EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL

By

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M.Phil. Education, Islamia University Bahawalpur, 2013

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

DOCTORATE OF PHILOSOPHY
IN **Education**

To

DEPARTMENT OF EDUCATION
FACULTY OF SOCIAL SCIENCES

NATIONAL UNIVERSITY OF MODERN LANGUAGES, ISLAMABAD

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NATIONAL UNIVERSITY OF MODERN LANGUAGE FACULTY OF SOCIAL SCIENCES

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Thesis Title: Effects of Teachers' Continuous Professional Development on Students' Self-Regulated Learning at University Level

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ABSTRACT

Title: Effects of Teachers' Continuous Professional Development on Self-Regulated Learning of Students, at University Level

This study pursued to identify level of continuous professional development (CPD) among university teachers, to assess self-regulated learning (SRL) of university students, to compare demographic differences, i.e., gender and teaching experience regarding university teachers' CPD, to compare gender-based difference regarding SRL of students at university level, and to analyze the effect of CPD of teachers on SRL of the students, in the universities of Islamabad. Descriptive type research was followed, using survey technique. Study population consisted of the teachers and students in the universities of Islamabad with Social and Management Sciences Faculties. The study used both purposive and systematic random sampling. Five public-sector universities with these faculties were shortlisted and three from them were randomly selected as population. Hundred CPD qualified teachers from BS class-rooms were purposively selected in these three universities. Around five students from each class were selected for SRL data. Two questionnaires were used for data collection, i.e., self-devised questionnaire to assess teachers' CPD, and a standardized tool, MSLQ for SRL of their students. Descriptive statistics were used to analyze the obtained data. Hypotheses testing was done by using t-test and regression analysis. Discussion was based on five objectives. It was concluded from the study findings that CPD for teachers in the universities of Islamabad was strong. But CPD related to out of institute learning was found to be the weakest. Demographic variables like gender and teaching experience had insignificant role in CPD of teachers. It was also found that SRL was being practiced by the students of universities in Islamabad. Gender played significant role in SRL of the students. Inferential statistics found that CPD of the university teachers in Islamabad had no significant effect on the SRL of the students. It was concluded that CPD of teachers was positively related with SRL of their students. The study recommended that CPD of University teachers may include focus on SRL of their students to make such learning practices more productive and across the gender. It would require inclusion of such training sessions in universities' training cycle and by sensitizing the teachers about significance of this form of learning.

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LIST OF ABBREVIATIONS

BELMAS	British Educational Leadership, Management and Administration Society
β	Coefficient
CB	Control Beliefs
CLaSIC	Title of biennial conference organized by Center for Language Studies, National University of Singapore
COPES	Conditions, operations, products, evaluations and standards
CPD	Continuous Professional Development
CT	Critical Thinking
df	Difference
EGO	Extrinsic Goal Orientation
Elab	Elaboration
ER	Effort Regulation
f	Frequencies
FaSMEd	Formative Assessment in Science and Mathematics Education
HEC	Higher Education Commission
HS	Help Seeking
ICT	Islamabad Capital Territory
IGO	Intrinsic Goal Orientation
IR	International Relations
KPK	Khyber Pakhtunkhwa
MS	Management Sciences
MCSR	Meta-Cognitive Self-Regulation
MSLQ	Motivated Strategies for Learning Questionnaire
NCTAF	National Commission on Teaching and America's Future
NUML	National University of Modern Languages
OECD	Organisation for Economic Co-operation and Development
Org	Organization
PD	Professional Development
PL	Peer Learning
Reh	Rehearsal
SELP	Self-Efficacy for Learning and Performance
Sig.	Significant
SPSS	Statistical Package for Social Sciences
SRL	Self-Regulated Learning
SS	Social Sciences
t	t-value
TA	Test Anxiety
TSE	Time & Study Environment
TV	Task Value

ACKNOWLEDGEMENTS

First of all, I must thank Allah Almighty for the strength and courage He bestowed upon me to have perseverance and patience. He very graciously gave me the temperament to carry out this laborious task. Although writing this dissertation has probably been one of the most challenging ventures that I have faced in life, it has been truly one of the most rewarding. As a result of my studies and research, I have grown in stamina, patience and endurance. Many a time, the task appeared daunting and unsurmountable, but then I drew matching strength from within.

I owe a great deal of thanks to my university teacher Dr. Allah Baksh, who provided the guidance and light to become confident researcher and admirer of learning. He is always such an outstanding source of inspiration. I am grateful for the support, guidance, wisdom, and motivation of my supervisor, Dr. Shazia Zamir, whose expertise, patience, and generosity with her time made it possible for me to complete this project and realize my dream to become Doctor of Education. I am forever indebted to my worthy supervisor.

I am deeply indebted to the outstanding faculty of Department of Education in National University of Modern Languages, Islamabad whose influence has enabled me to grow personally and professionally throughout my doctoral program. It has truly been a life changing experience. Specifically, Dr. Hukam Dad Malik, ex Head of Department, has always supported me throughout my program to think deeper and grow professionally. He was ever helpful; may Allah bless him always. I would like to extend thanks to my respected teachers, Dr. Maryam Din, Dr. Saira Nudrat, Dr. Qurat Ul Ain and Dr. Khushbakht Hina.

I also would like to thank all the respondents who gave their valuable time involving in the pilot study and surveys.

My thanks to my wife, Fouzia and my children, Khadija, Ibrahim and Aalia, for their constant and loving support while I spent many hours, days and months, on my research.

DEDICATION

This thesis is dedicated to all new researchers, who have endless possibilities ahead. Creating a bit of knowledge is whole lot of achievement.

CHAPTER 1

INTRODUCTION

Professional development of teachers has gathered increasing significance around. This aspect of teachers' effectiveness always overlaps with institutional improvement, and thus ultimately causes change through education. This rising interest in the concept has multiplied owing to rapid change in education in general and particularly in higher education, changing dynamics of education related facets including nature of knowledge and delivery techniques, and rising social complexity. As the challenges evolve, the teachers are required to enhance their competence through refining their conceptual base and methodology (Guskey, 2000). These domains are encompassed by the concept of professional development. Thus, it is such intense, focused and sufficient development which results into enabling the teachers to become effective educators. Cohen and Hill (1998) established that professional development must enrich subject-matter related knowledge of the teachers and improve their content skills. Professional development of teachers is directly linked with achievements at institute and class levels.

Studies by McCutchen et al., Saxe, Gearhart and Nasir, and Tienken (as cited in US Department of Education Report, 2007) clearly found that teachers who have gone-through some element of professional development, have been able to bring some qualitative improvement in their class-room practices, including direct teaching in class-rooms. Their students have shown better performance as far as level of learning and overall performance are concerned. Desimone (2009) found that PD of teachers brings changes in their knowledge and beliefs, which will ultimately help them to modify their teaching. US Department of Education Report (2007) quoted nine studies which revealed that teachers who were given professional development (PD) for an average of 49 hours

could enhance their students' score by 21 percentile. Thus, PD of the teachers had direct impact on achievement level of their students. The professional development comes through many traditional-novel ways. Reid gave four dimensional teachers' professional growth which includes formal and informal modes, and planned and incidental modes (Fraser, 2007). The development can come if participating teachers have capacity to absorb the contents, and then have capability and skill to apply contents of the training sessions.

Teachers' continuous professional development (CPD) is a wide-ranging concept, which can encompass multifarious activities in different domains but has been largely misunderstood and made limited to: formal courses, training workshops, in-service training, deliberate mentoring and planned coaching. However Day (1999), Cordingley et al. (2003), Fraser (2005), Avalos (2011), Clark and Hollingsworth, Ling and Mackenzie, and Craft (as cited in Asmelash, 2014) consider it as a limited interpretation of the concept. On the contrary, CPD includes range of activities carried out through varied media, not limited to any particular time frame or location. Engaging various dimensions, CPD of the teachers is a complex process. Teachers are involved in many activities concerning their professional development which are occurring voluntarily and include many involuntarily occurring instances of learning. In the course of these CPD related processes, various personal and external factors come into play making this process a complicated one. To understand a teacher's response the dynamics of these influencing factors are required to be understood in detail, failing which the efficacy of the CPD related activities would be compromised. Same wise, a CPD activity carried out as a single instance, devoid of any follow-up or consistent practice would not bring desired outcomes. Cordingley, Bell, Rundell and Evans (2003) hold the view that any long-term

and significant changes cannot be expected in the practices of a teacher through any single event of professional development, e.g. a seminar or a workshop.

Students in higher education learn through different modes of learning. These modes of learning are adopted in different situations. Many factors play their role in selection and subsequently practicing these modes. Students' social and academic backgrounds (Zimmerman, 2002), institutional environment, motivation and adopted strategies play their role in adoption of learning modes. Ultimately students' modes of learning are reflected in their class-room achievements. Through this yardstick, efficacy of the learning modes can also be judged. Among various learning techniques, self-regulated learning of the students holds significant position, rather the self-regulated learning (SRL) concept has got prominence during last few decades. According to Broadbent and Poon (as cited in Broadbent, 2017) SRL strategies are relevant in higher education context. In this mode of learning, the learners can regulate their learning, the outcomes of which are then traceable in their class-room achievements. Thus, SRL of the students has some tangible relationship with their ultimate learning. During such learning through self-regulation, the learners, after setting goals, can monitor their own progress towards achievement of those goals. In this way they are conscious about the usefulness of their learning styles (Crede & Philips, 2011). Zimmerman and Schunk (2008) drew out a comparison between poor and good self-regulators. Suitable learning environment plays significant role, so good self-regulator learners, according to Zimmerman and Schunk (2008), would maintain appropriate learning environment, and do not hesitate to seek assistance from mentors and peers whenever it is needed. Their efforts towards learning are persistent and adjustable, whenever the need arises to adjust their strategies during the goal achievement or when they are set to pursue new goals.

1.1 Rationale of the Study

Teachers are considered to be the change agents who bring any desired change in their students. Hattie found teachers to be at the centre of any effort to bring positive changes in students' learning (as cited in Basma & Savage, 2018). So, to bring any tangible change in individuals and society, teachers are required to be changed. This change in a teacher is the outcome of some kind of training. Training of a teacher is a continuous process of her professional development (PD). The training process is initiated right from the outset in the form of formal pre-service teacher training; to remain updated, training of the teacher is required to continue during her career. This purposeful training guides her how to understand the dynamics of the teaching and maximize the teaching-learning process. It is needed to be focused, objective-oriented and planned. The point of emphasis is that professional and personal growth of the teachers enables them to attain maximum of their potential and act accordingly. At the same instance it is expected at university level that the students will become active learners, by devising and pursuing academic goals, monitoring their progress and evaluating the outcomes at the end. These goals will take the shape of SRL. Keeping this dual perspective in sight, question emerges regarding the effect of CPD of university teachers on their students' SRL.

It is worth mentioning that the effect of CPD on many aspects of learning of the students has been a domain of research for quite some time but no study was found which might have explored the SRL of students being caused through professional development of teachers. There is a need to provide an in-depth study of the situation of CPD practices in universities of Federal Capital Territory and analyze the effect caused by such CPD on the students' learning, in general, and SRL of the students in those universities, in particular. In the context of Pakistan, effect of university teachers' CPD on their students' SRL has not been discussed as yet. Present research is going to evaluate the CPD

practices in the universities of Islamabad, and their effect on SRL of their students. So, this study is expected to guide university administrations to devise programs of CPD of their faculty in a way to impact students' SRL in universities.

Present study is aimed to explore this effect in the universities of Islamabad Capital Territory. This PD of the teachers holds greatly significant place in their profession. Teachers are known to have improved, as a consequence of their professional grooming, in various areas including direct teaching in class-rooms, significantly impacting the students' performance. A relationship exists in the form that PD of the teachers will result into better teaching in class-room, thus ultimately impacting students' achievements. The effects of these practices of CPD of university teachers on students learning have been explored. Keeping the significance attached to the area of CPD, this present study is likely to impact the students, the teachers, education administrators and planners of teacher-education programmes. Keeping in view such diverse and significant effect, it was quite relevant and noteworthy to explore the impact of teachers' CPD on SRL of their students. This research conducted with such purpose will enable the stake holders to add to the efficacy of the practices.

1.2 Theoretical Framework

In present research, Lieberman's classification model of CPD has been used. Research's focus in this area mainly remained on professional development of the teachers in different spheres. Thus, Lieberman's classification model of CPD was used, in this study, to measure CPD of those teachers who were engaged in teaching in universities. Alongside, present study focused on SRL which is characterized by ways in which individual controls her learning in an educational setting. Such regulation is a challenging task (Roll et al. as cited in Roll & Winne, 2015). Various models to cover

SRL have been developed which are of three types: socio-cognitive models, socio-cultural models and constructionist models. Present study used Pintrich's SRL model, which is a socio-cognitive one. SRL generally consists of four stages (Pintrich, 2000) which have been paraphrased below. Some time, these are brought to three stages:

1. Phase 1: This phase is related to goal setting and planning. At this stage perceptions of the learner come into action. These perceptions cover entire perspective of the learner. These include her prior knowledge concerning the task being undertaken and her awareness of the context. Finally, she brings her own self viz-a-viz the task which she is performing.
2. Phase 2: It consists of the processes of monitoring. These processes are meant to have better understanding of the aspects of an individual's self and comprehending the context and task.
3. Phase 3: Here the task of learning is regulated. Efforts are undertaken to control various aspects related directly or indirectly with the context in which learning activity is being carried out, learner or the task.
4. Finally, Phase 4: This phase mainly concerns with learner's response and reflections which are directly related to her own self and the task or context. These four stages are based on Pintrich (2000) model of SRL

Most of the models of SRL share one common perception, which states that here the cognition is active – constructive. Thus, learners construct their own experiences, and monitor and regulate their learning. Pintrich devised a questionnaire to measure SRL, which was termed as Motivated Strategies for Learning Questionnaire (MSLQ). In MSLQ, Pintrich divided this form of learning into Motivational Strategies and Learning Strategies, further sub-divided into sub-scales. In Listing of Motivation Scales, motivation is a learner's internal drive to achieve her learning task. Motivational scales

have three components, which are value, expectancy and affective components. While regarding Listing of Learning Strategies Scales**., t**here are two main sets of strategies in learning strategies scales. These are cognitive and metacognitive strategies, and resource management strategies. The scales of MSLQ are modular and it is appropriate for the needs of teachers and researchers (Pintrich et al., 1991). There are two sections in this standardized tool. The first section includes sub-sections to measure students' motivation level during SRL. This motivation in this learning task is related to learners' drive to work for the achievement of those learning goals which have been designed for the process.

Theoretical framework of the present research is given in figure 1.1.

Theoretical Framework

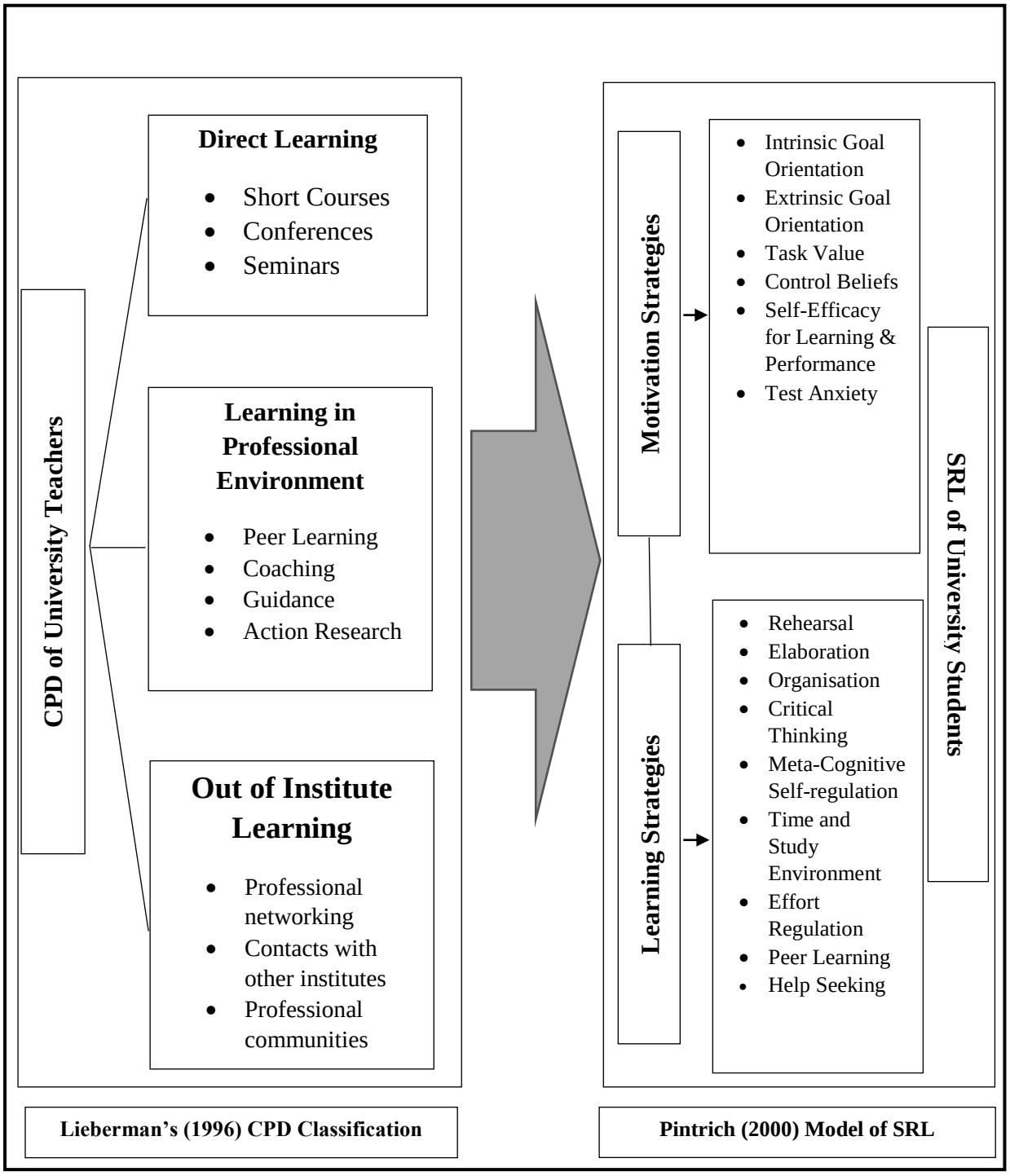

Figure 1.1. Study Theoretical Framework

1.3 Statement of the Problem

Teachers' professional development brings significant changes in their out-look, professional competence and over-all personality. After being engaged in PD, teachers emerge as better practitioners, able to handle situations in a better fashion. This professional development is required to be continuous in nature. Thus, it would become more effective and relevant. Education is an agent which is directly linked with such changes. University education being the 'higher education' is the most significant component of the Education field. The professional development of the teachers at university level becomes major concern for successfully imparting education to the students. CPD of the University teachers is conducted with a variety of purposes and objectives. The purposes of CPD range from teachers' perceptions and practices to learning outcomes, students' performance, and university environment. The present study will assess the advancement being brought in professional domain of teachers at university level, occurring with the help of direct learning, learning through professional environment and out of institute learning. Through many researches it has been found that professional development of teachers casts direct impact on their professional out-look. Effective role of teachers in class-room will definitely improve the students' performance. This fact can be asserted that professional development of the teachers will result into better teaching in class-room. On the other hand, self-regulated learning is a highly significant aspect of university students' learning. Students at this higher level of education are mature and independent learners. More often, they devise their learning techniques. In such learning environment, SRL is a learning procedure which suits students' needs. How can university teachers cause their students to carry-out their learning through adoption of SRL techniques? There is a need to investigate into the effects caused by CPD of university teachers upon SRL practices of their students. CPD

of the university teachers is assumed to bring effective changes in this aspect of their students' learning. Present study has been designed to find out the effects of CPD of teachers on their students' SRL, in universities of Islamabad, Pakistan.

1.4 Significance of the Study

Teachers' PD has direct impact on different aspects of the class-room practices. Darling-Hammond, Hyler and Gardner (2017) also derived that the students whose teachers had gone through PD instances, showed higher learning achievements. On the other hand, dependent variable of the study, SRL is again an important mode of learning by students, especially at higher education level. According to Broadbent and Poon (as cited in Broadbent, 2017) SRL strategies are relevant in higher education context. In addition, Dominguez and Marcelo (2017) are of the view that university teachers are needed to create learning environment favourable for self-regulated learning. So, inter-play of CPD of university teachers and SRL practices of their students was of much significance to research upon, in national context of Pakistan. The impact of university teachers' PD on their students' learning (self-regulated learning in present research) is noteworthy, and present study would be significant in helping universities located in all provinces, throughout Pakistan, in their effort to find this relationship. Future researchers would rightly be guided through this research to further explore the areas of CPD of university teachers and SRL of their students. It is worth mentioning that the effect of CPD on many aspects of learning of the students has been a domain of research for quite sometimes but no study was found which might have explored the SRL of students being caused through professional development of teachers.

