePublishers, Rotterdam.

Groenewald, T. (2004). A phenomenological research design illustrated. *International journal of qualitative methods*, *3*(1), 42-55.

Gujjar, A. A., & Choudhry, B. N. (2009). Role of teacher as classroom manager. *Journal on Educational Psychology*, *2*(4), 65-73.

Gupta, K. (2011). *A practical guide to needs assessment*. John Wiley & Sons.

Guskey, T. R. (2000). *Evaluating professional development*. Corwin Press.

Guthrie, J. T., &Wigfield, A. (2004). Classroom contexts for engaged reading: An overview. *Motivating reading comprehension: Concept-oriented reading instruction*, 1-24.

Habermas, J. (1972). *Knowledge and human interests*. Beacon Press

Hasan, M., & Parvez, M. (2017). Professional development of 21st century teachers in higher education. *Educational Quest*, *8*(1), 145-160.

Illeris, K. (2018). Transformative learning theory. In *Contemporary theories of learning* (pp. 114-128). Routledge.

Kagoda, A. M., & Ezati, B. A. (2014). Secondary school teachers' perception of teacher professional development: A case study of teachers from five districts of Uganda. *Journal of Teacher Education and Educators*, *3*(2), 185-202.

Kaleli-Yilmaz, G. (2015). The views of mathematics teachers on the factors affecting the integration of technology in mathematics courses. *Australian Journal of Teacher Education (Online)*, *40*(8), 132-148.

Kamal, S. S. L. B. A. (2019). Research paradigm and the philosophical foundations of a qualitative study. *PEOPLE: International Journal of Social Sciences*, *4*(3), 1386-1394.

Kennedy, A. (2017). Teacher perceptions of school-based and district professional development. http://digitalcommons.kennesaw.edu/teachleaddoc_etd/17?utm_source=digitalcommons.kennesaw.edu%2Fteachleaddoc_etd%2F17&utm_medium=PDF&utm_campaign=PDFCoverPages

Killam, L. (2013). *Research terminology simplified: Paradigms, axiology, ontology, epistemology and methodology*. Sudbury.

Kim, J. H. (2015). *Understanding narrative inquiry: The crafting and analysis of stories as research*. Sage publications.

Krauss, S., Brunner, M., Kunter, M., Baumert, J., Blum, W., Neubrand, M., & Jordan, A. (2008). Pedagogical content knowledge and content knowledge of

secondary mathematics teachers. *Journal of educational psychology*, *100*(3), 716-735.

Kvale, S., & Brinkman, S. (2009). Interview quality. *Interviews: Learning the craft of qualitative research interviewing*, 161-175.

Laal, M., & Laal, M. (2012). Collaborative learning: what is it? *Procedia-Social and Behavioral Sciences*, *31*, 491-495.

Luitel, B. C. (2009). *Culture, worldview and transformative philosophy of mathematics education in Nepal: A cultural-philosophical inquiry* [Doctoral dissertation]. Curtin university press.

Macià, M., & García, I. (2016). Informal online communities and networks as a source of teacher professional development: A review. *Teaching and teacher education*, *55*, 291-307.

Mahmoudi, S., Jafari, E., Nasrabadi, H. A., &Liaghatdar, M. J. (2012). Holistic education: An approach for 21st century. *International Education Studies*, *5*(2), 178-186.

Malik, M. A., & Ghazi, S. A. (2011). Enhancing Learning Outcomes through Proper Management of Teaching Learning Situation. *International Journal of Social Sciences & Education*, *1*(4). 405 – 415. http://www.ijsse.com/sites/default/files/issues/2011/v1i4/paper%208/paper%208.pdf

Manandhar, N. K. (2018). *Conceptual and procedural knowledge of students in mathematics: A mixed method study* [Unpublished master's dissertation]. Kathmandu University.

Mezirow, J. (1990). How critical reflection triggers transformative learning. *Fostering critical reflection in adulthood*, *1*(20), 1-20.

Mezirow, J. (1997). Transformative learning: Theory to practice. *New directions for adult and continuing education, 1997*(74), 5-12. https://oget.pw/transformative_learning.pdf

Mezirow, J. (2000). Learning to think like an adult. *Learning as transformation: Critical perspectives on a theory in progress*, 3-33. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.463.1039&rep=rep1&type=pdf

Ministry of Education [MOE]. (2009). *School sector reform plan* 2009-2015. Ministry of Education, Nepal.

Ministry of Education [MOE]. (2015). Report on national assessment of student achievement (NASA) 2013.

Ministry of Education [MOE]. (2016). School sector development plan, Nepal, 2016–2023.

Mohammadi, M., & Moradi, K. (2017). Exploring change in EFL teachers' perceptions of professional development. *Journal of Teacher Education for Sustainability*, *19*(1), 22-42. https://files.eric.ed.gov/fulltext/EJ1146839.pdf

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, *52*(2), 250.

Murtaza, A., Khan, A. M., Khaleeq, A. R., & Saeed, S. (2012). An evaluation of classroom management in effective teaching. *International Journal of Business and Social Science*, *3*(3). 201-209. http://www.ijbssnet.com/journals/Vol_3_No_3_February_2012/21.pdf

Nakawa, N. (2013). Current situations in pre-primary and primary mathematics education in Kathmandu, Nepal. *Tokyo Future University bulletin*, *6*, 131-139.