Present research would be more helpful for the Departmental heads and university authorities in Pakistan to train their faculty in a more comprehensive and appropriate manner. To successfully impart education, it is necessary that the teachers are

continuously going through the process of professional development. In this way they would significantly impact their students' learning. In class-room, teacher enjoys a pivotal role. She is the one who implements strategies, decides pace, sets direction and achieves goals of the education program. Gupta and Lee (2020) confirmed through their research that teacher and teaching quality are the most powerful predictors of student success. Without an active role performed by teacher, students will not be able to achieve their goals. Professional development of the teacher enables her to perform these tasks effectively. In this way continuous professional development of the teachers has direct effects on the students' modes of learning. Students at university level are mature and independent learners. They are encouraged to devise their learning techniques. In such learning environment, SRL is a learning procedure which suits students' needs at university level. Keeping the significance attached to the area of CPD of university teachers and its effects on the students' SRL, an important mode of learning, present study is likely to impact the students, the teachers, education administrators and planners of teacher-education programmes. Keeping in view such diverse and significant impact, the study will enable the stakeholders to add to the efficacy of the practices.

The present research has evaluated the CPD practices in the universities of Islamabad. With the help of this study, authorities in the universities of Pakistan would obtain some useful guidelines. The researchers like Powell and Terrell (2003); Siebrich et al. (2014); Flecknoe (2000); Turner (2006); Sieveke-Pearson (2004); Jackson (2014); Adornetto (1999) and Hinsely (2018) conducted researches on effects of CPD on students' aspects of learning in their own cultural perspectives. However, if we talk about the cultural context of Pakistan, effect of university teachers' CPD on their students' SRL has not been discussed as yet. So, this study is expected to guide university

administrations to devise programs of CPD of their faculty in a way to impact students' SRL in universities.

Present research also provides an in-depth study of the situation of CPD practices in universities of Federal Capital Territory and analyzes the effect caused by such CPD on the SRL of the students in those universities. This detailed analysis would provide a chance for the Higher Education Commission (HEC) in Pakistan and the universities management to increase and organize the chances of CPD of their faculties, so that it can cast more influence on the SRL among the university students. The study findings have been framed in a way so that these would be applicable for the universities of other parts of Pakistan as well. All relevant ethical considerations and cultural sensitivities have been kept in focus while conducting the research and drawing the results. Thus, the universities from all over the country and the region can use study recommendations to maximize the opportunities of their faculties' professional development.

The present study would also help the universities administration in Pakistan to evaluate the professional development opportunities available for their faculties. In this way they would be able to take some desired steps in this regard. The study would also be helpful for the university teachers in Pakistan to become aware of the vital nature of this process and other opportunities related to their professional development. They would, thus be able to get awareness of available prospects of professional development within their organization and outside the organization, in their social environment. That would help them to make use of the related opportunities in the best possible way. Same wise, study of SRL of students would highlight the significance and mechanics of this important facet of learning concerning students of higher learning.

1.5 Study Objectives

Objectives for present study were formulated as necessary guidelines for conduct of the research. The research objectives framed for the conduct of this present research are:

1. To identify level of CPD among university teachers.
2. To assess the level of university students' SRL.
3. To compare demographic differences, i.e. gender and teaching experience regarding CPD of university teachers.
4. To compare gender-based difference regarding SRL of students at university level.
5. To determine effect of CPD of teachers on their students' SRL at university level.

1.6 Study Hypotheses

Basing on the study objectives, following null hypotheses have been developed:

H_0^1: There is no significant gender-based difference between male and female university teachers regarding CPD.

H_0^{1a}: There is no significant gender-based difference between male and female university teachers regarding sub-scales of CPD.

H_0^2: There is no significant teaching experience difference between university teachers regarding CPD.

H_0^{2a}: There is no significant teaching experience difference between university teachers regarding sub-scales of CPD.

H_0^3: There is no significant gender-based difference between male and female students regarding SRL, at university level.

H_0^{3a}: There is no significant gender-based difference between male and female University Students regarding sub-scales of SRL.

H_0^{4}: There is no significant effect of CPD of teachers on students' self-regulated learning at university level.

H_0^{4a}: There is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Motivational Strategies, i.e., intrinsic goal orientation, extrinsic goal orientation, control beliefs, self-efficacy for learning & performance and test anxiety.

H_0^{4b}: There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Motivational Strategies, i.e. intrinsic goal orientation, extrinsic goal orientation, control beliefs, self-efficacy for learning & performance and test anxiety.

H_0^{4c}: There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' SRL related to sub variables of Motivational Strategies, i.e., intrinsic goal orientation, extrinsic goal orientation, control beliefs, self-efficacy for learning & performance and test anxiety.

H_0^{4d}: There is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Learning Strategies, i.e., rehearsal, elaboration, organisation, critical thinking, meta-cognitive self-regulation, time & study environment, effort regulation, peer learning, and help seeking.

H_0^{4e}: There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Learning Strategies, i.e., rehearsal, elaboration, organisation, critical thinking, meta-cognitive self-regulation, time & study environment, effort regulation, peer learning, and help seeking.

H_0^{4f}: There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' SRL related to sub variables of Learning Strategies, i.e., rehearsal, elaboration, organisation, critical thinking, meta-cognitive self-regulation, time & study environment, effort regulation, peer learning, and help seeking.

1.7 Study Methodology

The study titled, "Effects of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level" (the scanned letter of topic and supervisor approval is attached as **Appendix A**) was designed to be a descriptive and survey type research. It was also designed to be a quantitative research. The researcher explored what was the level of CPD amongst the university teachers, and how CPD of teachers teaching in universities affected their students' SRL.

1.7.1 Research Design

This present study was of descriptive type. Descriptive research is used to transform obtained datasets into meaningful dimensions to reveal patterns (Loeb et al., 2017). In this mode of research, data is gathered concerning a situation. The researcher collected data regarding CPD practices in the universities through the survey technique. The responses of the respondent university teachers were collected with the help of a self-constructed questionnaire. Five students were

systematic randomly selected from the classes of these teachers. The responses of the students of those teachers were collected using a standardized questionnaire, MSLQ. These were related to use of different aspects concerning SRL. The research employed quantitative approach for drawing inferences from the collected data. Through the use of quantitative techniques, researcher was able to know about the level of forms of CPD of teachers teaching in universities, and the effects of this CPD on use of SRL techniques by the students in their studies. By employing quantitative statistical techniques, the researcher was facilitated in finding the correlation among CPD forms, and their effects on students' SRL.

The researcher visited Faculty of Social Sciences of Quaid-i-Azam University, Islamabad and distributed the CPD and SRL questionnaires (based on MSLQ) among thirteen teachers and their 83 students for pilot testing. The researcher inquired about any difficulties faced by the respondents, related to lay-out, syntax and language of the statements. When few suggestions were received, language and format of the questionnaire were amended and then finalized. The researcher admits that some of the research themes exploring in this study proved to be sensitive. That is the reason that the researcher had to assure confidentiality to the participants on their given information. The ethical considerations were also followed as much as possible to ensure correctness of responses.

1.7.2 Instrumentation

Two questionnaires were used by the researcher to measure CPD of the university teachers and SRL of the students of those teachers. To measure CPD of the teachers at university level, a questionnaire was developed by the researcher. It was prepared covering Lieberman's three domains of teachers' CPD, i.e., direct learning, learning in institution and out of institute learning. The questionnaire

contained three parts: Part I covered demographic details, Part II gathered data regarding effectiveness of CPD activities related to direct learning, Part III consisted of 30 statements covering other two domains of CPD. The respondents had to provide their responses on a five points Likert Scale. The questionnaire was validated through three teachers of NUML, Islamabad (Education Department). Validity experts gave number of observations. Details of such observations have been given in Chapter 3. In the light of guidance and recommendations of the education experts, changes were made, and few items were dropped on the recommendations of the experts. Further improvements in the questionnaire for the measurement of university teachers' CPD were made after the conduct of the pilot testing. Finally, 35 items became part of the data collection tool.

In order to measure university students' SRL, a standardized research tool, i.e., MSLQ was used. This questionnaire was based on two sub-variables of SRL, i.e., motivation scales and learning strategies scales. There were three parts in this data collection instrument. Demographic information were sought from respondents in 1st part; the second part was based on motivation scales and it had 22 statements. The third part, covering learning strategies scales, consisted of 34 statements. In total this questionnaire consisted of 56 statements to measure the SRL of the university students. Permission was taken from the originators to use and amend the MSLQ (mail granting permission is at **Appendix B**).

1.7.3 Study Population

Present research was designed to cover all public sector university level teachers and students of Islamabad, with social sciences and management sciences faculties (session 2017-18). Thus target population of those 5 universities

was 2605 for teachers, and 76876 students. Total 20 universities are chartered by HEC in Islamabad (in both public and private sectors). Details of HEC chartered universities were obtained from HEC data-base (for year 2017-18), given at **Appendixes C and D**. Amongst them, three universities of public sector of the ICT were randomly selected as population to measure CPD of the university teachers and SRL of the students of those teachers. Social Sciences and Management Sciences faculty members of Air University, Islamabad (129), Bahria University, Islamabad (137) and NUML, Islamabad (223) totalled at 489 teachers and 8563 students were registered in these faculties.

1.7.4 Sampling and Sample

The study sample in present research was taken from Management Sciences and Social Sciences faculties of three public sector universities of ICT. Study sample was selected by using purposive and systematic random sampling techniques. To conduct the study, some common departments of Social Sciences Faculty (Education, English, International Relations, Psychology and Media Studies), and three departments of Management Sciences Faculty were selected. Hundred university teachers selected through purposive sampling technique became the study sample to measure CPD. Around five students were selected through systematic random technique, from the classes of each of those 100 teachers, in these public sector universities.

1.7.5 Collection of Data and Its Analysis

The researcher personally collected data regarding CPD of the university teachers and SRL of the students of same teachers, by visiting the universities shortlisted as sample of this present study. Reference letter for data collection

obtained from the Department of Education, NUML, Islamabad (the scanned letter of reference attached as **Appendix E**) was presented to the authorities in the sample universities. Hundred such teachers were purposely selected in the Departments of Business Management Studies and Social Sciences in Air University, Islamabad, Bahria University Islamabad and NUML, Islamabad, who had undergone some form of CPD. Survey forms to measure CPD were handed over to these teachers in class-rooms, and all 100 questionnaires were received back, complete in all respects. To measure SRL, total 545 questionnaires were distributed among the systematic randomly selected students from the class-rooms of these same teachers. Some 522 questionnaires were received back. A total of 19 questionnaires were incomplete so these were rejected. The response rate of the respondents was recorded at 92.29%.

The researcher recorded all returned responses of questionnaires by using SPSS 22nd Edition. All data which was gathered with the help of research tools was decoded and entered into the software. Later on, descriptive techniques were used and inferential statistics were applied to analyse this data. The data was analyzed by applying different appropriate statistical tests which were Cronbach's Alpha used for reliability analysis of the scale, percentages, mean, t-test and liner regression. Through the application of these statistical procedures, the researcher was able to arrive at the research objectives and test the hypotheses pronounced for the study. The results of the statistical applications were tabulated, interpreted and findings were chalked out. Basing on those research conclusions, the researcher framed valid recommendations.

1.8 Delimitations

The study was conducted with following delimitations:-

- The present study was delimited to the teachers and students of public sector universities in ICT.
- Students and teachers of Management Sciences and Social Sciences faculties in each university were selected.
- Teachers who had attended CPD activities were included in the sample.
- BS level students (7^{th} and 8^{th} Semesters) in the faculties of Management Sciences and Social Sciences were selected for data collection.

1.9 Operational Definitions

Operational definitions of certain important concepts, as has been used in this study, are given in the succeeding paragraphs.

1.9.1 **Continuous Professional Development**

Professional development for teachers continues vertically and horizontally during their career. PD of a teacher continues through-out one's professional career. Teachers' CPD encompasses many activities, aimed at their professional development, which take place through varied media, and may have but are not limited to any particular time-frame or place. Lieberman (1996) delineated the scope of CPD spread over three spheres: The domain of formal training; secondly, the professional development attained through environment of the institution where the teacher is working,; and lastly learning taking place out-of-university.

1.9.2 **Direct Learning**

It takes place through courses, workshops, seminars etc. These are different instances of direct learning which are aimed at providing the teachers with requisite competencies so that they can perform various assigned tasks.

1.9.3 **Learning in professional environment**

This form of professional learning takes place through peer learning, coaching, mentoring, action research, evaluation etc. This type of CPD is also meant to primarily focus on specific individual and organisational needs and requirements.

1.9.4 **Out-of-Institute Learning**

This form of professional learning is acquired through contacts with other institutes, joining professional networking etc. It is a collaborative learning experience.

1.9.5 **Self-Regulated Learning**

This concept has been used in this thesis in the sense as defined by Pintrich. The essence of Pintrich (2000) definition terms SRL as an active and constructive process. In this process, cardinal point is that here the students choose their goals meant for the process of learning. Afterwards, during the process of learning, the learners are encouraged to monitor their process of learning through regulating the activities and gaining control of their cognition. Motivation plays significant role in shaping the behavior. Their set goals provide them with guidelines to pursue their learning activity, keeping in view the contextual and environmental constraints in perspective.

1.9.6 **Motivated Strategies for Learning Questionnaire (MSLQ)**

This self-report questionnaire approaches SRL as an aptitude and targets students' perception of their current competences of their SRL skills. This MSLQ has also been used in several significant studies. This standardized tool consists of two sections, one is 'Listing of Motivational Scales' and the other one is 'Learning Strategies Scales' section. The scale originator (Pintrich et al., 1993)

found it appropriate for the needs of teachers and researchers, and drafted a manual for its use where scale reliabilities were found to be robust, and good factor structure was witnessed.

1.9.7 **Motivational Strategies**

Motivation has been an integral part of many theoretical frameworks. Motivation here is a learner's internal drive to achieve her learning task. Motivational scales have three components, i.e., value, expectancy and affective components.

1.9.8 **Value Components**

The value component is related to goal orientation and valuing the task. The goal orientation is both intrinsic and extrinsic. The task valuation is also based on certain internal and external factors which originate from learner's need assessment.

1.9.9 **Goal Orientation**

Goal orientation deals with students' perceptions about the nature of job and their comprehension about the reasons to engage in it.

1.9.10 **Intrinsic Goal Orientation**

It occurs when the learner takes mastery, curiosity and challenge as some of the reasons to participate in a task. The learner participates in a learning task for its sake. With intrinsic goal orientation, she will take real interest in the learning process, resulting into enhanced subject material knowledge.

1.9.11 **Extrinsic Goal Orientation**

It works on external factors, where certain external reasons become the cause of learner's engagement in a learning task. It also refers to the general orientation of the learning task. It also includes understanding of resource

constraints and contextual circumstances. Same wise, awareness of any punishment or reward also plays its role towards this extrinsic goal orientation.

1.9.12 **Task Value**

It is learner's valuation of the task being learnt. It is also learner's task perception. She is also concerned about the level of utility attached with the task being undertaken. This task valuation will be based on learner's need perception. This need perception is evolved due to multiple internal and external factors.

1.9.13 **Expectancy Components**

This component of the motivation scales deals with learners' expectations from the learning process. Control beliefs and self-efficacy are part of the expectancy components.

1.9.14 **Control Beliefs**

It concerns with students' belief about the positive outcome of their efforts towards realization of the goals. When the learners have belief that through hard work, they can achieve better grades, then they are likely to study more and harder.

1.9.15 **Self-Efficacy for Learning and Performance**

Such self-efficacy is two-pronged; it deals with learner's self-efficacy and her expectancy to perform during the learning activity. Self-efficacy has a significant co-relation with students' learning behaviours. In the performance expectancy, the learner expects success achievement. Self-efficacy, of learner is her self-confidence concerning own capabilities.

1.9.16 **Affective Components**

Affective component involves students' reaction to the assigned task. It is not a simple process. These affective reactions to a situation are not voluntarily

and cannot be explained fully on the basis of what a person thinks or believes. The basis of such reactions lies in student's background knowledge and social/ intellectual make-up.

1.9.17 **Test Anxiety**

Test anxiety refers to an individual's unpleasant feeling which is clearly visible while taking a test. Such anxiety could have some known and unknown repercussions, and the outcome of this test anxiety might be or not be limited to a particular test. This anxiety is divided into two parts, i.e., cognitive and emotionality component. Both kinds of anxiety will need separate set of handling practices.

1.9.18 **Learning Strategies Scales**

There exist two main sets of strategies in learning strategies scales. These are strategies in the domains of cognition and meta-cognition, and resource management.

1.9.19 **Rehearsal**

Here learners recite or say over the desired information again and again to make it part of working memory. It is a simple learning technique which has nothing to do with long-term memory. So, with the adoption of this strategy the learner can not relate a newly confronted information with some already acquired bit of knowledge. This rehearsal will enable the learner to grasp few such details of the material being learnt which are apparent and easily comprehensible.

1.9.20 **Elaboration**

It is a comparatively higher learning skill where learner summarizes or paraphrases the content being learnt. In this way, the learning material is made part of the memory. The learner here can make use of the long-term memory for

storage of information. Connections with previously acquired learnt material can also be made. The learnt material acquired through elaboration will become permanent part of the memory, and through rehearsal, its utility is enhanced.

1.9.21 **Organization**

Organization of ideas during the learning activity is considered as a complex learning technique where learner is not only deeply involved in the learning activity, but she is connecting key ideas. The formation of out-lines is based on existing situation and learner's knowledge storage. Mapping the material being taught also enhances comprehension. Through selection of the main idea of the content, the learner also grasps various dimensions of the topic, with complete understanding.

1.9.22 **Critical Thinking**

This form of learning strategy is employed as an application strategy. In critical thinking, learner is able to apply previously attained knowledge in some new situation. The learner is able to compare previous situation with the current one. Here learner is able to analyse the content material with complete perspective in mind. Then she is able to apply her reasoning and can reflect in detail. In this way, an approach is developed which enables the learner to turn towards application phase.

1.9.23 **Metacognitive Self-Regulation**

Here learners have conscious control of their learning process. This meta-cognitive SRL revolves around the activities of planning, monitoring and regulating processes. It encompasses learner's awareness of details about the cognition involved in the learning activity.

1.9.24 **Resource Management Strategies**

Resource management is also significant for the learning process. The learners are required to manage the available resources, beside the learning techniques. This aspect of learning is important for the successful completion of the learning process. Better managed resources will assist in increasing the learnt material. For better management of the resources, complete listing of such resources will be required.

1.9.25 Time and Study Environment

The learners are required to arrange the study environment in the way that distractions are removed, and study environment is conducive for the completion of the learning process. In time management, the learners make use of the study time by effectively planning and scheduling the study time.

1.9.26 Effort Regulation

Effort management on the part of the learner is needed for achievement of the goals set for the learning process. It is related to a conscious effort on the part of the learner to remove distractions and difficulties, handle failures, and work toward achievement of the goals.

1.9.27 Peer Learning

Coming in contact with peers for discussing content to be learnt and enhancing own learning is peer learning. Peer learning is also getting help from peers to clarify course contents and using class-mates and friends to clarify the academic concepts. Peer learning also assists in gaining more pragmatic solutions to problems being felt in the professional environment.

1.9.28 Help Seeking

In help-seeking, learners manage the support of their peers, instructors and textual material. By optimizing upon such resources, learner is able to overcome

her academic impediments. This help is also beneficial to give confidence to the learner to tackle new situations. The help seeking should precede by need assessment.

CHAPTER 2

LITERATURE REVIEW

Literature in the domains of teachers' professional development, continuous professional development, different areas concerning self-regulated learning being practiced by students and impact of teacher's PD on students' learning, have been reviewed in this chapter. Professional development of the teachers has been viewed critically. Its aim, characteristics and principles have been highlighted. Impact of professional development on teachers' perceptions has been studied in this part to understand its true nature. After reviewing literature on teachers' professional development in general, focus has been shifted to teachers' continuous professional development. Genesis of CPD has been focused by concentrating on various definitions offered by theorists of the concept. Different types and forms of CPD, its evaluation theories and purposes/ objectives have been evaluated to understand the true nature of teachers' CPD. Then CPD models have been analysed, and in this regard, discussed models are Reid's quadrants of teachers' learning, Kennedy's three frameworks to categorize CPD models, Bell and Gilberts' three aspects, Sparks and Horsley (1989) and Lieberman's (1996) CPD classification. Same wise, learning through self-regulation plays significant role in learning of students, university students in case of present study. Its theoretical background, nature and the part played by social cognitive theory in framing this concept have been explored here in literature review. Models of SRL and several factors playing their role in this form of learning have also been reviewed with the help of relevant literature. Sup-processes of SRL and its components form significant part of the studies on the subject, so these concepts have also been reviewed. SRL is achieved through employing various strategies, and these main strategies have been studied in the

perspective of related literature. In the last part of the chapter, some researches have been investigated which focused on effect of teachers' PD on different aspects of their students' learning.

2.1 Professional Development of Teachers

The teacher's role in class-room is of vital significance. She is the one who implements strategies, decides pace, sets direction and achieves goals of the education program. Without an active role by her, students will hardly be able to achieve their goals. Professional development of the teacher enables her to perform these tasks effectively. She is able to, through the acquisition of professional development, understand the requirements, needs and objectives of the process of learning and implement the program. Wilson (as cited in Whitworth & Chiu, 2015) considers that high quality PD is a crucial component to improve education. It is a concept which has attracted much attention of theorists, practitioners and other stake holders. Mukan et al. (2019) termed PD of teachers to be a phenomenon having cultural and social dimensions, and it continues for deepening of their knowledge. To remain updated with latest trends in own field of knowledge, to be aware of newest trends in class-room practices, and to overcome any emerging issues, a teacher is required to always invest in practices of PD. The need of relevant PD is always felt, and it remains a life-long process, as emphasized by Fullan (1991). Hinsley (2018) is of the view that till 1990s, the concept of PD was mainly restricted to teacher workshops or single topic seminars. But then number of events emerged which can be regarded as PD opportunities. Lalitha (2005) considers that a teacher has to be engaged in PD activities right from the start of her career and remain conscious of the process throughout one's professional life. At different situations, and as per multifarious requirements, this professional training of the teachers takes different forms. So, it cannot be made limited to any particular form, or to any specific time. Mukan et al. (2019) stressed upon the

central and essential position of PD in a teacher's professional outlook. Sieveke-Pearson (2004) termed PD as a 'promising approach' which becomes the cause of continuous growth in professional profile of a teacher. Teachers' motivation level mediates their PD (Whitworth & Chiu, 2015). Teachers are required to pursue professional learning throughout their professional lives. It will enhance their capacity to work towards the achievement of goals set for the process of learning. Through participation in PD activities, class-room effectiveness of the teachers is reported to have improved. Niemi (as cited in Gupta and Lee, 2020) highlighted the benefits of training the in-service teachers to improve their teaching quality. Thus, PD of the teachers had direct impact on achievement level of their students.

A significant relationship has been established between teachers' professional actions and the professional development. Through such development, teachers are known to have improved in various areas including direct teaching in class-rooms, significantly impacting the students' performance. There is cause-and-effect relationship in the form that a superior quality professional development of the teachers will result into better teaching in class-room, thus ultimately impacting students' achievements. US Department of Education Report (2007) evaluated nine studies. The outcome of the analysis revealed that teachers who were given professional development for an average of 49 hours could enhance their students' score by 21 percentiles. Teachers' professional development is not restricted to a single domain. It comes through many traditional-novel ways. Reid's quadrants divided learning of teacher along four axes, which are planned-incidental, and formal-informal means (Fraser et al., 2007). The development can come if participating teachers have capacity to absorb the contents, and then have capability and skill to apply contents of the training sessions.

2.1.1 Professional Development and Impact on Teachers

Teachers' professional development brings significant changes in their out-look, professional competence and over-all personality. Enhancement in all these will result into professional development, which is then considered to produce better teaching in class-room. It will be instrumental for high achievement of the students. It is not merely adoption of new techniques, but rejection of prior approaches (Kennedy, 2016). So, positive contribution of PD is undeniable. Mukan et al. (2019) consider effective and relevant CPD of teachers to be instrumental in improving learning outcomes of the students. Harris (1989) suggested to bring improvement in job-related skills, attitudes and knowledge of the teacher in the domains of professional development. When such related skills are made the focus of professional training sessions, then participating teachers are able to have positive changes in their competencies and knowledge base. Various studies have brought out impact of teachers' professional development on their job orientation. A study conducted by Supovitz, Mayer and Kahle (2000), focused on certain teachers who had undergone 160 hours inquiry-based training session. It was found that this professional development casts significant and noticeable impact on the outlook and attitude of the participating teachers, in a measurable form (Supovitz, Mayer & Kahle, 2000). The attitude of the teachers towards any changes brought in their class-room practices and their professional perceptions was changed. The nature of the changes was not temporary, rather it was found that these changes continued to exist for several years after the teachers' exposure to the sessions of PD (Supovitz, Mayer & Kahle, 2000). These changes ultimately had positive impact on class-room performance of the

teachers. So, these desired changes in class-room practices were directly linked with those sessions of professional training which teachers were engaged with.

2.1.2 Aim of Teachers' Professional Development

Whatever connotations have been drawn, the sole aim of arranging training sessions for the teachers has been to enable them to fulfil needs of the students in class-room. Professional development has also been aimed at changing culture of the teaching-learning process (Lalitha, 2005). Desimone (2009) in his model of PD explains that PD of teachers brings changes in their knowledge and beliefs, which will ultimately help them to modify their teaching. Since recent times, teachers' professional development is generally accepted as a process of long-term effects. Those planned activities are included in it which have been designed to cater for the professional requirements (Lee, Longhurst & Campbell, 2017). However, the fact is, that it is conducted in a particular context. Its procedures and contents are mainly decided basing on the environmental factors (Supovitz, Mayer & Kahle, 2000). When professional development of the teachers will be based on environmental requirements, then it will remain relevant and beneficial. With this objective in view, that particular social settings will help to decide about the type of professional development to be imparted, the impact of these environmental factors can enhance teachers' motivation level and can influence teacher's sense of efficacy (Scribner, 1999). Institutional structure and culture are among these environmental factors. Woods (1994) also points out that social environment, and political and economic trends have to be considered while managing an activity for professional development of the teachers. Due to wide diversity in situations and circumstances, what might be relevant and useful in one context may not be applicable in another.

2.1.3 Characteristics of Professional Development

Professional development of teachers is a multi-pronged process. It has various dimensions. Desimone (2009) identified active learning, coherence, content focus, collective participation and duration as some of the characteristics of effective PD of teachers. Due to involvement of many influences and factors, its true nature can be analysed, basing on its characteristics:

- Teachers' professional development is not a process in isolation. It is neither planned nor executed in isolation. It is essentially a collaborative process, where teacher comes in interaction with not only her peers but other stake-holders as well. In this way, the teacher acquires feed-back from concerned quarters and gains professional insight resulting into her professional competence. A meta-study by Thurlings and den Brok (2017) indicated that teacher's peer learning contributed to teacher's growth. Despite this purported collaboration, the teacher gets enough time to self-analyze and contemplate. Such analysis of the situation and requirements helps her to understand the situation and then act accordingly. The significance of teachers' professional development can be understood by the very fact that it is considered by Thurlings and den Brok (2017) as the most appropriate to bring changes in teaching practices. Through it, teachers enhance their learning and gain better understanding of learning of their students (Lee, Longhurst & Campbell, 2017). Lieberman (1995) did not restrict it to only formal instances of teachers' PD, rather she expanded the concept to some other activities in the institution which could enable the teachers to enhance their capacity, by saying that 'authentic opportunities to learn from and with colleagues inside the

school'. Lieberman (1995) expanded teachers' training into numerous informal domains. Her classification encompassed teacher's professional contacts with other institutions and personnel in other institutions. This social networking is also part of teacher's PD.

- Professional development is required to be intensive and sustained. It can be made intensive if right and detailed planning is carried out in advance. Same wise, sustained PD is a continuous process to remain in place for the training of the teachers in relevant areas. If it is planned as long-term and coherent, it would bring improvement in the process and students' achievements. Darling-Hammond, Hyler and Gardner (2017) included sustained duration in the vital characteristics of effective PD. The sessions of the professional development are needed to be long enough to achieve the desired objectives. Abrupt and ill-planned instances of training will be non-productive and wastage of resources. If sustained planning is carried out, then participating teachers would also get enough opportunity to benefit from it. On one hand, PD focusses on enabling the teachers to effectively perform their role in class-room, on the other hand emphasis is laid on teachers to take appropriate measures towards enhancing their concerned subject-matter knowledge by keeping themselves updated about latest trends in their particular subject (Cohen & Hill, 1998). Kennedy (1998) has linked PD of teachers with teachers' subject matter knowledge. Sessions of PD which include teachers' knowledge base of their relevant subject cause significant impact on student learning (p. 11).

- Moreover, the objectives of the planned professional development sessions are required to be selected very carefully. These objectives will decide the

course of action to be followed in planning and conduct of the professional development. They have to be grounded in reality, considering resources, time allocation and realistic (Cohen & Hill, 1998). The broader aim of the teachers' professional development is enhancement of individual teacher's capacity so that the process of learning can be conducted effectively (Lee, Longhurst & Campbell, 2017). To meet this end, it is required that the objectives for conduct of professional development must be selected with consideration for individual needs. In this way, these will help all the stake-holders.

2.2 Continuous Professional Development

Training aspects of a teacher are instrumental in shaping the personality of a teacher. Through training conducted in different modes, at different time frames and space, a teacher can become an effective educator. This training of the teacher is a continuous process of her professional development. It is needed to be focused, purposeful and planned (Anderson et al., 2000). Such training is called Continuous Professional Development. CPD is not one dimensional. Diversity in its nature adds to its efficacy. In this way CPD has become a multi-pronged process which is not limited to sessions of formal training or courses. In context of Pakistan, CPD has diverse view in terms of mode of conduct, frequency and its spatial context (Mukan et al., 2019). Here CPD includes in-service formal training, workshops etc and teachers' informal, and sometime formal, interaction with their surroundings, including interaction with other institutes.

Anderson et al. (2000) considered CPD as, 'an ongoing process which is led to enhance work satisfaction, extended work-relevant competencies, the attainment of

professional goals, and it leads to positive development.' Engaging various dimensions, CPD of the teachers is a complex process. Grungy and Robinson (as cited in Mukan et al., 2019) termed CPD as having characteristic feature of teaching profession. During the course of service, teachers are involved in many activities concerning their professional development which are occurring voluntarily and include many involuntarily occurring instances of learning. In the processing of these CPD related activities, various personal and external factors come into play (Cordingley et al., 2003) making this process a complicated one. To understand an individual's response the dynamics of these influencing factors are required to be taken into stock, failing which the efficacy of the CPD related activities would be compromised. Same wise, a CPD activity carried out as a single instance, devoid of any follow-up or consistent practice would not bring desired outcomes. Cordingley et al. (2003) hold the view that any long-term and significant changes cannot be expected in the practices of a teacher through any single event of professional development, e.g., a seminar or a workshop.

2.2.1 Types/Forms of Continuous Professional Development

CPD has often been made limited to formal training and coaching, however Day (1999), Cordingley et al. (2003), Fraser (2005), Avalos (2011), Clark and Hollingsworth, Ling and Mackenzie, and Craft (as cited in Asmelash, 2014) have highlighted that this is a limited and formal interpretation of the concept. Day (1999), while covering more aspects of the notion of CPD, asserted it to be covering planned learning experiences and those which occur naturally, aimed at improving class-room practices.

Day (1999) included planned and conscious activities in this domain which are purported to cause some benefit to the individual who is a faculty member or to the institution. The activities are planned after chalking out a

specific plan. Such devised plan is comprehensive and is able to meet individual and organisational needs. At the same time, such devised plan has to be realistic in its nature and scope. The objective to be attained is clear for the stake-holders. Day's (1999) explanation of CPD is not restricted to planned activities in the institution rather many informal occasions of learning are also made part of the CPD of teachers. So CPD is a concept which does not stick to set of formal activities, rather it liberates teacher's professional learning from the bounds of time and space. More activities in formal and informal domains form part of the teachers' professional development activities. A similar view of CPD is held by Fraser (2005) who includes any activities into CPD that teachers are engaged in to develop professionally. However, CPD also occurs when a teacher engages in conversation with her colleague, some executives, or with parents of the students. Avalos (2011) viewed CPD a combination of multiple forms of dialogues, conversations and interactions.

Lieberman (1996) presented a model of CPD in which various activities contributing to the factor were made part of. In his classification model of CPD, he divided it into three spheres, CPD through formal means, i.e., professional courses, workshops, seminars etc. Second type of CPD is attained through coaching, mentoring, peer learning and action research. As stated by him, third type is through external linkages in different directions, which are established through contact with learning communities and interactions made with other institutes. Day (1999) termed learning for teacher occurring in class-room as possibly fourth dimension or form of her professional training. In class-room, the teacher is learning through her interaction with the students where many situations are arising to be tackled. The teacher indulges herself in action research

in the class-room to gain insight. Generally, agreement on forms and types of teachers' CPD have been found. Clark and Hollingsworth, Ling and Mackenzie, and Craft (as cited in Asmelash, 2014) evolved various contexts to view professional development of teachers, starting from immediate surrounding (i.e. class-room) to self-directed study, courses, workshops, mentoring, coaching, collaborative learning, action research, personal reflection, observation, networking, and mediated learning. Hustler (as cited in Tantranont, 2009) considers workshops, seminars, conferences, and short courses as the most common forms of CPD for teachers. So, different activities are to be carried out in multifarious directions. Cordingley et al. (2003) also considered that any long-term and significant changes cannot be expected in the practices of a teacher through any single event of professional development, e.g. a seminar or a workshop.

Duration of the training activity can cause significant impact upon efficacy of the practice. Length of PD will influence student learning (Basma & Savage, 2018). Amendum and Fitzgerald (2013) studied the impact of PD activities of various lengths and studied their effects on different learning aspects of students. Guskey and Yoon (as cited in Basma & Savage, 2018) also found relationship between hours of teachers' PD and students' learning.

Professional Courses

Courses are significant and organised form of teachers' professional development. Teachers' CPD for Tantranont (2009) is multi-directional, with variety of techniques. Not only formal courses in professional domains are part of PD, but many informally arranged diverse activities are also included. Being important ones among the traditional forms of CPD, courses are taken at the start

of service and during the service. Such courses enable the teachers to acquire and enhance the related competencies. Contents of these courses vary as per the needs. Same wise other related matters are also dependent on and are decided as per the circumstances. These courses vary in their duration and objective. Teaching – learning is a very dynamic process. As circumstances associated with the process keep evolving, always there is a need to bring changes. Although Selemani-Meke (2011) found that teachers in many instances undergo pre-service training in their field, yet it is found that as realities change, so soon such professional courses turn to be out-dated. To deal with such emerging realities, need arises to keep the teachers abreast with latest trends. Thus, professional courses during the service become a need. These courses are generally carried out in some specialized institutions. Clark and Hollingsworth (2002), Ling and Mackenzie (2001), Craft (2000) and Tantranont (2009) also mentioned professional courses amongst most common sources of CPD; they have also held the view that pre-service courses do not have the capacity to comprehensively meet needs of the teachers. Darling-Hammond and Lieberman (as cited in Wan, 2011) considered these pre-service courses insufficient because these cannot prepare the teachers for the role of 'knowledge facilitator'. The efficacy of such courses can be enhanced through up-dated curriculum and consideration for social needs.

Workshops

It is another traditional form of CPD, which is prevalent. This form of CPD acquisition is short in duration and restricted in scope (Tantranont, 2009). The workshops are also planned on some specific issues in hand. The experts of the field are invited to act as resource persons. These off-institution activities are also among most common sources of CPD (Goodall et al., 2005; Clarke &

Robson, 2005; Clark & Hollingsworth, 2002; Ling & Mackenzie, 2001; Craft, 2000 & Tantranont, 2009). Workshops are often designed with top-down approach (Wan, 2011), with little long-term perceivable impact. Frost et al. (2000) considered that most of the traditional practices of CPD, including workshops have less significance and relevance. These professional workshops normally focus on some particular issue. Sometime these may also entail discussion on some policy matters (Back et al., 2009). Liberman (1995), Darling-Hammond (1997) and Ferguson (2006) did not believe in the efficacy of workshops being short in duration, lacking depth and casting no significant impact on teachers' learning. To be effective, the process of professional development has to be on-going and continuous.

Seminars

Seminars are the organised sessions to bring qualitative change in teachers. These are arranged with a view to address some matter. Like other traditional forms of formal CPD, a seminar is an issue-oriented and focused activity (Pedder, Storey & Opfer, 2008). The efficacy of these seminars is enhanced through their conduct pattern and professional competence of the resource persons. A seminar is conducted in a way that it becomes more interactive in its form. Pedder, Storey and Opfer (2008) term seminars as among the most common forms of CPD, where learning takes place through presentations, lectures, and different forms of discussions. Seminars are mostly held with aims like highlighting an issue of significance, developing a solution through mutual consultation and exchange of views. These are very effective contributory factors towards CPD of teachers because CPD is an on-going process; it is not a one-time seminar (Tantranont, 2009). Seminar can be in-house,

arranged by University administration for its teachers, or held in some other institute, organised by some professional organisation.

Peer Coaching and Mentoring

Mutual support or mentoring helps the teacher to identify critical areas related to her professional and other personality aspects. Such guidance in the form of peer coaching or mentoring may be provided to the teacher by an individual, or more than one fellow staff members (Selemani-Meke, 2011). One to one relationship plays pivotal role in coaching or mentoring, a relationship which focuses on a new learner and an experienced one. Effective CPD is enhanced through social elements which often include processes such as coaching and mentoring. Such guidance in the form of coaching and mentoring by the peers is available to the teacher in her near environment (Wan, 2011). The proximity plays a major role in making this practice an effective one. In similar environment, it is easier to understand the contexts and needs.

Peer coaching and mentoring completely rely on learning from the experiences of fellows. Teachers' learning through each other is greatly emphasized here, which helps them to improve their practices. It will enable the junior partners to develop self-confidence, and a more vibrant and cohesive environment would emerge, where teachers would enjoy control over their professional development (Beatty, 2000; Downey, 2001; Rhodes & Beneicke, 2002). Mentoring in broader sense, as part of collaborative CPD (Wan, 2011) includes counseling, facilitating and support (Landsberg, 1996; Clutterbuck, 1991) provided by a fellow faculty member who is more experienced and a trust-based relationship also exists (Rhodes & Beneicke, 2002). In transitional model

by Kennedy, teachers' professional development is also carried out through strategies like mentoring (Selemani-Meke, 2011).

Action Research

Action research involves teachers evaluating their own practices within the University premises. This tool is very convenient and can provide pragmatic solutions to the problems which a teacher might face. This practice helps the teachers to transform theory into practice. The purpose is that they get better understanding of issues involved in their teaching, and resultantly they search for the possible solutions (Selemani-Meke, 2011). Action research is an important activity in the domain of professional development of teachers because, through the process they turn to be analytical, critical and reflective about their teaching style (Boyle, Lamprianou, & Boyle, 2005). Thus, it can be said that through action research, teachers in universities evaluate their teaching practices and bring some desired changes. Kennedy (as cited in Selemani-Meke, 2011) refers to action research as a process of CPD through which teachers ask critical questions about their class-room practices. Among Kennedy's models of CPD, action research is among the transformative ones. CPD attained with the help of action research is very useful because it is practical and occurs continuously (Cohen, Manion & Morrison, 2002).

Educational Networking

This is another form of CPD where university teachers collaborate with teachers of various institutions and professionally benefit from each other. Such professional engagements help the teachers in getting awareness and widening professional perspective. Gray (2005) refers to these opportunities as stimulating

and refreshing for teachers' professional development. Teacher's professional networking has been found useful for class-room practices. It is a medium through which teachers are encouraged to deal with issues collaboratively and overcome their weaknesses. Desimone et al. (2002) has suggested that informal CPD activities such as educational networking is agreed to be more effective. Goodall et al. (2005) also reported that amongst the more effective CPD strategies were informal ones, educational networking being a prominent informal CPD component.

2.2.2 Purposes/ Objectives of CPD

CPD of the University teachers is conducted with a variety of purposes and objectives. Purposes of CPD range from teachers' perceptions and practices to learning outcomes (Asmelash, 2014), students' performance, and university environment. Teachers experience changes in their delivery and response after being exposed to situations of professional development (Day & Sachs, 2004). They emerge as better practitioners, able to handle situations in a better fashion. Clarke and Hollingsworth (2002) found that a successful CPD session positively changes knowledge base of the teachers and practice thereof. Craft (2000) considered that CPD of teachers is conducted for various purposes including: Clarifying institute policy, making staff feel valued, job satisfaction, improved job performance skills, enhanced experience of teachers for career development or promotion purposes, improved teachers' understanding, skills and knowledge, teachers being prepared for the changes and challenges, and enhanced role or effectiveness which might be experienced in the process of learning.

As an outcome of CPD, the teachers who are the pivot of teaching-learning process get better grip of the related situations. They will be able to

understand any emerging issues comprehensively and search for the solutions in a systematic way. According to Shaha et al. (2004), they will emerge as better educators. They will be in possession of better strategies and competencies, and moreover will be able to employ those learnt competencies to enhance their teaching effectiveness. This will enable them to perform their role in a befitting manner. Purposes of CPD have been viewed in multifarious domains, ranging from individual growth to better professional efficiency. Day and Sachs (2004) summarized purposes of CPD, into three areas:

- **Extension**. This extension is the process of moving ahead from the existing base of knowledge and bringing new knowledge into existence. This process not only takes into consideration the existing base of knowledge, but the process of up-dating is also carried out. Because universities also need to respond to this emerging requirement in a highly complex environment, so these institutions of higher learning need to bring major transformation in their learning environment by strengthening their capacity to respond to the emerging needs (Collinson et al., 2009). During these times, knowledge-base has been growing exponentially, and there is always need for the teachers to embrace emerging ideas, which will ultimately lead them to a position where they would be able to meet the requirements of their professional obligations in class-room. Votruba (1992) termed knowledge as our ‘newest commodity’. People in all fields aspire to acquire it to remain updated and relevant. In order to reconceptualize the role of universities and university teachers, extension in knowledge has to be welcomed (Day & Sachs, 2004). The knowledge extension in education, especially university education can be achieved by

broadening the conceptual definitions of teaching and research (Karpati, 2009). In this way the universities that wish to meet the needs of the knowledge age will require to strengthen their knowledge acquiring procedures through concerted efforts.