National Center for Educational Development [NCED]. (2016). *Teacher Competency Framework-2072.*

Nessipbayeva, O. (2012). The Competencies of the Modern Teacher. *Bulgarian Comparative Education Society*. 148-154. https://files.eric.ed.gov/fulltext/ED567059.pdf

Nugent, T. A. (2007). *A narrative inquiry of teachers' perceptions regarding their professional development experiences*. Western Michigan University.

Pandey, S. C., & Patnaik, S. (2014). Establishing reliability and validity in qualitative inquiry: A critical examination. *Jharkhand Journal of development and management studies*, *12*(1), 5743-5753.

Pant, B. P. (2017). Doing, teaching, learning and thinking about mathematics–On becoming a transformative teacher. *Journal of Education and Research*, *7*(1), 11-24. https://www.nepjol.info/index.php/JER/article/download/21237/17387

Pant, S. K., Luitel, B. C., & Pant, B. P. (2020, December). STEAM Pedagogy as an Approach for Teacher Professional Development. In *Mathematics Education Forum Chitwan* (Vol. 5, No. 5, pp. 28-33).

Panthi, R. K., &Belbase, S. (2017). Teaching and learning issues in mathematics in the context of Nepal. *European Journal of Educational and Social Sciences,* 2 (1), 1–27. https://www.preprints.org/manuscript/201706.0029/download/final_file

Peña-López, I. (2009). Creating effective teaching and learning environments: First results from TALIS.

Piedrahita, A. M. S. (2018). Changing teaching practices: The impact of a professional development program on an English teacher. *Íkala*, *23*(1), 101-

121.

https://www.redalyc.org/jatsRepo/2550/255055383008/255055383008.pdf

Pokhrel, T. R., & Behera, S. K. (2016). Expectations of teachers from teachers professional development program in Nepal. *American Journal of Educational Research*, *4*(2), 190-194.

http://article.scieducationalresearch.com/pdf/EDUCATION-4-2-6.pdf

Richards, J. C., & Farrell, T. S. C. (2005). *Professional development for language teachers: Strategies for teacher learning*. Ernst KlettSprachen.

Richardson, M. O. (2000). Peer observation: Learning from one another. *Thought & Action*, *16*(1), 9-20.

Rittle-Johnson, B., & Schneider, M. (2015). Developing conceptual and procedural knowledge of mathematics. *Oxford handbook of numerical cognition*, 1118-1134. https://www.uni-trier.de/fileadmin/fb1/prof/PSY/PAE/Team/Schneider/RittleJohnsonSchneiderInPress.pdf

Schlager, M. S., & Fusco, J. (2003). Teacher professional development, technology, and communities of practice: Are we putting the cart before the horse? *The information society*, *19*(3), 203-220.

Selvi, K. (2010). Teachers' competencies. *Cultura International Journal of Philosophy of Culture and Axiology*, *7*(1), 167-175.

https://www.academia.edu/download/24760736/art12.pdf

Shah, T., Patel, M. A., & Shah, H. (2017). A comparative study on the teaching effectiveness of chalk & talk versus Microsoft PowerPoint presentation-An institution based pilot study of physiotherapy students. *Int J Cur Res Rev*, *9*(11), 40-43

Shrestha, I. M., Luitel, B. C., & Pant, B. P. (2020, December). Exploring

transformative pedagogy in teaching mathematics. In *Mathematics Education

Forum Chitwan* (Vol. 5, No. 5, pp. 9-16).

Shulman, L. S. (1986). Those who understand: Knowledge growth in

teaching. *Educational researcher*, *15*(2), 4-14.

Sinha, R. S. (2015). Teacher educators for teacher professional development. *Teacher

Education*, *20*(72), 269-277.

Smith, M. E. (2015). *Math teacher perceptions of professional development and

student mathematics performance* [A doctoral dissertation]. Walden

University.

https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?referer=https://scholar.

google.com/&httpsredir=1&article=1300&context=dissertations

Taylor, P. C. (2015). *Constructivism.* Springer Netherlands.

Taylor, P. C., & Medina, M. (2011). Educational research paradigms: From

positivism to pluralism. *College Research Journal*, *1*(1), 1-16.

https://researchrepository.murdoch.edu.au/id/eprint/36978/1/Educational_rese

arch_paradigms_From_posi.pdf

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2008). *Teacher professional

learning and development* (Vol. 18). International Academy of Education.

Van Manen, M. (2016). *Researching lived experience: Human science for an action

sensitive pedagogy*. Routledge.

Villegas-Reimers, E. (2003). *Teacher professional development: an international

review of the literature.* International Institute for Educational Planning.

Webster, L., &Mertova, P. (2007). *Using narrative inquiry as a research method: An introduction to using critical event narrative analysis in research on learning and teaching*. Routledge.

Williams, J. H. (Ed.). (2014). *(Re) Constructing memory: School textbooks and the imagination of the nation*. Springer.

Wright, C. R. (2019). *Teacher Perception of Professional Development and Impact on Instructional Practice and Student Achievement* [Doctoral dissertation]. Virginia Tech. https://vtechworks.lib.vt.edu/bitstream/handle/10919/90779/Wright_CR_T_2019.pdf?sequence=1&isAllowed=y

Zaidi, S., Khan, N. R., & Khan, N. (2018). Organizational factors, teachers' professional development and teaching practices: findings from Female elementary school teachers. *International Journal of Experiential Learning & Case Studies*, *3*(1), 84-96. https://www.journals.iobmresearch.com/index.php/JELCS/article/download/2155/403