- **Growth**. A teacher is also required to grow in her professional skills. Growth is enhancement in teachers' job-related skills and competencies (Gore et al., 2017). Teachers have their individual needs also. Their in-service learning can be translated in terms of their growth in their personal and professional domains. Environment has a major part in teachers' professional growth. Joyce and Showers (1988) argued that teachers who are active professionally are also more active personally. Teachers have different perceptions of their professional environment. Resultantly they view their chances of professional growth in their own personal context. The point of emphasis is that professional and personal growth of the teachers enables them to attain maximum of their potential and act accordingly.

- **Renewal**. Renewal is transformation in teachers' teaching strategies and their knowledge base through reflective practices (Mathew et al., 2017). Due to emergence of novel technologies and knowledge, there is always a need to replace existing strategies and knowledge domains with the current ones. For this purpose, role of teacher is not limited in nature, rather it will be expanded to conducting research also. Karpati (2009) held the opinion that if teacher training is sufficiently integrated with teaching of research methodology, renewal in teacher's PD will be ensured. She

will critically evaluate the scenario of her profession. In this way, she will be able to find the gaps and fill them with appropriate strategies.

2.2.3 CPD Models

Various models of CPD of teachers dealing with different domains have been developed. These models aim at covering various aspects and dimensions of professional development of the teachers. Fraser et al. (2007), while considering the complexity of the nature of CPD, discussed CPD in three frameworks: Reid's quadrants of teachers' learning, Kennedy's three frameworks to categorize CPD models, and Bell and Gilberts' three aspects. Reid (2007) measured CPD in four dimensions. These dimensions given by him are: formal-informal and planned-accidental. Formal-informal are on same axis and are opposite, and same is the case of planned and accidental CPD. Kennedy gave nine categories of different models being used to study CPD of teachers. These models can encompass activities of teachers' professional development. These nine models include training, cascade, deficit models etc. which have been distributed among three broad categories. In this way a framework has been devised. These nine models are transmissive, transitional and transformative. While Bell and Gilbert (1996) divided teachers' professional learning into three domains, which start from personal being of a teacher, then expand to her social sphere, and finally encompass teacher's professional learning. These domains are inter-related in character. Sparks and Horsley (1989) studied the range of professional development of teachers models and gave five broad categories:

- Individual-based professional development
- Process of bringing development and improvement
- Observation/ assessment

- Training
- Inquiry

Ann Lieberman model of CPD for teachers categorised CPD into three categories. Here the related activities of teachers' CPD have been divided into three domains, i.e., direct training (including in-service courses, workshops, etc), learning in professional environment (which include mentoring, peer coaching, action research, tasks related to some project) and out-of-institute learning which includes visits to other institutes, learning communities, inter-institute partnerships etc.

2.2.3.1 Reid's Four Dimensions

Fraser, Kennedy, Reid and Mckinney (2007) maintain that teachers' professional learning represents those changes which as a result occur in their skills, beliefs, attitudes and professional knowledge. Reid's quadrants provide an in-depth view of social dimension of teachers' learning. Reid (2007) brought the point that teacher's learning is not limited to individual domain, rather it is a process which is collaborative in nature. So, it can not be made limited to an isolated setting.

Reid's Quadrants are along two dimensions, i.e., planned/accidental and formal/informal (McKinney et al. as cited in Selemani-Meke, 2011). Each quadrant is characterized by number of learning opportunities planned and designed for the teachers (Reid's Model). These opportunities for learning pertain to different domains. Formal activities are introduced by some institution or individual with prerequisites. These activities include courses, seminars/ workshops or some other activities, while informal activities are the ones sought by the teacher herself (Selemani-Meke, 2011). On the other hand, planned

activities may fall either in formal or in informal domain, but these are pre-planned and arranged. Incidental activities of teacher's professional development occur without any design; these are unstructured and unprompted. Fraser et al. (2007) has highlighted the diversified nature of these activities. These quadrants of Reid mainly stress on the point that teacher's professional learning can take place in range of settings, with variety of possibilities. Fraser et al. (as cited in Selemani-Meke, 2011) termed these distributions as the ones which represent polarized positions, encompassing the entire range of activities which are aimed at learning and professional development of the teachers. Reid's Four Dimensional Model of CPD is shown in Figure 2.1:

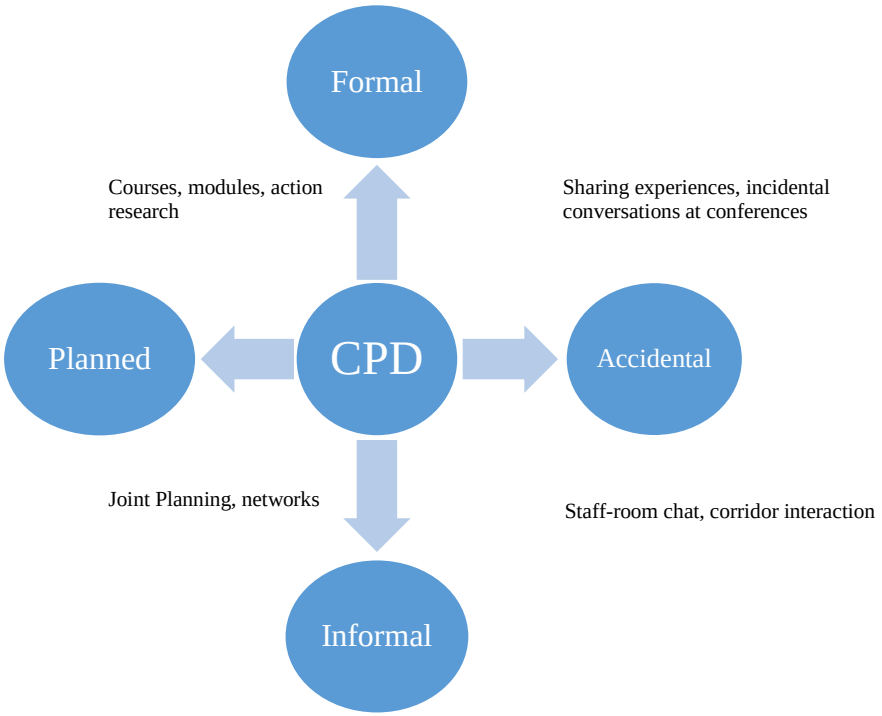

Figure 2.1. Reid's Four Dimensions of CPD

2.2.3.2 Kennedy's Models of CPD

Kennedy (2005) provided a set of nine models covering various areas of CPD of teachers. These models are placed in three broader categories – a continuum along which the models are placed as per their purpose and role in professional development of teachers (Fraser et al., 2007). These models are categorized as transmissive, transitional and transformative models. The models in these three broad categories are assigned keeping in view the mode of knowledge acquisition as well. Transmissive models are the ones in which teachers' professional development is driven by some external agent in the form of a teacher or resource person. These nine models are:

The Training Model

This model of CPD is transmissive in nature and is characterized by strict control by organizers over aim and scope, with stated purpose of quality assurance. Kennedy (2005) is of the opinion that over-emphasis due to strict control on conduct pattern and learning resources, training sessions are prone to standardization, hence are less dynamic in approach, without catering for teachers' individual professional needs. Being a resource-person-centric model, it is also criticized for its lack of direct connection with the class-room issues. On the other hand, Hoban (as cited in Kennedy, 2005) considers this model as a useful tool for introducing new knowledge.

The Award-bearing Model

This model is again a transmissive model, which is solely linked with professional development accrued through certification or awards giving procedures. Such awards are accredited through universities or institutes of higher education with degree-awarding status and are granted through a process of

quality assurance. Certain ideological considerations can be over-ruled in the process of award-bearing model. Such Over-seeing bodies or funding organizations also monitor the given training (Kennedy, 2005).

The Deficit Model

This model uses a process of evaluation to find out weaknesses in the practices of teachers. Such identified weak areas in individual teacher are then addressed through this model of professional development. Kennedy (2005) considers desired competence as a benchmark in this transmissive model, and in the light of these objectives, individual's performance is monitored to find out any deficiencies, if exist. The teachers must also be explicitly aware of the expectations and the standard against which their performance is judged. However, according to Rhodes and Beneicke (2003), it must also be taken into consideration that organizational aspects may also be related to teachers' deficiencies.

The Cascade Model

This model operates on the lines of training master trainers who then go to transmit the learnt knowledge and competencies. As per Kennedy (2005), Cascade model is usually employed in institutions which face resource constraints and cannot provide same training modules to all of the teachers. Through this model transmission of desired skills and competencies are targeted to be addressed through the training sessions (Kennedy, 2005). However, values and attitudes are not the sole focused areas of the training.

The Standards-based Model

This model emphasizes and centers around set of objectives chosen to conduct the professional development sessions. These standards are carefully

chosen to meet the needs. Once the standards have been drawn after deliberation, Kennedy (2005) elaborates that the focus is then turned to implementation of those standards. The standards are designed and implemented with a view to enhance teachers' effectiveness and resultantly augment students' learning. However, setting up of standards limits the possibility of other forms of CPD as an option.

The Coaching/mentoring Model

Mainly based on one-on-one tactic, learning in this model takes place between an experienced teacher and a new fellow. In this transitional model, the learning takes place within the context of the university, mainly on the premise that learning can be enhanced through sharing of experiences between the colleagues. Tantranont (2009) considers this one to one relationship having pivotal role in coaching or mentoring, a relationship which focuses on a new learner and an experienced one. Effective CPD is enhanced through social elements which often include processes such as coaching and mentoring. Such guidance in the form of coaching and mentoring by the peers is available to the teacher in her near environment. Through coaching/ mentoring, the new entrant is initiated by the experienced teacher into the teaching profession (Kennedy, 2005). The basis of this model is quality mutual interaction, which can only bring fruitful learning provided it is built on the principles of trust, sincerity and confidentiality.

The Community of Practice Model

This model is different from the previously discussed coaching/ mentoring model in the sense that mentoring and coaching relied on one-on-one interaction, held in an informal setting where no pre-planning is involved. But this model engages more teachers, where involved people are engaged in mutual

engagement, which is based on understanding and knowledge sharing. It lays emphasis on learning through social interaction and information sharing in a formal relationship. Yeatman and Sachs (as cited in Day, 1999) term the community of practice to be a formal relationship which occurs between 'practicing teachers and teacher educators'. This model also brings out new knowledge, which results as an outcome of several individuals' knowledge (Tantranont, 2009). However, the participants in this sort of learning are required to be fully aware of the instances of learning, so that they are willing to perform role of active learners.

Action Research Model

In this transformative model, teachers investigate into various issues which they come across while carrying out teaching practices. This tool is very convenient and can provide pragmatic solutions to the problems which a teacher might face. This practice helps the teachers to transform theory into practice. The purpose is that the teachers get better understanding of issues involved in their teaching, and resultantly they search for the possible solutions. Burbank and Kauchack (as cited in Kennedy, 2005) found that class-room teaching practices of the teachers will experience change if action research of the teacher is shared in relevant groups. Teachers might confront with different challenging situations during their class-room practices. Kennedy (2005) found that action research also helps teachers 'to find solutions to critical questions' which might emerge during their teaching. Through active mode their involvement and understanding are also enhanced. They gain self-confidence, with less reliance on efforts of others (Kennedy, 2005), and they tend to be self-reliant in pursuits of seeking knowledge.

The Transformative Model

This model does not have any independent strategies or processes of its own, rather its main characteristic is the fact that it amalgamates various conditions from other models. Those practices from other models are picked up which contribute towards some transformative design. Thus, its central agenda is to be a combination of other models with transformative design (Tantranont, 2009). Hoban (2002) supported this model to bring change in educational practices. This model is expected to cater for all kinds of situations and contexts. It is potentially able to solve issues and bring positive results.

2.2.3.3 Bell and Gilbert's Division

Teachers' professional learning occurs through various modes and at different stages. Such learning also takes place at different levels, which are concerning the teacher. These levels of learning encompass her entire spectrum of professional learning. She would switch voluntarily basing on her situations and basing on nature of learning being undertaken. Bell and Gilbert (1996) spelled out three domains of a teacher's professional learning sphere. These divisions start from personal being of a teacher. Then expand to her social sphere, and finally encompass teacher's professional learning. These domains are inter-related in character. The authors of the model have divided all three aspects into Initial, First and Second phases.

The personal aspect of teacher's learning involves rejection or acceptance of certain beliefs. She is thus able to construct new knowledge and evolve as a result of learning which would take place. The activities which she would undertake in class-room, in the wake of professional learning activity, would carry a distinctive mark of the conducted session of learning (Bell & Cowie,

2001). The learning in personal domain will bring some changes which are more permanent in nature, being related to some set of beliefs and perceptions, especially when these occur while supporting or negating certain personal opinions. These changes in personal domain may have direct impact on teacher's beliefs, ideas and her attitudes (Fraser et al., 2007). Personal learning as part of professional development of a teacher occurs when she is able to use different teaching techniques while performing different tasks in class-room. Bell and Gilbert (1996) also see role of this professional development of teachers in shaping those beliefs and perceptions of the teachers through which she carries out such academic tasks.

Social aspect of learning of a teacher brings the teacher in direct collaboration with both of her immediate and remote surroundings. Neither a teacher nor the educational institute is in isolation. Societal aspirations and needs get reflected directly in whatever occurs in the bounds of the institutions of the community (Bell & Cowie, 2001). Educational programs are planned and executed, keeping in view the social needs. Same wise, the professional learning of the teachers has a dominant social dimension to it. Through social learning, a teacher is able to renegotiate and reconstruct all what is meant to be a teacher (Bell & Cowie, 2001). Educational institutions are the common grounds for the teachers and the community. Teachers may very relevantly interact with stake-holders and fellow teachers. Social aspect enabled the teachers to develop and sustain 'collaborative relationship' (Bell & Gilbert, 1996). While teachers are active within social perimeters, and there are socio-cultural expectations (Fraser et al., 2007), these always influence teachers' learning.

Professional aspect of a teacher's learning finds its manifestation in the actual teaching. In a traditional class-room a teacher is involved in carrying out many tasks. In various situations in the class-room, the teacher is able to bring her perceptual understanding into action. She teaches in the light of her learning being acquired and internalized. In the domain of a class-room, the teacher is able to enact her learning, bringing it in her relevant context (Reeves & Forde, 2004). Professional aspect of teacher's learning highlights intellectual stimulation, which is then manifested in actual teaching taking place in educational institution. They were engaging in cognitive development and in development of their teaching techniques (Bell & Gilbert, 1996). At this level of learning, the other two aspects converge. On one hand the teachers were reflecting about their practices in the class-room, and on the other hand they were consulting with their fellows to get awareness about new teaching ideas.

2.2.3.4 Sparks and Horsley's Categories of Teachers' PD

Teachers' PD has been phrased by Sparks and Horsley (1990) as the set of processes which are aimed at bringing job-relevant changes in teachers. Improvements in teachers' role are linked with achievement level of their students. Sparks and Horsley (1990) presented five models related to the professional development which included personal professional development, observation-based assessment, involvement in improvement process, training, and finally, inquiry. Although these are mentioned as models, but most of them are merely types of professional development.

Individually guided development, as part of professional development, occurs as an intrinsically motivated process of self-development of the teachers. Learning is designed by the teacher herself. Here teachers get awareness of their

training needs and plan such activities which support their teaching (InPraxis Group Inc, 2006). Teacher herself sets her goals and decides the course for the achievement of those goals. This aspect also leads to the fact that individually guided development will also be influenced by the factors like self-reflection, individual aspirations, level of motivation and job satisfaction. Sparks and Horsley (1990) identified five phases of this form of professional development: need or interest identification; devising a plan for the attainment of these needs; the specific learning activities; and the assessment that the undertaken learning activity is relevant to meet the identified needs.

The second model is observation/ assessment. Observation of the teacher's teaching activity is carried out, and appropriate feedback is given which is based on the assessment done on the teacher. Once teacher has been observed, record of her performance is maintained and, basing on objective data, feedback is given to him (InPraxis Group Inc, 2006). It is assumed that teaching is an isolated profession (Sparks & Horsley, 1990), where a teacher is working alone, without the presence of some peer. When being observed, teacher is able to view her own performance in perspective. McGreal (1982) considered that this observation can be made more reliable if the observer has pre-decided observation parameters.

Next dimension of teacher's professional development is her involvement in improvement and development process. This improvement and development are in the domains of curriculum and training program (InPraxis Group Inc, 2006). The teacher also actively participates in the problem- solving process. So, this model emphasizes teacher's learning of these aspects as part of her professional development. When a teacher is required to be involved in these processes, she is expected to have attained a certain level of 'growth' (Sparks &

Horsley, 1990), which will be the outcome of professional development. She would be capable of viewing the curriculum and academic plans critically and use her reasoning to understand the logics involved.

For Sparks and Horsley, fourth model of professional development is mainly based on conduct of training for the teachers. Focus in this model is to develop a training module or paradigm where objective is to equip teachers with knowledge or skills, being imparted individually or in group (InPraxis Group Inc, 2006). To make these training sessions more productive and useful it is needed that these are conducted with some clearly defined objective in perspective (Sparks & Horsley, 1990). The training session organizers are responsible to select the activities to meet the desired objectives. These sessions may be organized to enhance teaching skills, other class-room competencies, knowledge base, IT literacy etc. But the ultimate objective would be to bring cognitive improvement in the teachers who are being trained (Sparks & Horsley, 1990). It can also be assumed that a successful training would be transcribed in better teaching techniques being used in the class-room by the teacher. Inquiry based professional development is the fifth model introduced by Sparks and Horsley.

Inquiry formed the fifth model for professional development of the teachers (Sparks & Horsley, 1990). Through inquiry, teachers get assistance from surrounding to augment their class-room teaching. They are assumed to be individuals with enough expertise to have questions, in first place, and then proceed to search for answers. It also becomes a form of action research (Sparks & Horsley, 1990) where teacher's inquiry may be as an individual or in the form of a group. Teachers' observatory and inquisitive temperament guides them to gather data about any issue of concern. The data is then manipulated to gather

findings which are then used to aid in class-room practices (InPraxis Group Inc, 2006).

2.2.3.5 Lieberman's Model of CPD.

Lieberman (as cited in Day, 2004) gave 'an expanded view of professional learning'. For her if teachers were to be aware of new teaching approaches, they were required to reassess themselves and transform themselves as learners. The theorist considered that in this case the teachers had to ground themselves in true spirit of learning by adopting the course of intellectual growth which was an essential part of learning (Lieberman, 1996). The success of a CPD program chiefly relied on the level of participating teachers' perceptions about the activity. This perception of the teachers will enhance their motivation level and will be instrumental in bringing improvement. After the sessions of CPD classroom practices have shown improvements when the professional development experiences addressing teachers' needs are closely linked to the reality and objectives set by the stake holders (Garet et al., 2001). This collective method is at the heart of Lieberman's perception of teachers' professional development. Through instances of CPD, teachers could attain professional development through a number of sources, at various locations in their surroundings, and through the use of multi techniques. She divided teachers' professional development into three domains:

Direct Learning: It takes place through courses, workshops, seminars etc. These are different instances of direct learning which are aimed at providing the teachers with requisite competencies so that they can perform various assigned tasks.

Learning in institution: This form of professional learning takes place through peer learning, coaching, mentoring, action research, evaluation etc. This type of CPD is also meant to bring focus on individual needs arising while working in a specific organisation. Short one-day workshops or training sessions would be held in this category, with primary focus on specific individual and organisational needs and requirements.

Out-of-Institute Learning: This form of professional learning is acquired through contacts with other institutes, joining professional networking etc. It is a collaborative learning experience which helps the teachers to form part of certain communities where they can share experiences, discuss issues and dilate upon professional strategies. Internal culture of knowledge-based professional competence grows in such learning circles, which resultantly enables participants to develop.

These CPD domains are comprehensive and encompass both formal and informal practices needed for teachers' professional development. Viewed objectively, this is fast-changing scenario of professional domains. If teachers want to remain relevant and tackle any situation they will require to engage with all of these forms of CPD in their various capacities. Armour and Makopoulou (as cited in Jones, 2015) are of the view that teacher's learning has been taken as a multi-faceted activity which is complex in nature, requiring a range of different approaches to be effective. Clark and Hollingsworth, Ling and Mackenzie, and Craft (as cited in Asmelash, 2014) evolved various contexts to view professional development of teachers, starting from immediate surrounding (i.e., class-room)

to self-directed study, courses, workshops, mentoring, coaching, collaborative learning, action research, personal reflection, observation, networking, and mediated learning. Hustler (as cited in Tantratont, 2009) considers such forms of CPD as workshops of various durations and seminars as common forms for bringing teachers' professional development. He also considers professional conferences and short courses as some other forms of teachers' CPD which are quite common in educational institutions. Inclusion of both types of domains makes this model wider in range and effective. Here learning for the teachers is liberated from a limited scope, and they get more opportunities to acquire context-based training. Helsby and McCulloch (1997) also considered that professional learning does not always come through formal means. Such opportunities can be informal also. Diversification of the available prospects is the key characteristic of this model (Helsby & McCulloch, 1997). A number of opportunities are available and sometimes the institution decides the nature and frequency of sessions or instances of PD, basing on the relevance and requirements. At times teachers can opt to participate in any such opportunity or even she can adopt combination of these.

Direct Learning

Direct learning is attained through diversified means ranging from workshops, seminars, courses etc. viewed in perspective of Kennedy's models (2005), CPD courses combine the traits of training, cascade and deficit models. These instances of direct learning are aimed at providing the teachers with requisite competencies so that they can perform various tasks given to them. Here talks or lectures are delivered by some experts of the field and teacher is at the listening end. However, by employing different techniques, the sessions can be

made more interactive. These courses etc have been criticised also on the account that there is a disconnect between them and actual situation in the class-room. So, no real issues are made subject of such short duration courses because no long-term changes can be brought in methodology adopted by the teachers, and these instances of CPD are unlikely to change teachers' perceptions of themselves as teachers (Jones, 2015).

Learning in Institution

The professional development attained within the institution helps the teachers to improve their competency and understand institutional requirements. Craft (2000) recognised this aspect of professional development to serve the needs of both individual and organisation. This type of CPD is also meant to bring focus on individual needs arising while working in a specific organisation. Short one-day workshops or training sessions would also be held in this category, with primary focus on specific individual and organisational needs and requirements. Peer-learning and coaching take forms of teachers' professional development within the institution. All the stakeholders within the institution are made part of the planning of this type of CPD to ensure that learning strategy was designed with wholesome approach. This practice of teachers' professional development also enabled the teachers to actively participate in their own CPD and gain deeper understanding of teaching practices.

Out-of-Institute Learning

The third dimension of teachers' professional development in this model is out-side the boundary of the institution. This community-oriented learning of the teachers occurs when they interact with other professional, join various groups and broaden their experiences. Lieberman (1996) researched on a number of

practices that supported teacher development and made the point that through these, teachers could create new possibilities for student learning. This collaborative learning experience helped the teachers to form part of certain communities where they could share experiences, discuss issues and dilate upon professional strategies. They could mutually attain emotional stimulation and attain intellectual enrichment. The interactions that take place serve to enhance professional learning (James, 2007). Wenger (2000) considered the communities as building blocks in this system of social learning. Internal culture of knowledge-based professional competence grows in such learning circles, which resultantly enables participants to develop. Engeström (2001), however, described learning in these communities as a 'vertical process'. Such vertical process elevates them to more competence in professional domains. This collaborative learning practice could be used to bring some longer-term shifts in teaching practices and help teachers develop shared sense of identity about their profession. Kennedy (2005) identified the issues of power and authority which could possibly arise in learning of teachers taking place in community.

2.2.4 CPD Principles

Professional development of teachers is based on certain principles which deal not only with conduct of CPD activities but transfer of changes in teachers' class-room strategies. Leu and Gray (2005) considered that it is a major principle of CPD that subject matter of teachers' PD activity should be focused on and address the problems and issues which students might face while their learning activity is in progress. Professional development has to be integrated and linked with the teaching-learning process, failing which it will lose relevance and

validity. Following are some of the principles derived from some approaches towards CPD (FaSMEd, 2016):

- *Competence-oriented.* The professional development activities should target some specific competencies of the teachers. Various practices may be planned to improve upon those skills.
- *Participant-oriented.* Every teacher who participates in professional development programs has her individualized needs and perceptions. Those occasions of CPD which have wider participation, like courses, conferences, seminars etc cannot cater for characteristics of all the participants on individual basis, however some broader considerations may be derived and subsequently taken care of. On the other hand, mentoring, peer coaching etc can be more specific and direct.
- *Stimulate cooperation.* It is another CPD principle which stresses on the need of motivation and readiness level of the participants. The willing cooperation of the participating teachers will guide them to be active learners in the CPD. Darling-Hammond, Hyler and Gardner (2017) termed cooperative learning as one of the vital characteristics of effective PD. Motivation and need-consciousness will assist in eliciting rapid response. So, this principle of CPD requires generating innate desire to learn and participate in self-learning process.
- *Case-relatedness*. Planned activities of CPD should not be out of context. It is another principle for purposeful conduct of professional development sessions. Case-relatedness increases chances of applicability of learned competencies. Through the principle of relatedness, the participants are more motivated to take part in the activities. They will be

able to find solutions to many problems being faced in their routine professional life.

- *Diverse instruction formats*. Individual teachers have diverse learning styles and needs. These diverse learning styles and needs emerge due to various social and individual factors. Exploiting these needs and styles would add to the effectiveness of the CPD programs. Variety must be brought in instructional formats of CPD programs to address the needs and to enhance interest factor.
- *Foster (self) reflection*. Self-evaluation is required before, during and after the sessions of CPD. PD must be designed in a manner to bring self-awareness amongst participants concerning their professional environment and class-room practices. Feed-back or reflection has significant role among the vital characteristics of effective PD (Darling-Hammond, Hyler & Gardner, 2017). Self-analysis will assist the participants to draw maximum benefit from the CPD activities.

2.3 Self-Regulated Learning

SRL is explained as psychological process of complex nature in which learner significantly controls her thoughts and behaviour (Kruglanski et al., 2010; Morf and Horvath, 2010). This form of learning is perceived to help the learner in achieving her goals. With the help of complex cognitive processes, SRL works alongside many other psychological processes. The environmental components form important contributory factors (Karoly, 2010). Panadero (2017) considers this concept as a core conceptual framework to understand the cognitive, motivational and emotional aspects of learning. Though the birth of this concept of learning was initially witnessed in 1970s, yet it resurfaced not before 1990s (Boekerts, Pintrinch, & Zeidner, 2000). Since that time, this

concept has always been under study. One of the reasons could be more focus on student-centred studies which resulted into emphasis on self-monitored learning, independent learning and self-control of studies.

SRL has its foundation on the basis that here the students learn to devise, monitor and evaluate their process of learning. The learners learn to effectively manage their learning for the achievement of their goals. Link has been established between higher SRL and positive academic out-comes (Fontana et al., 2015). In this learning process of acquiring knowledge, many skills related to self-regulation are employed which include self-assessing, self-directing, controlling and adjusting (Zimmerman, 1989). Self-regulation can occur in many activities in the learning process (Schunk, 1989). The very act of concentrating on their instruction is a significant component of learners' self-regulation of their academic activities. Organizing material and efforts towards learning and creating a suitable learning environment which is free from distractions are other manifestations of self-regulation in learning. Schunk (1989) included activities of rehearsing the contents to memorize, and effective use of available resources in the domain of self-regulation. Schunk (1989) is of the view that having a positive self-perception, and able to consider the hurdles are also characteristics which are learnt as a result of SRL.

2.3.1 Nature and Background

SRL gives learners the choice to direct their own learning, as per the goals set by themselves. Thus, it is a sort of learning which is based on self- motivation and independent way of learning. Students involved in SRL adopt specific strategies for attaining their goals (Kroop et al., 2015). SRL emphasises the internal (motivation and cognition) process of learning (Fontana et al., 2015). Students set their strategies to fix their goals and then pursue them. The concept

of SRL also reveals that by using such independent learning mode, the students are in a position to track their educational pursuits effectively (Perry et al., 2006). It is an important concept which has gathered much attention of the researchers. In the views of Zimmerman (1989), researchers in Education have been investigating the relationship of adoption of self-regulating processes by students and their academic achievements. SRL of students also affects their learning behaviours. They learn to devise ways and means to further their motivation and cognition. Zimmerman and Pons (1986) found a direct connection between self-regulation ability and the learning outcomes of the students.

In 1986, during annual session of AERA, a symposium was held on self-regulation. Proceedings of its scientific session were published in *Contemporary Educational Psychology* (Zimmerman, 1986b). This 1986 Symposium was greatly significant in SRL studies and practices (Zimmerman, 2008). According to Seeger (2012), during the course of the proceedings, definition of SRL emerged for the first time. SRL was articulated as a process where students are active learners in the domains of metacognition and self-motivation. It was clear through this definition of SRL that in this form of learning students make proactive use of some specific cognitive and behavioral processes. As a result, they improve their academic achievement. Active role of the students has remained, since then, a cornerstone in the concept of SRL. This concept is also termed as a proactive method of students' learning voluntarily. Panadero (2017) analyzed various social elements which play their role in SRL by the students. These social elements have varying degrees of interaction amongst themselves, cast influence on SRL in different dimensions. Thus, this sort of learning acts as an umbrella concept encompassing inter-related social factors. As a result,

students' learning level will also be successfully improved. So SRL interventions have differential effects based on the students' educational level. If the students who are to be involved in SRL activity are sufficiently motivated, then desired results from this activity can be achieved. Same wise, engaging the learners in emotional aspects, i.e., self-efficacy and goal setting will prove beneficial in learning.

2.3.1.1 Theoretical background – Social Cognitive Theory in SRL

Studies in SRL got into prominence in 1980s when more research into personality development and psychological dimensions of personality were highlighted. The research was aimed at bringing the patterns of behaviours and influences into study. Role of environment and factors shaping the social context were given significance in all relevant articles and studies. With growing stress on the significance of individual learner, it was emphasised in 1990s that learning can better take place through self-regulation. Related concepts like self-control and self-management (Boekaerts et al., 2000) also came into prominence. The rise in 'lessening role of instructor in class-room' is growingly rapidly in USA and Europe (Beishuizen & Steffens, 2007). In this learner-centred environment, self-regulatory learning was preferred, and it suited the needs also. Being learner as the prime focus of the learning process, strategies were being considered to enhance her skills and competencies for the smooth conduct of the learning process. A lot of empirical evidence has been found, of strong linkages between the academic performance of the students and adoption of SRL techniques by them in the class-room settings (Pintrich, 2003; Zimmerman & Schunk, 2001; Bandura, 1997).

2.3.1.2 Social Factor in Social Cognitive Theory

Learning of the students is not a phenomenon in isolation. It is never independent of surrounding factors and elements. The learner is part of the surrounding and grows out of surrounding. The environment has dominating role in her behaviour, attitude and cognitive setting. In this way, learning of an individual is social in context and emerges out of learner's interaction with the environment. Social Cognitive Theory was developed in 1986 by Bandura and is based on learning of an individual occurring as a result of interaction with the surrounding. It is not simply the emergence of a learnt behaviour, rather the continuation and maintenance of a learnt behaviour which is cardinal of this theory. This theory explains in detail that how a learner achieves the object of learning, how an individual regulates her behaviour towards the achievement of a set of goals. So, this is also a goal-directed approach where learner is gaining control of her own learning process.

2.3.1.3 Social Cognitive Theory and SRL

Social cognitive theory links SRL with social and immediate environment. Social theorists explain the course of linking SRL processes and environmental factors. Their interplay determines the linkage. Bandura (1986), a pioneer in Social Cognitive Theory, stated SRL as having three sub-processes This theory determines that individuals indulge in SRL as per the intellectual patterns they have developed through their interaction with their surroundings. By way of this interaction, students become aware of their capability which is self-observation, and accordingly they set achievable goals (self-judgment), and then take appropriate steps to achieve them which is self-reaction (Bandura, 1991). According to Andrade and Evans (2013), SRL is generally divided into four

categories. These categories are metacognition, motivation, cognition and behavior. Different dimensions or sub-processes of this aspect of learning are further allocated to these broad SRL categories. Metacognition is divided into various components which include planning in the initial stage, which leads towards goal-setting. This goal formulation is followed by monitoring and evaluation of the progress. While motivation is composed of learner's self-motivational state, self-efficacy and shouldering responsibility for the learning task are also as a result of motivation level. Next comes cognition which consists of certain mental functions. Lastly comes behavior pattern of the learner which is her ability to seek help for the accomplishment of learning task and set a positive learning environment. Social cognitive theory has significant association with the idea of SRL. This theory interprets self-regulation basing on three inter-related sub-processes (Bandura, 1986; Kanfer & Gaelick, 1986) which are:

1. Self-observation,
2. Self-judgment, and
3. Self-reaction.

2.3.2 Sub-processes of Self-Regulated Learning

Learning through self-regulation is based on the basic conception that here students achieve learning by devising (a strategy), monitoring their progress and finally evaluating the whole process (Cobb, 2003). The learners learn to effectively manage their process of learning to attain their objectives. In SRL, a key role is given to learning strategies (Kroop et al., 2015). Here in this learning, certain learning goals are set and students, through their behavior, cognition and affects work for the achievement of those pre-determined goals (Zimmerman, 1989, 1990, 1994). Various models have been devised to explain the process of

self-regulated learning, which are composed of certain sets of sub-processes (Kroop et al., 2015). These sub-processes are also sometimes termed as SRL components, and theorists have categorized them into metacognitive, affective, motivational and behavioural domains.

Social cognitive theory has significant association with the idea of SRL. This theory interprets self-regulation basing on three inter-related subprocesses (Bandura, 1986; Kanfer & Gaelick, 1986) which are self-observation, self-judgment, and self-reaction. These sub-processes initiate when students become conscious of their own behavior while they are undertaking the learning assignment. In a way, they are self-observing their progress in learning task. Through this observation, students come to know whether their progress in the learning activity is in consonance with their goals. The goals or standards might have been their personal, given by teachers or set through social context. The outcome of such self-observation, in the light of standards, makes the learners conscious about efficacy of the process of SRL. With its help, they decide about a reaction, whether positive or negative (Zimmerman, 1989). If found suitable, the learning strategies would be viewed positively and adopted for replication in future as well, otherwise some modifications are sought, or objectives are reconsidered. In this way, the three sub-processes are interdependent for successful accomplishment of the learning goals.

- *Self-observation*. In self-observation the learner is conscious of her behaviour while the activity of learning is being undertaken (Bandura, 1986). Through this process, the learner is able to get real-time knowledge of what all is happening. If required, then changes can be caused and any hurdles might also be removed. This subprocess is very necessary for the

successful accomplishment of SRL process. This self-observation is carried out to view the situation and understand the dynamics of the available resources. So strategic level planning is carried out during this sub-process. This process also helps in formulation of those goals and standards which would be achieved when this learning process is completed. Later the performance of the learner is viewed in the light of those standards and goals. This aspect of SRL also brings into focus an important point of Bandura's (1989) theory which stated that monitoring own progress in this fashion enables the learner to gain some amount of self-confidence which then helps in goal attainment.

- *Self-judgment*. Self-judgment provides review of the learning performance while the process is in progress. Here comparison is drawn between learning activity being undertaken and the goals which were initially set. A significant dimension to self-judgment was given by Bandura (1991) who provided dual aspects of self-judgment: self-comparison and comparison with any other learner. Such comparison would be drawn purely basing on the goals of the learning process. Important point is unbiased judgment of the learner regarding the process. This aspect can be ensured by making her conscious about personal characteristics. Williams-Miller (1998) related self-judgement with peer-group assessment of the task accomplishment and found that learners were more conscious about observations of the peers as compared to their self-judgment. Goal attainment also affected self-judgments. When learners visualize goals as challenging, significant and attainable, then their judgment will also be characterized by these values.

- *Self-reaction*. This subprocess is related to learner's effort to change their thinking and behaviour (Pajares, 1996). This change in behaviour is preceded by self-analysis where learner contemplates over her process of learning. If a learner views her progress towards achievement of the goal to be satisfactory, then this very fact will increase motivation level, further adding to the individual learner's performance. If a learner sets tangible goals while making progress towards completion of learning task, it will boost her motivation level considerably. So, self-reactions of learners towards goal progress initiate certain behaviours.

These sub-processes of SRL will enable the learner to handle the task effectively, overcome any hurdles or challenges, gain mastery over some skills, understand the requirements of surrounding, plan strategically and execute for achievement of the set objectives. These sub-processes have been essentially part of reflection phases of self-regulation (Zimmerman, 1998). If we analyze these sub-processes in retrospection, it is found that they are aligned with the phases of SRL: the sub-process of self-observation is linked with the formulation of goals to be accomplished. Self-judgment intimates about the progress for the achievement of the goal already set for the learning process. Next comes the sub-process of self-reaction which enables the learner to monitor her progress towards goal achievement. This progress comes in comparison with the objective already set. Any change in strategy is also considered in view of situation.

2.3.3 SRL Components.

SRL is a concept which involves such processes that it is no more a limited concept. It is wide ranging in its scope, and diverse in choice of place and

time. In the words of Weinert, in SRL, the learner is free at liberty to decide about the time of intended learning, the mode and at the same time, where and what to learn (as cited in Beishuizen & Steffens, 2007). The process of SRL activates main psychological processes. These processes are in multiple domains and have also been termed as components of SRL. Self-regulated processes are of greater significance at university level, as pointed out by Fiorilli, Albanese, Gabola and Pepe (2011). Here the students are mostly well-grounded in study habits and have devised their self-conceptualization. Four components of SRL have been drawn through which students carry out their learning independently (Fiorilli, Albanese, Gabola & Pepe, 2011). These components are meta-cognitive, affective, motivational, and behavioural.

Meta-Cognitive is a key sub process of SRL. For Shuy (2010), metacognition in SRL is actually declarative knowledge where learner has knowledge about her own-self and factors affecting acquisition of knowledge. It is self-awareness and control of mental thoughts (Broadbent & Poon, 2015). While we talk about cognition, it consists of those habits and skills which are required to think critically and recall and memorize information. In the process of metacognition learners can monitor their own activities which are related to cognition. Corno and Mandinach (1983) termed SRL as characterized by "an effort put forth by students to deepen and manipulate the associative network in content areas, and to monitor and improve that deepening process" (p.95). When a learner consciously employs some strategies to plan or find solutions, then SRL is linked with learner's mental process. Mih and Mih (2010) has linked metacognition with learning achievements, meaning by that learning achievements are the result of effective meta cognitive processes. It can also be

said that students who employ SRL are able to be involved in critical thinking and deep mental processes. Academic achievement of the students can also be predicted through the process of metacognition. In recent times, the study of relationship between academic achievement and metacognitive process has brought many positive results. Through this combination many metacognitive tasks are accomplished which include self-efficacy of higher degree, tasks valuation, higher level of interest in the learning task, positive emotional reactions, continuous interest in the task, and effective use of learning strategies (Mih & Mih, 2010). It is goal orientation in metacognition where students focus on their academic achievement and obtaining good grades. They also focus on maintaining positive image (Mih & Mih, 2010) in front of their peers and teachers. In their research on the topic, Zimmerman and Schunk (as cited in Shuy, 2010) have very relevantly found relationship between learning through SRL and active learning posture of learners in behavioural, motivational and meta-cognitive domains.

This concept can be best understood by the study of a German psychologist named Julius Kuhl who analyzed the information-processing which takes place in state of volition or willpower. He also related the theory of volition with everyday life (Kuhl, 1985; Kuhl & Beckmann,1985).

Affective component involves students' reaction to the assigned task. Of this category, most important appears to be test anxiety. Here the students are engrossed in negative thoughts, which might emerge from anxiety or fear. This is a negative reaction to a test resulting into faulty performance. Affective reactions mostly depend on or are linked with some situation, so reactions of a learner cannot be explained fully on the basis of what she thinks or believes. Klass (1990)

and Boekarts (1997) have linked SRL of a person with type of affective response displayed by her. Affective change can also be linked with such situation where student switches between negative and positive affects, basing on her individualized response to a given situation. Affective states of guilt, shame, and embarrassment (Klass, 1990) are the examples of negative affective state. Affective factors are more specific and related to an individual's needs, motives and values. Boekarts (1997) conducted a study on motivation and students' performance in different subjects. The study revealed that students who judge themselves as competent were the ones who were also ready to put in more effort in the process of learning. Self-regulation mostly depends on the factor of metacognition, but Zimmerman (1995) believed that it also depends on learner's perceptions towards learning material. These reactions are displayed in multifarious situations and in many varied ways. Fears of different types, doubts, apprehensions and hesitations concerning such situations are the examples of affective component.

Earlier more focus of SRL studies was related to cognitive and meta-cognitive domains. Various dimensions related to acquiring knowledge and correlated aspects were given focus. However, an integrated approach was adopted later on by Hofer, Yu and Pintrich (1998) who worked out integrated model, where affective process was used alongside metacognitive and cognitive domains. Regulation of motivational beliefs is involved in affective component. Pintrich and Schunk (1996), and Wolters (1998) talked about different aspects like personal interest in task and task value, along with goal orientation. On the other hand, Schunk and Zimmerman (1998) pointed out that affective domain may cause a range of self-regulatory dysfunctions. These dys-functionalities

cause many hindrances in carrying out tasks related to affective realm of SRL. However, significant evidence have been found that interventions aimed at resolving these dysfunctions are quite helpful in finding the solutions to such issues (Pintrich & Schunk,1996, Hofer, Yu & Pintrich, 1998 & Wolters, 1998).

Affective domain supports the actions linked with positive effects and discourages the ones leading to negative effects. In this way, it has the capability to control behavior of the learner to guide it to desired end. Such kind of mechanism is directly associated with cognitive process which has developed over a considerable period and through many conditionalities. Fostering the positive affective sphere augments the SRL of the students. For this purpose, Ford and Nichols (1991) discussed about a specific mechanism with three sub-components, namely: feedback mechanisms (here learner gets feedback about her progress in the task of learning towards achievement of set objectives); (b) feedforward mechanisms (this sub-component is related to learner's capabilities towards successful task performance), and (c) activation of control processes, related to gaining control of the learning task through effective planning mechanism.

Among the factors of SRL, *Motivation* is a factor which plays a significant role in students' tendencies of higher goal setting, pursuing the goals with greater urge, eagerly devising plans and tactics, and purposefully evaluating their SRL. Pintrich and Schunk (1996) consider that motivation affects people the way they learn. Since mid-1980s, the learner has become the focus of the learning process, with more focus on her needs and competencies. A strong connection between motivation, self-regulation and goal setting in learning by the students, and research conducted lately has focused on their inter-relationship. Richardson et al.

(as cited in Panadero, 2017) have given expanded view of socio-cognitive theory by stating that significant motivational value of self-efficacy, effort, persistence and objectives in this theory is dominant.

McWraw and Abrami (2001) investigated to ascertain the relationship existing between goal orientation and motivation, and their effect upon the SRL. The results gathered revealed that it appeared to be a reciprocal relationship. Through the presence of motivation, the learner will be inclined to the use of such learning strategies which will enable him to achieve desired results. In their research Zimmerman and Schunk (2001; 2008) found that self-regulated students are active when they are going through the learning process. Zimmerman's model of SRL categorized this learning process consisting of Cyclical Phases. In this model, there is a direct relationship between metacognitive and motivational processes (Panadero, 2017). This model was elaborative in its true nature. There the subprocesses that belong to each phase were presented.

Motivational aspect of a learner's learning has been divided into various domains. Noels, Clement and Pelletier (2001) suggested that extrinsic, intrinsic and amotivation are three main types of motivation. The intrinsic motivation is the one in which the learner will be motivated to perform when there is fear of punishment or expectation of a reward. Extrinsic motivation has been further categorized into sub-categories. In this regard, Noels et al. (2001) categorized extrinsic motivation with three sub-types. First one is external regulation. Here a learner learns when she is aware of some external pressure or some reward is expected. Once such pressure or reward is removed, she would not exert for the learning. Second is introjected regulation. In this condition the learning is linked with some negative elements like presence of guilt or shame. Lastly, identified

regulation, where learner sets some personal goal and learns for the achievement of that personal goal. The learning slows down or is absent if interest is lost.

Self-efficacy has a greater role among the motivational variables involved in self-regulated learning (Pajares & Schunk, 2001). Through this factor of self-efficacy, an individual is able to hold a belief about her own capacity to self-regulate her learning. *Self-efficacy* is another important factor in SRL in which learner has certain belief in her own self, in her own capabilities, which compel to perform at a desired level. Self-efficacy regulates motivation level of learners (Bandura, 1997). Yamada et al. (as cited in Yamada et al., 2017) considered that self-efficacy has a significant co-relation with students' learning behaviours. Through self-efficacy, the students decide on their course towards certain action. Schunk (1990) feels that it is the factor of self-efficacy which determines the choices of activities, effort, persistence, and achievement, which are made by the students. Bandura (1986) has linked self-efficacy with students' achievement. In this case, it can be assumed that, it would reduce in case of falling achievement level of the students who are undergoing SRL. This reciprocal role can be applied to other phases or steps involved in SRL. Zimmerman (1990) felt that higher self-efficacy will compel the students to set more challenging goals for themselves. So, they will be engaged in activities which will enhance their learning. To Elliott and Dweck (1988), it appeared that goal orientation of the students and their achievement are linked through the factor of self-efficacy. Thus, the relationship between these three elements is reciprocal, and directly connected with SRL of the students.

Behavioural component of SRL is also the emotional dimension of the SRL in which students are involved. They try to control their behavior related

with the learning process. This control however is not explicit, directly dealing with control of self. In the model of social cognition, the individual is not isolated rather behavior is considered as a component of the person (Bandura, 1986; Zimmerman, 1989). Boekarts (1996) does not link behavior solely with the internal self of the person. It has wider dimensions. For him, cognition (both metacognition & simple cognitive processes), motivation and affect which are SRL components widely influence the inner self of the individual. An individual has the capacity to exercise control over her behavior through observation, monitoring and regulation. Thus, talking about psychological aspect of a learner, she can self-regulate these processes.

Behavioural aspect is directly linked with the decisions and actions made by learners related to their learning environment (Zimmerman as cited in Williamson, 2015). Through the behavioural aspect, the students can control their time and effort, basing on the perceived requirements. The requirements will be completely understood and pursued for accomplishment. The aspect of behavioural control assists them to enhance their effort if the learning process is found much harder than they expected in the beginning. The behavioural modification can also generate persistence in their effort, if the circumstances need consistency. This persistence is testimonial of their level of motivation (Boekaerts & Niemivirta, 2000). Behavioural control thus plays a pivotal role in SRL of the students. Defensive pessimism, self-handicapping, help seeking and reflection are various behavioural dimensions which augment an individual's SRL. In the aspect of help seeking, it is critical to pre-determine when, how and from whom to seek the desired help. Reflection is more of a cognitive process, but its internalization considers it as part of personality and thus a behavioural

aspect. Reflection about the learning process and chalking out a road-map will make SRL an effective process.

2.3.4 Main Strategies of Self-Regulated Learning

SRL is a comprehensive and detailed procedure. Many factors combine to constitute it. It includes a number of factors which form part of the process of SRL. These factors sometime include setting of goals, managing the resources available to manage those goals, self-efficacy for success expectations, and deep cognitive involvement (Trawick & Corno, as cited in Cazan, 2013). A learner will be termed as a self-regulated one when she is equipped with the motivation to accomplish any academic task. She is able to set realistic goals which are related to the task in hand; some specific learning strategies are used by her for the task accomplishment; she engages in self-monitoring to see the effectiveness of adopted strategy, and finally, to ensure the likelihood of success, the student is required to make any adjustments in the adopted learning strategies. Zimmerman (1990) considers that the students engaged in this kind of learning take learning as a systematic and controllable effort to achieve the desired outcomes, they accept greater responsibility. Ertmer and Newby (1996) expanded the horizon of students' intellectual involvement by maintaining that the learners take the complete picture by considering all cognitive, motivational, and environmental strategies what the current task requires. They are also expected to be able to determine the adequacy of the resources available to them in their personal domain, for accomplishment of the learning activity being undertaken.

Strategies for learning have been enumerated in all the SRL models. It is found that SRL models have four shared assumptions on which strategies for learning acquisition have been built. These assumptions are (Pintrich, 2004):

- Learners determine their learning goals and strategies; thus, they play active roles.
- SRL has many inter-related components. These components include monitoring of the process, environment of task performance, any behavioral patterns, level of motivation, self-efficacy, cognitive manipulation, and task evaluation. Learners have the ability to regulate the SRL components for completion of learning.
- The process of SRL is linked with the environmental factors, and these environmental elements are very significant for the completion of this process, alongside the individual behavioural qualities which revolve around their cognition and motivation.
- Certain standards and goals are set before the process of SRL. Evaluation of the learning process is carried out against these standards.

These SRL strategies or components have been explained by most theorists. Learners who are learning through the process of SRL can focus on their process of learning and achievement of goals or objectives set for the process (Boekaerts 1996; Pintrich 2000). Such set of objectives or goals occupy central place in the whole process of SRL (Boekaerts 1996). Pintrich (2000) considers these set goals as the benchmarks to evaluate their tasks. Students involved in this learning perform certain academic task, and then they make a conscious effort to compare it to a preset to a standard. It helps them to carry out self-analysis. According to SRL models, such conscious practices of the students play dominant role (Pintrich 2000; Zeinder et al., 2000). The cognitive strategies hold a prominent place in students' learning activities, because here they select and enact what all they have to learn and how they have to learn (Boekaerts 1996;

Garcia & Pintrich 1994; Pintrich 2000). During the process of SRL related to an academic task, students use strategies such as Elaboration, Organization, Critical Thinking and Rehearsal. The use of such strategies is greatly helpful for the learners when they are learning the contents of their course. These will sometime be used without making a clear mention of these, meaning by that these are implied ones (Zimmerman, 1989). On certain other occasions, these cognitive processes which are vital for the goal accomplishment in SRL are included (e.g., Winne & Hadwin 1998, Pintrich 2000).

The process of SRL is very diverse in nature, in the sense that it includes many social and environmental elements. Many strategies are adopted basing on these elements. Some of such strategies are listed below:

- Help-seeking is most commonly used SRL strategy. This help is sought by the learner from her surroundings. Thus, through enhanced social interaction, the learner will be able to shape her behavior (Ryan & Pintrich, 1997) related to learning, and enhance social interaction with her immediate environment. Help seeking also enables the learner to attain further use of her environment through mutual interaction and learning process.
- As mentioned in the preceding paragraph, learner acquires context control. She does so to get enhanced control of the nature of the task and context in which learning is being carried out. Printrich (2000) however considers that learner has to carry out the process in many diverse settings, and the context is not always under the learner's entire control. Mostly, here class-room environment is not student-centred. Learners can control the contextual aspect of learning when they are learning in a class-room

environment where students are the main focus. The more student-centered a classroom is, the more contextual control the students will have. Here example can be quoted of the UBIKO project (Kontturi, as cited in Jutrakul, 2017) in a teachers' training school in Finland. It is a project that aims to support learners as self-regulated, including allowing them most contextual control to benefit their learning environment.

- The research of Chamot is significant in this regard as he took various steps of SRL mentioned in different related models and synthesized them together (Jutrakul, 2017). He also highlighted various strategies which are related to developing self-regulation. The first step for Chamot (2014) is goal-setting and planning. Initial planning is the basis on which whole process is carried out at later stage. Goal setting is crucial. It helps to ascertain where the students are expected to reach when learning session ends. A relevant action plan and procedure is devised with the help of guidance provided by the teachers. While the learning process is underway, there is a need to monitor the progress. Thus, the next step in SRL strategy is monitoring. During this monitoring, the students review what they were required to learn and what they are learning. They are conscious about the process, and efficacy of SRL is enhanced. In the monitoring process, and while the learning activity is in progress, certain problems might emerge. The next step is finding solutions to the problems. Students are expected to deal with the arising issues effectively. They will need some guidance in identifying and tackling with the emerging problems. With the help of guidance, they will learn as per the set goals. The next step is evaluation. Here students are expected to finally

see if they have learnt what was desired. This evaluation will require critical and analytical approach to be adopted by the students. With such analytical approach, when they will evaluate the acquired learning, they will gain confidence, and will be more responsible learners in future endeavours, as well. The final step is self-management. The students are required to manage their own learning by using the methods that are the most efficient for them. This ranges from time management to strategy management.

Shuy (2010) classifies the SRL strategies according to the nature of content being learnt. The cognition component for him is based on certain skills and habits. Through these skills and habits the students are able to decode information, memorize contents, and recall when needed to. As a result, they will also be able to think critically. Shuy (2010) assigns a broader role to meta-cognition component. Within the domain of this component learners are able to grasp their own cognitive process and monitor its functions. Behind the development of all such skills, a strong motivation is needed. This motivation component directs the attitude and underlying beliefs of the students. Thus, it casts impact on both the cognitive and metacognitive skills. Now some strategies would be discussed to impart learning to the students in the mode of SRL:

Cognitive Strategies

Problem solving techniques, critical thinking and learning strategies are part of the cognitive strategies of content learning in specific learning instances. Through problem solving, any emerging issues will be resolved and learning would take place effectively. Critical thinking helps the students in viewing the plan of learning in true perspective and reflect whether any new piece of

information which they are acquiring is in consonance with their existing base of knowledge or not.

The metacognitive

Shuy (2010) considers that the metacognitive component is comprised of three-dimensional knowledge forms: declarative, procedural, and conditional. The declarative knowledge is related to self-awareness by the learner, about own related skills and any shortcomings. Secondly, procedural knowledge is about strategies and other procedures. The conditional knowledge is basically awareness of the environment where the SRL process is being carried out.

The motivation

Motivation is a factor which plays a significant role in students' achievements in their academics. Researches have concluded that the students' tendencies of higher goal setting, pursuing the goals with greater urge, eagerly devising plans and tactics, and purposefully evaluating their SRL have been accentuated by the level of their motivation.

Students learn self-regulation in their learning with the help of number of factors. Pintrich (1995) considered that the learners become self-regulated through their personal experiences. This fact brings teachers to a position where they can instruct students to learn through the mode of self-regulation. In this way, role of teachers is enhanced in inculcating the habit of SRL among the students. They provide them with all required guidance to carry out the process and tackle any challenges and hurdles. In this aspect, students can enhance their learning competencies and performance through more control over their learning behaviour. Here, it is pertinent to mention that the university students can exercise more control over their learning schedule and style (Pintrich, 1995). Thus, with

the help of SRL they can learn more efficiently. Here teachers can also assist the students to take part in multifarious metacognitive activities and use the related skills in acquisition of SRL. They assist learners to make learning strategies, self-monitor task progress and evaluate available feed-back, view their progress towards attainment of goals, construction of metacognitive knowledge about academic work (Pintrich, 1995), and frame specific strategies for learning task.

2.3.5 Self-Regulated Learning Models

The topic of self-regulation though emerged in 1980s, yet it remained linked with aspects such as SRL, self-regulation of health-related aspects (Puustinen & Pulkkinen, 2001). Present study will focus on SRL which is characterized by ways in which individual controls her learning in an education setting. This form of learning is multi-dimensional and involves human and environmental factors. Zimmerman (2001) termed it as a subject covering very wide-range, and has been explored from a variety of perspectives (Effeney, Carroll & Bahr, 2013). Mostly, the models of SRL are related to and based upon social cognitive perspective (Zimmerman & Bonner; Zimmerman & Kitsantas, as cited in Effeney et al., 2013). Social cognitive theory links SRL with social and immediate environment. Social theorists explain the course of linking SRL processes and environmental factors. Their interplay determines the linkage. Bandura (1999) held the opinion that the process of SRL is related to the processes of intellectual development and social functioning. These processes, in the context of SRL, cannot be separated from the circumstances in which they occur, and are not grown instantly. Such abilities start developing over the course of childhood and continue building up as a person grows in age (Vukman, &

Licardo, 2010) with varying degree of such competence developed through adolescence.

Many models emerged during the course of time. Most relevant models are those which were articulated by Boekaerts, Borkowski, Pintrich, Winne and Zimmerman (Panadero, 2017). For the purpose of study, in this present research, following three models have been studied: -

- Winne's Four-stage model of SRL
- Zimmerman's Social cognitive model
- Pintrich's SRL framework

2.3.5.1 Winne's Four-Stage SRL Model

Winne's model has four stages. In this model, SRL is considered a combination of both an aptitude and an event. The model was presented by Winne and his colleagues (Winne & Hadwin, 1998). This model termed SRL as predominantly an event, and as a metacognitively guided behaviour. In this model, SRL includes four stages. All the four stages share the same cognitive basis. This model is also shown in Figure 2.2:

- *Stage I - Task Definition*: Here in this stage, the student gets the task defined, she gets complete task perception. The student also gets to know what all resources are available, and what kind of constraints might be faced during the course of learning. This task definition leads the students to formulation of goals of the learning process. Task definition is also related to those perceptions of the students participating in this form of learning which they have about the task. This perception of the student,

realized in the form of her perceived goals, may be aligned with the desired end of the teacher or the text.

- *Stage II – Goal setting and Planning*:The goals set initially in the first stage are stressed. Here in the second stage, the students may feel the need to re-adjust the already set goals if the need is felt for the readjustment. This re-alignment of the goals is carried out if some discrepancy is sensed. After the finalization of the goals, planning is carried out for the attainment of the goals. This planning is based on the type of learning involved. The requirements of different lessons are different. Planning is based on the specific needs and requirements.
- *Stage III – Enacting Tactics and Strategies*: The plan which was formed in the previous stage is enacted in the third stage. During the adoption of the tactics and strategies, the student is also engaged in a sort of evaluation to judge whether the strategies are effective for the successful execution of the plan. In this way, the student may bring some required changes in the tactics. Winne and Hadwin (1998) find that these changes which are as per the needs, are very helpful in enabling the learners to grasp the contents of the learning task. In this case, the student will be cogitatively engaged in searching for some solution or alternatives, failing which she may opt to quit the assignment.
- *Stage IV* is devoted to *metacognitively adopting studying techniques*, with due consideration to future needs. Basing on the experiences of the three stages, the student, in the fourth stage will make changes to her cognitive structure. Future learning will also be affected by this newly acquired learning. Here the student is involved in deliberation about the outcomes

of the previous stages and brings required changes in personal understanding about the learning process. Moreover, student thinks beyond the present and her learning in the future may also be adjusted accordingly. If sufficient motivation exists, student may also adopt the tried strategies for future learning as well.

Figure 2.2. Winne's SRL Model

The essence of this model lies in being recursive in nature. Every stage is expected to augment the conditions of the next stage. Conditions operative in a stage not only have their role in their own stage but lay foundations of the work to be undertaken during the next stage as well (Winne & Hadwin, 1998). It can be assumed that actions in a stage will have some certain effect on the stages to follow. Furthermore, it is assumed that learning processes will generally proceed stage-wise, from stage 1 to stage 4, so it will follow a general pattern. This pattern

is normally found to be sequenced. Puustinen and Pulkkinen (2001) found that the environmental factors affect the learning during different stages. The mix of such environmental factors and cognitive information will create suitable platform for any future cognitive activities.

Winne introduced a five-stage interlinked scheme of actions or activities which characterizes the SRL process. The stages are to be studied in the light of the same five aspects. Winne and Hadwin (1998) introduced a general structure mentioned as COPES. The elements of this structure are: Conditions, operations, products, evaluations and standards. Conditions in this paradigm include the details of the environment in which task is being undertaken. These are physical and cognitive conditions which are related to the task. Availability of resources, time and any constraints are part of the physical conditions. Next in the process of COPES come operations. When an individual is engaged in a learning process, she adopts some strategies and plans to carry out the learning. This operation is at the cognitive level. The learning outcomes are the products. These products are required to be in line with the objectives initially set for the process of SRL. The products range from internal to external. Their internal or external feedback forms the basis of over-all evaluation of the learning process. At the end of this general structure, come standards or criterion to monitor the products. Winne's model is based on an elaborate metacognitive monitoring process. If any difference is witnessed between the products and the set objectives or standards, it is identified. The feedback thus attained can help in adopting any future course (Butler & Winne, 1995; Winne & Perry, 2000).

2.3.5.2 Zimmerman's Model

Zimmerman was one of the first SRL authors (Panadero, 2017). His model is a four-stage process which was jointly presented by Zimmerman and Kitsantas (2005). Zimmerman's process of SRL is cyclic in nature. This model of Zimmerman is based on Bandura's (1986) social cognitive theory, so this can also be described in short terms as a social cognitive model. According to this model learning performance and behaviour consist of both cognitive and meta-cognitive activities (Kroop et al., 2015). In its true sense, this model terms the learners who are learning through self-regulation as active participants of the process of their own learning. Zimmerman (1986, 1989) defined that the students would be self-regulated, when they become active learners in the domains of metacognition, motivation and behaviour. Learning in SRL mode is significantly bifurcated into the personal, environmental, and behavioral domains. Zimmerman (1986) called this distinction in learning modes as 'a triadic analysis of self-regulated functioning'. Three personal factors of SRL include self-efficacy and individual's perception of performance (Kroop et al., 2015). Here self-efficacy is related to learner's belief in her own capacity to get engaged in SRL. In this way, factor of self-efficacy is greatly significant in SRL process because through it, the learner will develop belief about own personal capabilities. This belief will make the achievement of learning goals possible. Yamada et al. (as cited in Yamada et al., 2017) indicated that self-efficacy has a significant co-relation with students' learning behaviours.

Now coming towards the environmental domains and their role in learners' learning through SRL. Social guidance, feedback and patronage by the peers help the students who are learning through SRL to learn related skills and

strategies rapidly. Verbal description by teacher and modeling can also be greatly beneficial. In the first stage, imitation is done following a model and learner emulates such model in SRL. In the next stage of this learning, the learner is able to use self-regulation independently by internalizing this process. Next level of self-regulatory skill, in Zimmerman and Kitsantas' (2005) model, occurs in more complex situations when learner tries to control surrounding situations and improve own competencies.

Researchers of SRL have grounded it in a socio-cognitive action, embarking mainly on the above-mentioned learning domains, i.e., metacognition, motivation and behaviour. Moreover, SRL is not carried out in isolation. Here the learner is not involved in learning in an isolated setting rather she would need social assistance and help from different knowledge data-bases. Zimmerman discussed social cognitive view of SRL in detail and highlighted its three sub-processes which are listed as: Self-observation, self-judgment and self-reaction (Zimmerman, 1989). Social learning initiates this form of learning. Thus, this SRL involves individuals who are active learners and obtain social inspiration for their learning. The research conducted by Zimmerman has finally focused on motivation (including work on self-efficacy) and strategy (consisting on development). He has elaborated the concept of SRL in four interrelated processes (Zimmerman, Bonner & Kovach, 1996) that are defined below:

- Learner carries out self-evaluation to record her performance during the current phase of learning. She monitors and records personal effectiveness of existing learning out-comes viz-a-viz previous performances and outcomes.

- After the self-evaluation, the recorded observations are analyzed. The learner sets the goals and detailed planning for the achievement of those specific learning goals is carried out. Refinement in the strategic planning is also done, keeping the goals in perspective.
- Now the execution of finalized strategic planning is to be carried out. This implementation is done with due consideration for the contextual perspective. This is strategy-implementation monitoring. Here the students keep track of the strategy they are adopting and keep record of their monitoring closely. With more practices, they learn to follow the strategy in a spontaneous fashion. Sometimes, it is found in implementation monitoring that the strategy adopted is partially able to achieve the desired SRL. In this case, the teacher will ask for partial adjustments in the technique.
- Next comes strategic-outcome monitoring. Keeping in view the objectives, the learners monitor the outcome in the perspective of the goals and determine effectiveness of the process. The performance outcomes are evaluated to judge the effectiveness of the whole exercise. However, it must also be taken into consideration that effectiveness of a strategy is directly linked with and is affected by many elements. Self-monitoring of the outcomes is necessary for the attainment of SRL. Through this process, corrective cognitive, behavioural and emotional results are monitored effectively. In contrast, sometimes the students are unprepared for negative learning outcomes. For them any kind of failure in learning is perceived undesirable and failure in achieving learning goals

might impact negatively, resulting into withdrawal from the learning process, or indulging into helplessness.

Figure 2.3. Zimmerman Model of SRL

Traditionally, the role of teachers in class room has been to emphasize specific contents, track goal-achievement, monitor students' progress, and modulate the class learning pace. But in SRL the role of teacher is different than usual. In classes where SRL is being followed, more responsibility of the learning is shifted to students. The role of teacher is more of supervision. She assists the students to identify and set the learning goals, and choose strategies for the achievement of those goals. The students who are involved in SRL are encouraged by their teacher to self-analyze their learning process and outcomes. Zimmerman et al. (1996) consider that the teacher is also expected to emphasise and show self-monitoring to the students while teaching self-regulatory techniques so that they get a fair idea about it. The teacher may adopt strategy-selection procedures, by modelling the self-monitoring for the students, who will

thus be able to refine their strategies in the light of achieved results. Lastly, one most important technique adopted by the teacher is the encouragement being provided to the students to self-monitor their progress in learning. This self-monitoring will assist them to later refine their self-regulatory strategies. The teacher focuses on individualized learning need of the students, and acts like coach (Zimmerman et al., 1996). She facilitates SRL among the students so that they can take responsibility of their own learning. Feedback is also provided to the students once the learning session is over so that students may apply any corrective measures. Through teachers' guidance, students can monitor their use of strategies related to self-efficacy while they are trying to attain their learning outcomes (Zimmerman et al., 1996), and to learn more ways of time and other resource management. The time management techniques may include fixing regular study periods, prioritizing the tasks, avoiding distractors and setting realistic goals as far as time allocation is concerned. Effeney, Carroll and Bahr (as cited in Broadbent & Poon, 2015) call it ability to plan study time and tasks. Students generally have poor sense of time management. Teachers can assist them in this regard.

2.3.5.3 Pintrich SRL Model

Pintrich's model of SRL is termed 'general framework for SRL'. It is called a framework because, unlike other SRL models, it is in the form of a table. Pintrich's work on SRL is mainly characterized by the theme of motivation which is directly linked with adoption of learning strategies. This model by Pintrich consists of most comprehensive set of SRL strategies (Broadbent, 2017). One common aspect has been viewed in all SRL models. These models consider students as active learners, who formulate goals for learning, adopt suitable

strategies and monitor their progress. It is assumed by Pintrich that learners are in a position to effectively monitor their cognition. They can also monitor and control their personal level of motivation for that learning task. Same wise, they can potentially monitor and regulate their bahaviour related to the task. Some features of the environment where task is being undertaken can also be controlled by them. This monitoring, control and regulation is limited in nature and context-specific only. It does not mean that learners are in total control of their self-regulation; rather monitoring, control and regulation are limited in time and scope (Pintrich, 2004). In these models, efficacy of the learning process is judged against some goal or standards.

According to this framework, SRL is based on four phases. In each phase, four areas discussed below cover the self-regulatory activities. Most of Pintrich studies reflect that he is mentioning a self-regulated learner who is sufficiently motivated. He dilated upon students' motivation and found relationship between students' motivational level, SRL and their academic achievements. Four stages of Pintrich framework for SRL are discussed below. These stages are in time-order:

- Phase 1 (Forethought, Planning and Activation) is related to planning of the learning task and goal setting. The learner here gains knowledge of the task, awareness about the circumstances, and perceives own personal traits in relation to the task required to be performed. The planning carried out at this stage helps in execution at later stage. The goal setting is also part of the first stage. The already held knowledge and perception of the capabilities, circumstances and related context are also activated.

- Phase 2 (Monitoring) is metacognitive monitoring by the learner of own self, of task and context. These are three vital phases for the completion of the task. In the second phase, metacognitive awareness of the three components is performed. After monitoring in second phase, now the learner moves on in the next phase.
- Phase 3 (Control) is related to learner's efforts to gain control of the process of learning. She is involved in efforts to control the learning activity and regulate aspects of own self, task and context. Control phase is more related to the actual execution. Here efforts are made to control the learning process through various elements related to self, task or context.
- Phase 4 covers various reactions and reflections in these three domains. In this self-evaluation or reflection, the learner keeps the learning goals or some other standards like another person's performance in mind and views her present performance in perspective.

The Pintrich model of SRL considers that students of universities are not passive participants of the learning process, rather they are constructive participants and active learners. The same assumption is also held in other models of self-regulation (Pintrich, 2000b; Zimmerman & Schunk, 2001). These models also share a common assumption that students learning through self-regulation can potentially control their learning activities and are able to make choices during the process. Thirdly, most of the SRL models agree on the presence of pre-defined goals. These goals are set as per the needs and other environmental factors. Next is the need of some standard against which the students would assess their performance in the learning process. One more commonality in most models or SRL is the assumption that self-regulatory processes will judge the

performance in the light of students' potentialities and skills. Pintrich (2000b) considered that this model would assist the researchers to carry-out some detailed analysis of the process of SRL and influencing factors. The main focus of research conducted on SRL by Pintrich and his colleagues have been primarily on cognitive and motivational processes. Pintrich, (2000b); Zimmerman and Schunk, (2001) have found that this framework presented by Pintrich is quite relevant for investigating into SRL being practiced by students in academic environment. Thus, it is useful to study the SRL by university students. This model includes diversified factors related to learning being focused in students of higher learning. It also includes different related processes, covering some complexities of self-regulation in such learning environment. Focus of this model remained on individual, contextual and environmental elements, in connection with students' learning.

Pintrich and his associates developed a questionnaire termed as MSLQ. It is a self-report questionnaire (Pintrich & Groot, 1990). The MSLQ approaches SRL as an aptitude and targets students' perception of their current competences of their SRL skills. Each guiding question reinforces the respondent to think and reflect about the learning process that she followed. The researchers started developing the MSLQ in the early 1980s. Many studies were done on it to ensure its validity and reliability. In 1991, this questionnaire was finalized in its present form (Pintrich et al., 1991). Several significant studies used MSLQ for collection of data. Barnard-Brak, Lan and Paton (as cited in Fontana et al., 2015) found that in formal education, MSLQ has proved useful in providing reliable measures of SRL behaviour. The scales of MSLQ are modular and it is appropriate for the needs of teachers and researchers (Pintrich et al., 1991). Pintrich et al. (1993)

found the scale reliabilities to be robust enough to gather data on the subject, in order to conduct research thereof. There are two sections in this standardized tool. The first section includes sub-sections to measure students' motivation level during SRL. This motivation in this learning task is related to learners' drive to work for the achievement of those learning goals which have been designed for the process. It is a mental state or a condition in which the learners 'activate, sustain, and maintain behavior' (Pintrich & Schunk, 2002) for a specific learning task, in a pre-defined context. Dweck (1999) and Nicholls (1984) are of the opinion regarding motivation for learning that it is also an attempt by the students to put in efforts, overcome hurdles, and persistently exercise self-efficacy, to engage themselves in achievement tasks.

MSLQ is a research instrument which has been used widely to measure SRL of the students (Pintrich, Smith, Garcia & McKeachie, 1993), because of one reason that, while measuring students' actual performance, this instrument shows reasonable predictive validity. Covering all these sections and sub-sections of SRL, this questionnaire consists of 81 items. Two main categories of the questionnaire have been further divided into sub scales:

Listing of Motivation Scales

Motivation has been an integral part of many theoretical frameworks. Motivation here is a learner's internal drive to achieve her learning task. Motivational scales have three components, which are value, expectancy and affective components.

- **Value Components**. The value component is related to goal orientation and valuing the task. The goal orientation takes place in intrinsic and extrinsic domains.

Goal Orientation. Goal orientation is related to students' perceptions about the nature of job and their comprehension about the reasons to engage in it. Intrinsic goal orientation occurs when the learner takes mastery, curiosity and challenge as some of the reasons to participate in a task. The learner participates in a learning task for its sake. With intrinsic goal orientation, she will take real interest in the learning process. Dweck and Leggett (as cited in Taylor, 2012) find that such higher level of interest will result into enhancing subject matter knowledge.

Now coming over to *extrinsic goal orientation*. This goal orientation works on external factors or reasons, e.g. to outperform others in competition or to achieve good grades or appreciation (Middleton & Midgley, 1997; Pintrich, 2000a). It also refers to the general orientation of the learning task. It also includes understanding of resource constraints and contextual circumstances. Same wise, awareness of any punishment or reward also plays its role towards this extrinsic goal orientation.

Task Value. It is learner's valuation of the learning task. It is also her perception, in that how significant or relevant the learning task is (Taylor, 2012). She is also concerned about the level of utility attached with the task being undertaken. This task valuation will be based on learner's need perception. This need perception is evolved due to multiple internal and external factors.

- **Expectancy Components.** This component of the motivation scales deals with learners' expectations from the learning process.

Control beliefs and self-efficacy are part of the expectancy components.

Control Beliefs. It concerns with students' belief about the positive outcome of their efforts towards realization of the goals. When the learners have belief that through hard work, they can achieve better grades, then they are likely to study more and harder. It is also similar to 'locus of control' (Taylor, 2012) because it depicts learner's perception about control over her learning task. Bandura (as cited in Taylor, 2012) explained control of learning beliefs where learners' have control over their motivation, cognition, behavior and affective domains.

Self-Efficacy for Learning and Performance. This aspect is two pronged. According to Pintrich et al. (1993), it deals with learner's expectancy of performance in the learning task and self-efficacy. In the performance expectancy, the learner expects to achieve success. Self-efficacy is belief of an individual about successful execution of a task at desired level (Bandura, 1986).

- **Affective Components.** Affective component involves students' reaction to the assigned task. It is not a simple process. These affective reactions to a situation are not voluntarily and cannot be explained fully on the basis of what a person thinks or believes.

  Test Anxiety. Test anxiety refers to an individual's unpleasant feeling which is clearly manifested while taking a test (Pintrich et al., 1991; Zeidner, 1998). Such anxiety could have some known and unknown repercussions, and the outcome of this test anxiety might be

or not be limited to a particular test. This anxiety is divided into two parts, i.e. cognitive and emotionality component. Both kinds of anxiety will need separate set of handling practices.

Listing of Learning Strategies Scales

There are two main sets of strategies in learning strategies scales. These are cognitive and metacognitive strategies, and resource management strategies. These strategies are discussed below:

- **Cognitive and Metacognitive Strategies.**

  Rehearsal. Here learners recite or say over the desired information again and again to make it part of working memory. It is a simple learning technique which has nothing to do with long-term memory. It is learning by repetition (Effeney et al. as cited in Broadbent & Poon, 2015). So, with the adoption of this strategy the learner can not relate a newly confronted information with some already acquired bit of knowledge (Pintrich et al., 1991). This rehearsal will enable the learner to grasp few such details of the content being learnt which are apparent and easily comprehensible.

  Elaboration. It is a comparatively higher skill of learning where learner summarizes or paraphrases the content being learnt. Richardson et al. (as cited in Broadbent & Poon, 2015) explain this concept as the ability to fuse new and existing information for remembering new material. In this way, the learning material is made part of the memory. The learner here can make use of the long-term memory for storage of information. Connections with previously

acquired learnt material can also be made. The learnt material acquired through elaboration will become permanent part of the memory, and through rehearsal, its utility is enhanced.

Organization. Organization of ideas during the learning activity is considered as a complex learning technique where learner is not only deeply involved in the learning activity but she is connecting key ideas. Out-lining, mapping and selecting/ highlighting main idea from a paragraph are examples of this form of learning (Pintrich et al., 1991; Taylor, 2012; Effeney et al. as cited in Broadbent & Poon, 2015).

Critical Thinking. This form of learning strategy is employed as an application strategy. In critical thinking, learner is able to apply previously attained knowledge (Richardson et al. as cited in Broadbent & Poon, 2015) in some new situation. Here learner is able to analyze the content material and then she is able to apply her reasoning and can reflect in detail.

Metacognitive Self-Regulation. In metacognition, a learner has control of her learning process. This metacognitive SRL consists of three main processes (Pintrich et al., 1991): Planning, monitoring and regulating. It encompasses learner's awareness of details about the cognition involved in the learning activity.

- **Resource Management Strategies.** Resource management is also significant for the learning process. The learners are required to manage the available resources, beside the learning techniques. This

aspect of learning is important for the successful completion of the learning process. Better managed resources will assist in increasing the learnt material. For better management of the resources, complete listing of such resources will be required. Resource management techniques elaborated in MSLQ are listed below.

Time and Study Environment. The learners are required to use the study environment in a way that distractions are removed and study environment is conducive for the completion of the learning process. In time management, the learners make use of the study time by effectively planning and scheduling the study time.

Effort Regulation. Effort management on the part of the learner is needed for achievement of the goals set for the learning process. It is a conscious effort by the learner to remove distractions and difficulties, handle failures, and work toward achievement of the goals. Richardson et al. (as cited in Broadbent & Poon, 2015) term effort regulation as the capacity to persist when confronted with challenges.

Peer Learning. Coming in contact with peers for discussing content to be learnt is peer learning. Peer learning is also getting help from peers to clarify course contents and using class-mates and friends to clarify the academic concepts (Jones, Alexander & Estell, 2010; Taylor, 2012). Peer learning also assists in gaining more pragmatic solution to problems being faced in the professional environment.

Help Seeking. It is an ‘adaptive learning strategy’ (Taylor, 2012) where learners manage the support of their peers, instructors and

textual material. By optimizing upon such resources, learner is able to overcome her academic impediments (Richardson et al. as cited in Broadbent & Poon, 2015). This help is also beneficial to give confidence to the learner to tackle new situations. The help seeking should precede by need assessment.

2.3.6 Self-Regulated Learning Factors

Motivation is a factor which is significant for students' academic achievements. Motivation of the students highlights their tendency of higher goal setting, pursuing the goals with greater urge, eagerly devising plans and tactics, and purposefully evaluating their SRL. Pintrich and Schunk (1996) consider that motivation affects performance of the learners and the way they learn it. Research conducted lately has focused on the inter-relationship of motivational factor, goal setting and use of self-regulation by the learners. McWraw and Abrami (2001) conducted a research to ascertain the relationship of motivation and goal orientation, and their relationship upon the SRL. Thus, it appears to be a reciprocal relationship. Through the presence of motivation, the learner will be inclined to the use of such learning strategies which will enable him to achieve desired results.

Self-efficacy is another important factor in SRL in which learner has certain belief in her own self, in own capabilities, which compel to act as per desired standard. Self-efficacy is main regulating force of motivation and learning-specific actions of the learner (Bandura, 1997). Self-efficacy forms the students' perception towards learning which they prepare themselves to undertake. Through it, the students decide on their course towards certain action. Schunk (1990) feels that it is the factor of self-efficacy which determines the

choices of activities, effort, persistence, and achievement, which are made by the students. Bandura (1986) has linked self-efficacy with students' achievement. In this case, it can be assumed that, it would reduce in case of falling achievement level of the students who are undergoing SRL. This reciprocal role can be applied to other phases or steps involved in SRL. Zimmerman (1990) felt that higher self-efficacy will compel the students to set more challenging goals for themselves. Thus, they will be engaged in activities which will enhance their learning. To Elliott and Dweck (1988) it appeared that self-efficacy links goal orientation of the students with their academic achievements and is directly linked with SRL of the students.

Achievement of goals is another factor which mediates between the learner and her motivation. The desire to achieve goals enables the student to have higher degree of self-efficacy. Goals help the students to determine their direction and pace to move in that direction and monitor their progress. Goals have social relevance so surrounding have definite impact on goals setting. Locke and Latham (1990) explain that goals are external to the learner, and learners deliberately try to achieve them. Goals or defined standards act like guiding principles for them, and they can indulge in self-evaluation regarding their current task performance in the light of those goals (Bandura, 1986; Locke & Latham, 1990). Goals can better guide if these are precise, clear and relevant. Goals setting general terms will not be quite helpful. Goals are linked with expected outcome. Higher skill acquisition is directly linked with achievement of the goals (Schunk & Swartz, 1993).

2.4 Teachers' Professional Development and Students' Learning

Teachers' PD has direct impact on different aspects of the class-room practices. These effects range from class-room environment, communication to practices and students' achievement level. Darling-Hammond, Hyler and Gardner (2017) also derived that the students whose teachers had gone through PD instances, showed higher learning achievements. Many research projects, some given in succeeding paragraphs, have been undertaken to study the effect of teachers' PD on their class-room practices.

A study was conducted by Adornetto (1999) to uncover the best PD practices for improved students' outcomes. This study emphasised on the need that teachers in an institution should have common approach towards the need of PD, and its requirement for improving students' academic achievements. Shared beliefs amongst the teachers towards improvement in professional practices become powerful agent of change. This study also quoted report of NCTAF (1996). The Commission's report made a recommendation that PD of teachers should become a regular part of their routine, meaning by that it should be continuous in nature. It can be made permanent and effective if no long breaks are observed in between the sessions of such professional training. Peer coaching, study groups and research are few of the techniques towards this end. Adronetto (1999) also discussed Lieberman's classification of CPD. He considered 'learning out of institute' as a newer form of CPD which gives room to the teacher to learn in her own area of interest. Adronetto laid greater focus on learning by the students in an institute which should become the objective of all improvements being undertaken, and all instances of PD of the teachers. So, institutional activities would be focused on the learning aspects of the learner. The learner becomes the prime focus. It has been recommended in the study that specific plans at institutional level have to be drafted to bring improvements in teachers' professional practices which will then ultimately lead to

students' learning. Continuous nature of such plans would make them effective. The research has found that success of an instance of teachers' PD can not be measured by its duration or attendance, but how far it played its role in enhancing participating teachers' effectiveness in class-room, would determine success of such programs of training. Availability of resources has also been highlighted by the researcher which would make it possible to broaden the opportunities for teachers' professional growth. More focus in this study has been assigned to collaborative relationship to be adopted by teachers to learn from interaction. Through this interdependent approach, they become 'teachers of teachers'. Moreover, this study elaborated the need of a well-coordinated, planned and intensive type of sessions of teachers' PD which will contribute towards better and improved learning of the students.

Flecknoe (2000) studied the role of CPD of teachers in raising students' academic achievements. Through interviews of teachers who had participated in a training program, it was found that 80% of the teachers who had attended the session reported improvement in their students' achievement level. The researcher talks about 'affective gains' and 'cognitive gains'. He considers teachers as researchers who continuously pursue research in analyzing their teaching activity succeed and arrive at the best decisions. This research by the teachers would make difference for the students of their classes. Such research-oriented practices by the teachers brought changes in their class-room practices also, in a way that, after the training sessions, the teachers were able to use data to know their students, set academic goals, and raise cognitive level of the students. Flecknoe (2000) goes on to mention that through the study, it was also revealed that such teachers brought improvement in affective domain of the students by bringing change in their self-esteem, out-look and behavior. Teachers also, in the interviews admitted that their participation in the programs enabled them to achieve such cognitive

and other improvements in their students. However, through chi square, the researcher found that no significant impact on the outcomes of CPD programs was caused by gender difference. The collected data revealed that participation in the training sessions did bring some positive change, either in academic achievement and behavior of the students, or professional level of the teachers (Flecknoe, 2000, p. 455). Such changes were also found to be linked with the duration of the training sessions arranged for the teachers. It has also been concluded in the study that 'teachers as researchers' can be better placed to bring improvement in students' achievements.

Another study was conducted by Supovitz, Mayer, and Kahle (as cited in Supovitz & Turner, 2000). This study analyzed the professional attitude of those teachers who participated in Ohio's Statewide Systemic Initiative in science and mathematics. The teachers in this study participated in a 160 hours inquiry-based training session. Supovitz and Turner (2000) found that this professional development cast significant and noticeable impact on the outlook and attitude of the participating teachers, in a measurable form. The perceptions and attitude of the teachers who had undergone the training session changed significantly towards their class-room practices and other professional domains. The nature of the changes was not temporary. It was found that these changes related to perception and actual class-room practices continued to exist for several years after the teachers' exposure to the sessions of PD. These changes ultimately had positive impact on the learning level of the students. So, more sessions in specific domains were recommended in the study.

Teachers participate in number of training modules which form part of their CPD. Powell and Terrell (2003) considered that teachers' perceptions about effectiveness of such CPD instances play a role in their success. They analyzed such perceptions at individual, class-room and organizational levels. There is a growing interest in

monitoring the progress and outcomes attained through participation in CPD programs (Powell & Terrell, 2003). This rising interest in this evolutionary approach gave rise to the challenge that 'demonstrable performance' by the teachers must be achieved as a consequence of their participation in PD. Like an outcome of study by Flecknoe (2000), this study also revealed that impact of CPD can be in two domains, i.e. students' learning level on one hand and, improved teaching standards on the other. The study findings quoted most of the respondents (n = 49) believing that their students were getting better grades after they (the teachers) had attended PD. Improving learning of the students, as stated by Bolam (2000, p. 278) is 'ultimate aim of CPD'. It was also a perception that CPD helped them in dealing with issues like improving their class-room skills, exploring arising issues and having extended professional interaction with their peers. They were also able to be reflective in approach and become effective teachers. Amongst the practices of within the institution CPD, forty of the respondents considered peer learning as the most important.

Sieveke-Pearson (2004) conducted his study to analyse the relationship among teachers' learning acquired through PD, changes in their class-room practices as a result of PD and changes in their students' learning. PD is termed in the paper as a 'promising approach' which becomes the cause of continuous growth in professional profile of a teacher. The researcher highlighted that normally PD of teachers is made limited to in-service training or some workshops. He then makes endeavour to remove this misconception by quoting a number of studies in this regard. Hirsh, Robb and Guskey (as cited in Sieveke-Pearson, 2004) widened the scope of teachers' PD by including those activities in it which could bring knowledge based and skill-oriented changes. Teachers are required to pursue professional learning throughout their professional lives. However, Sieveke-Pearson (2004) considers that a lot many inter- and intra-personal factors or

variables are at work in the learning process that it is difficult to establish any clear causal relationship between the teachers' professional training and students' learning. It was revealed through the study findings that the teachers were actively engaged in the professional development activities, and they held positive perception about the relationship between their PD and achievements of their students. They, very willingly, integrated their professional learning with their actual class-room practices. It has also been found as a result of the study that it was not simply PD but quality professional development of the teachers which impacted their use of different strategies in teaching. The researcher also found that it was not only students' achievement which was the outcome, but this achievement could be further utilized to make effective and relevant changes in PD practices (Sieveke-Pearson, 2004, p. 168). When the teachers changed their strategies related to imparting reading skills, in the light of PD, the students indicated positive change in their learning level. So, such was the significance of teachers' PD.

Fields (2005) studied the effect caused by quality PD of the teachers on students' outcomes. The researcher found that PD of the teachers will improve the quality of the teaching practices. These improved teaching practices bring positive changes in the institution learning environment, and achievement level of the students is also improved in quality. It has also been found that such changes in learning environment will produce positivity in the general atmosphere of the educational institution, which will in turn enhance productivity. This improvement was found visible in results of the students in different academic subjects also. This study by Fields concluded that PD practices would have positive results if these continued for extended time span. This extended form of professional development is also termed as CPD which is aimed at bringing more of a comprehensive and lasting nature of change in teaching practices adopted by teachers. It

is not merely adoption of new techniques, but rejection of prior approaches (Kennedy, 2016). The researcher found that though researches have been conducted on topics such as PD, school culture and students' achievements, yet these were in isolation. The study also found that there was no direct relationship between quality PD of the teachers and students' academic achievements. One of the study findings revealed that PD of teachers had direct impact on the quality of instructions, meaning by that teachers improved in their class-room performance after going through sessions of PD. Same wise, quality professional training of the teachers had positive impact on the institution culture. The same finding led to the assertion that such PD is if carried out continuously, will bring more permanent kind of change. Rarely researches had been conducted to see the relationship of these. It was recommended in the research that studies could be conducted to analyse the impact of PD of teachers on students' achievements over 2-3 years of time, to obtain better evidence of such perceived impact.

Turner (2006) investigated the effects of teachers' PD on motivation of their students, and the study found a correlation between these two. In the premise, the researcher asserts that academic achievement and motivation are inter-woven concepts. This interaction between these two has also been termed as 'attribution theory' (Slavin, 2003). Hawley and Valli (as cited in Turner, 2006) termed PD of teachers as of greater significance for keeping abreast with latest knowledge base, and to gain awareness of students' learning needs. The motivation of the students is directly affected by the actions of the teachers (Cocks & Watt, 2004; Urdan, 2004). The researcher of the study has quoted Darling-Hammond (2000) stating that over two hundred studies had found positive relationship between teachers' sufficient content knowledge and PD, and students class-room performance. However, in this study it was found that teachers faced a severe problem in the form of lack of motivation, and further professional training for

the teachers was suggested in the domain of motivating the students. Due to limitations of the study, true picture of the impact of PD of teachers on motivation of the students could not be ascertained. In this study, the researcher found that teaching experience was not a significant factor in teachers' perceptions about PD. In addition, teachers' gender was found to be a significant factor in shaping said perception of the teachers. This research also identified some specific areas of interest relating to student motivation, teacher gender, and subject area taught that are in need of further research.

Harutunian (2007) studied the impact of PD of the teachers on their English language learners. In case of teaching a language, in addition to other instructional requirements, a teacher is required to gain insight of socio-cultural and linguistic background of the students. Professional training enables the teachers to understand the need of acquiring information about the students, which then helps in smooth conduct of class-room practices. The researcher in his study adopted case-study approach to analyze the effect of PD of teachers on the learning of the students. It was found in the study that teachers, after going through the training were able to get more awareness about hurdles which students were facing in the learning process, like in understanding the course contents. The teachers who had gone through PD, gained better understanding of needs of the students in the domains of class-room learning, and their socio-cultural needs as well. So, instructional needs of the students were better addressed by their teachers. The teachers were now equipped with special skills to understand the specific needs of the students with relation to their understanding of English language, like lexicon building, comprehension, translation, etc. It also emerged as one of the findings of the study that training sessions of the teachers are sometimes constrained by paucity of available time for actual contact between trainee teacher and mentors (Harutunian, 2007, p. 190). As final analysis, the researcher reported the respondents that as a result of their participation

in PD, they could avail deeper understanding of students' personal, socio-lingual and academic aspects. As a finding of this study, it emerged that paucity of available time for the PD activities was a hurdle in teachers' acquisition of this professional training. It was also a finding of the study that, as a result of participation in professional training, teachers made effort to gain information and feed-back about the academic needs of their students and, they brought changes in their instructional methodology basing on such feed-back.

De Vries et al. (2014), in his article, also analyzed teachers' perceptions about effect of CPD on their learning and teaching. They start with the premise that CPD of the teachers has a learner-centered perspective. During professional training, the teachers are made conscious about the problems which could arise in class-rooms. So CPD of teachers has direct link with the learning of the students. Reflection by the teachers is an integral part of this form of teachers learning which assists them to enhance theoretical base of their knowledge, respond to issues in societal context, and get more control over activities in class-room. De Vries et al. (2014) also favored collaborative aspect of the CPD activities which take place within the institute and outside as well. This collaboration with the peers and other professionals in the field will be instrumental in improving teaching and learning. It is also a medium for obtaining feedback which can then be utilized to improve practices. The study quotes Schommer (1998) theory which described how people's perceptions about their knowledge and learning affected their practices in actual teaching. One example is, teachers with learner-oriented perspective believed more in collaborative interaction with their peers as compared to those teachers who were subject matter-oriented. A learner-centred teacher will enhance cooperation with her peers to benefit from their experiences, and to benefit the students in diversified manners. In the same sense, De Vries et al. (2014) recommend that collaboration with

peers can help to identify issues in class-room practices which can be analyzed latter through action research.

Jackson (2014) dealt with three areas of professional learning: content, process and context while exploring relationship between teachers' PD and learning of the students. Basing on these three areas, the dominant characteristics of teachers' professional training include: research based, aimed at improving students' achievements, feed-back oriented, and in line with curriculum-based and institutional goals. While explaining the process of PD, the researcher has discussed its collaborative nature, with focus on improvement in teachers' pedagogical skills. The researcher also discovered through the literature which was reviewed in this study that through collaborative PD, on one hand, the instruction of the teachers was improved, and secondly, the teachers could attain professional growth. Earlier it was limited to single-day workshops, but now it has taken form of more rigorous form of activities encompassing continuous type of professional activities (Jackson, 2014, p.62). Significant relationship was found by researcher through pearson-correlation between teachers' PD and achievement of their students. Although, in this regard, the research found that the relationship between PD and students' achievements was not uniform in case of all subjects, so this relationship is not clear. The study recommended that further studies might be carried out to analyze relationship between teachers' professional development and other areas of students' learning. Reforms in areas related to teachers' PD have also been recommended to bring qualitative improvements in training of the teachers. The ultimate goal of such training of the teachers is to bring improvements in learning of the students. Steps are required to be taken at institutional and governmental level to bring meaningful changes in the practices. This study provides analysis of the PD practices in the domains of content,

process and context only. Through it, the policy makers and management can get guidance to make the teacher training more effective and relevant.

The impact of teachers' perceptions about the effects of CPD on their class-room practices has been focused since quite some time. Hinsley (2018), in his study has restricted PD to formal in-service training. He talks about the existence of empirical evidence regarding direct effect of teachers' PD on learning of their students. So, there is a direct and positive relationship between these two. Focused, purposeful and intensive PD of the teachers will assist them to gain control of the class-room teaching and improve their subject-matter knowledge, and as a result, improve students' academic profile. The study has quoted Yoon et al. stating that PD of teachers has significant impact on teachers' methodology of knowledge dissemination and on students' achievement level. The researcher is of the view that till 1990s, the concept of PD was mainly restricted to teacher workshops or single topic seminars. But then number of events emerged which can be regarded as PD opportunities. Joined together, these practices can increase teachers' capacity and students' learning. The study findings are significant in a way that these directly link teachers' perceptions about PD with the academic achievements of the students. The teachers who had undergone the training opportunities were able to incorporate the learnt practices into their class-room practices. The researcher is also of the view that PD instances should be an integral part of teachers' professional lives. A positive relationship was perceived between teachers' involvement in PD programs and their freedom in selection of such programs.

2.5 Summary

PD of teachers is a crucial component to improve education. It is a concept which has attracted much attention of theorists, practitioners and other stake holders. Mukan et al. (2019) termed PD of teachers to be a phenomenon having cultural and social

dimensions, and it continues for deepening of their knowledge. The need of relevant PD is always felt, and it remains a life-long process, as emphasized by Fullan (1991). Teachers' PD brings significant changes in their out-look, professional competence and over-all personality. Enhancement in all these will result into professional development, which is then considered to produce better teaching in class-room. It will be instrumental for high achievement of the students. It is not merely adoption of new techniques, but rejection of prior approaches (Kennedy, 2016). So, positive contribution of PD is undeniable. Mukan et al. (2019) consider effective and relevant PD of teachers to be instrumental in improving learning outcomes of the students.

CPD is not one dimensional. Diversity in its nature adds to its efficacy. In this way CPD has become a multi-pronged process which is not limited to sessions of formal training or courses. In the national context, CPD has diverse view in terms of mode of conduct, frequency and its spatial context (Mukan et al., 2019). Here CPD includes in-service formal training, workshops etc and teachers' informal, and sometime formal, interaction with their surroundings, including interaction with other institutes. Anderson et al. (2000) considered CPD as, 'an ongoing process which is led to enhance work satisfaction, extended work-relevant competencies, the attainment of professional goals, and it leads to positive development.' CPD has often been made limited to formal training and coaching, however Day (1999), Cordingley et al. (2003), Fraser (2005), Avalos (2011), Clark and Hollingsworth, Ling and Mackenzie, and Craft (as cited in Asmelash, 2014) have highlighted that this is a limited and formal interpretation of the concept. Day (1999), while covering more aspects of the notion of CPD, asserted it to be covering planned learning experiences and those which occur naturally, aimed at improving class-room practices.

CPD of the University teachers is conducted with a variety of purposes and objectives. The purposes of CPD range from teachers' perceptions and practices, to learning outcomes (Asmelash, 2014), students' performance, and university environment. Various models of CPD of teachers dealing with different domains have been developed. These models aim at covering various aspects and dimensions of professional development of the teachers. Fraser et al. (2007), while considering the complexity of the nature of CPD, discussed CPD in three frameworks: Reid's quadrants of teachers' learning, Kennedy's three frameworks to categorize CPD models, and Bell and Gilberts' three aspects. Reid (2007) measured CPD in four dimensions. These dimensions given by him are: formal-informal and planned-accidental. Formal-informal are on same axis and are opposite, and same is the case of planned and accidental CPD. Kennedy gave nine categories of different models being used to study CPD of teachers. While Bell and Gilbert (1996) divided teachers' professional learning into three domains, which start from personal being of a teacher, then is expanded to her social sphere, and finally encompasses teacher's professional learning. These domains are inter-related in character. Sparks and Horsley (1989) studied the range of professional development of teachers models and gave five broad categories. Ann Lieberman model of CPD for teachers categorised CPD into three categories. Here the related activities of teachers' CPD have been divided into three domains, i.e., direct training (including in-service courses, workshops, etc), learning in professional environment (which includes mentoring, peer coaching, action research, tasks related to some project) and out-of-institute learning which includes visits to other institutes, learning communities, inter-institute partnerships etc.

Professional development of teachers is based on certain principles which deal not only with conduct of CPD activities but transfer of changes in teachers' class-room

strategies. Leu and Gray (2005) considered that it is a major principle of CPD that subject matter of teachers' PD activity should be focused on and address the problems and issues which students might face while their learning activity is in progress. Professional development has to be integrated and linked with the teaching-learning process, failing which it will lose relevance and validity. Some of the principles derived from some approaches towards CPD (FaSMEd, 2016) are: Competence-oriented, participant-oriented, stimulate cooperation., case-relatedness, diverse instruction formats and foster (self) reflection.

Teachers' PD has direct impact on different aspects of the class-room practices. These effects range from class-room environment, communication to practices and students' achievement level. Darling-Hammond, Hyler and Gardner (2017) also derived that the students whose teachers had gone through PD instances, showed higher learning achievements. Many studies have been undertaken to evaluate the effect of teachers' PD on their class-room practices. Students in higher education learn through different modes of learning. Students at this higher level of education are mature and independent learners. More often, they devise their learning techniques.

In such learning environment, SRL is a learning procedure which suits students' needs. CPD of the university teachers is assumed to bring effective changes in this aspect of their students' learning. SRL gives learners the choice to direct their own learning, as per the goals set by themselves. Thus, it is a sort of learning which is based on self-motivation and independent way of learning. Students involved in SRL adopt specific strategies for attaining their goals (Kroop et al., 2015). SRL emphasises the internal (motivation and cognition) process of learning (Fontana et al., 2015). Students set their strategies to fix their goals and then pursue them. Panadero (2017) analyzed various social elements which play their role in SRL by the students. These social elements have

varying degrees of interaction amongst themselves, cast influence on SRL in different dimensions. Thus, this sort of learning acts as an umbrella concept encompassing inter-related social factors. When all related elements are taken care of while designing the SRL activities, then the social influences enhance the effectiveness of process of learning. As a result, students' learning level will also be successfully improved. A lot of empirical evidence has been found of strong linkages between the academic performance of the students and adoption of SRL techniques by them in the class-room settings (Pintrich, 2003; Zimmerman & Schunk, 2001; Bandura, 1997).

SRL involves such processes that it is no more a limited concept. It is wide ranging in its scope, and diverse in choice of place and time. In the words of Weinert (as cited in Beishuizen & Steffens, 2007), in SRL, the learner is free at liberty to decide about the time of intended learning, the mode and at the same time, where and what to learn. The process of SRL activates main psychological processes. These processes are in multiple domains and have also been termed as components of SRL. Self-regulated processes are of greater significance at university level, as pointed out by Fiorilli, Albanese, Gabola and Pepe (2011). Various models have been devised to explain the process of self-regulated learning, which are composed of certain sets of sub-processes. These sub-processes are also sometimes termed as SRL components, and theorists have categorized them into metacognitive, affective, motivational and behavioural domains. Social cognitive theory has significant association with the idea of SRL. This theory interprets self-regulation basing on three inter-related sub-processes (Bandura, 1986; Kanfer & Gaelick, 1986) which are self-observation, self-judgment, and self-reaction.

SRL is a comprehensive and detailed procedure. Many factors combine to constitute it. It includes a number of factors which form part of the process of SRL. These factors sometime include setting of goals, managing the resources available to manage

those goals, self-efficacy for success expectations, and deep cognitive involvement (Trawick & Corno, as cited in Cazan, 2013). During the process of SRL related to an academic task, students use strategies such as Elaboration, Organization, Critical Thinking and Rehearsal. The use of such strategies is greatly helpful for the learners when they are learning the contents of their course. These will sometime be used without making a clear mention of these, meaning by these are implied ones (Zimmerman, 1989).

The process of SRL is very diverse in nature, in the sense that it includes many social and environmental elements. Many strategies are adopted basing on these elements. Help-seeking is most commonly used SRL strategy. This help is sought by the learner from her surroundings. Thus, through enhanced social interaction, the learner will be able to shape her behavior (Ryan & Pintrich, 1997) related to learning, and enhance social interaction with her immediate environment. As mentioned here, learner acquires context control. She does so to get enhanced control of the nature of the task and context in which learning is being carried out. Printrich (2000) however considers that learner has to carry out the process in many diverse settings, and the context is not always under the learner's entire control. Mostly, here class-room environment is not student-centred. Learners can control the contextual aspect of learning when they are learning in a class-room environment where students are the main focus. The more student-centered a classroom is, the more contextual control the students will have. The research of Chamot is significant in this regard as he took various steps of SRL mentioned in different related models and synthesized them together (Jutrakul, 2017). Shuy (2010) classifies the SRL strategies according to the nature of content being learnt. The cognition component for him is based on certain skills and habits.

Now mentioning the models of SRL, mostly are related to and based upon social cognitive perspective (Zimmerman & Bonner; Zimmerman & Kitsantas, as cited in

Effeney et al., 2013). Social cognitive theory links SRL with social and immediate environment. Social theorists explain the course of linking SRL processes and environmental factors. Their interplay determines the linkage. Bandura (1999) held the opinion that the process of SRL is related to the processes of intellectual development and social functioning. These processes, in the context of SRL, cannot be separated from the circumstances in which they occur, and are not grown instantly. Such abilities start developing over the course of childhood and continue building up as a person grows in age (Vukman, & Licardo, 2010) with varying degree of such competence developed through adolescence. Many models emerged during the course of time. Most relevant models are those which were articulated by Boekaerts, Borkowski, Pintrich, Winne and Zimmerman (Panadero, 2017).

Studies conducted by, Adornetto (1999), Flecknoe (2000), Powell and Terrell (2003), Sieveke-Person (2004), Fields (2005), Turner (2006), Harutunian (2007), De Vries et al. (2014), Jackson (2014), and Hinsley (2018) found relationship between CPD of the teachers and learning of their students.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Research in education has mostly been carried out through descriptive mode. Researchers have been using this mode of research to find relationship between different variables and study their mutual effects. Present study is aimed at finding effect of CPD of teachers on SRL of their students. Researchers adopting this kind of research generally employ surveys in different modes to collect data. Descriptive research is used to transform obtained datasets into meaningful form to draw inferences. In this mode of research, data is gathered concerning a situation. Then gathered data is organized and tabulated as per the research objectives. Data is then interpreted and analyzed to draw inferences. This description of data will bring out certain patterns in the data which are then categorized and subjected to analysis and discussion. The information gathered through the survey is presented through comprehendible graphs and charts.

3.1 Research Design

The need for research lies at the base of finding suitable solutions to issues arising in society. Thus, a research is grounded at the human factor in its essence. It is conducted with socio-cognitive factors emancipating from its elements. It may be conducted in an educational environment or any other social setting, its major components and requirements would remain inter-related. In this particular research, for teachers' CPD, three domains which were identified by Lieberman (1996) have been picked. These domains of CPD are identified as direct professional learning, professional development attained through other means within the bounds of educational institution, and instances of professional development which occur outside the university premises. Another

variable which has been researched in this study is SRL of the university students. It has two main sub-variables, which are motivational and learning strategies. In present research, effect of university teachers' CPD was studied on the SRL of their students. Basing on their needs and requirements, researchers in educational research have been employing a number of data collection tools. Amongst these tools, survey questionnaires are the most convenient. Present research employed quantitative approach for drawing inferences from the data collected from teachers with reference to CPD practices, and from their students regarding the practices of SRL. In order to measure CPD of the university teachers a questionnaire was developed by the researcher which encompassed three domains of teachers' continuous professional development. To measure self-regulated learning of the students, a standardized questionnaire, i.e., MSLQ was used. Through the use of quantitative techniques, researcher was able to know about the level of forms of CPD of teachers teaching in universities, and the effects of this CPD on use of SRL techniques by the students in their studies. By employing quantitative statistical techniques, the researcher was facilitated in finding the correlation among CPD forms, and their effects on students' SRL.

The researcher personally collected data regarding CPD of the university teachers and SRL of their students, by visiting the universities shortlisted as sample of this present study. Survey forms to measure CPD were handed over to hundred such teachers who had attended some form of CPD, and all 100 questionnaires were received back, complete in all respects. To measure SRL, total 545 questionnaires were distributed among the systematic randomly selected students in these hundred class rooms. The process to carry out such systematic random sampling has been explained in **Appendix 'F'**. Some 522 questionnaires were received back. Out of these, nineteen were found incomplete. To analyse the collected data, various tests were applied to the data recorded

in SPSS. The tests which were applied were Cronbach's Alpha (for reliability measure), mean, percentages, t-test and regression analysis. The study research design is presented in Figure 3.1:

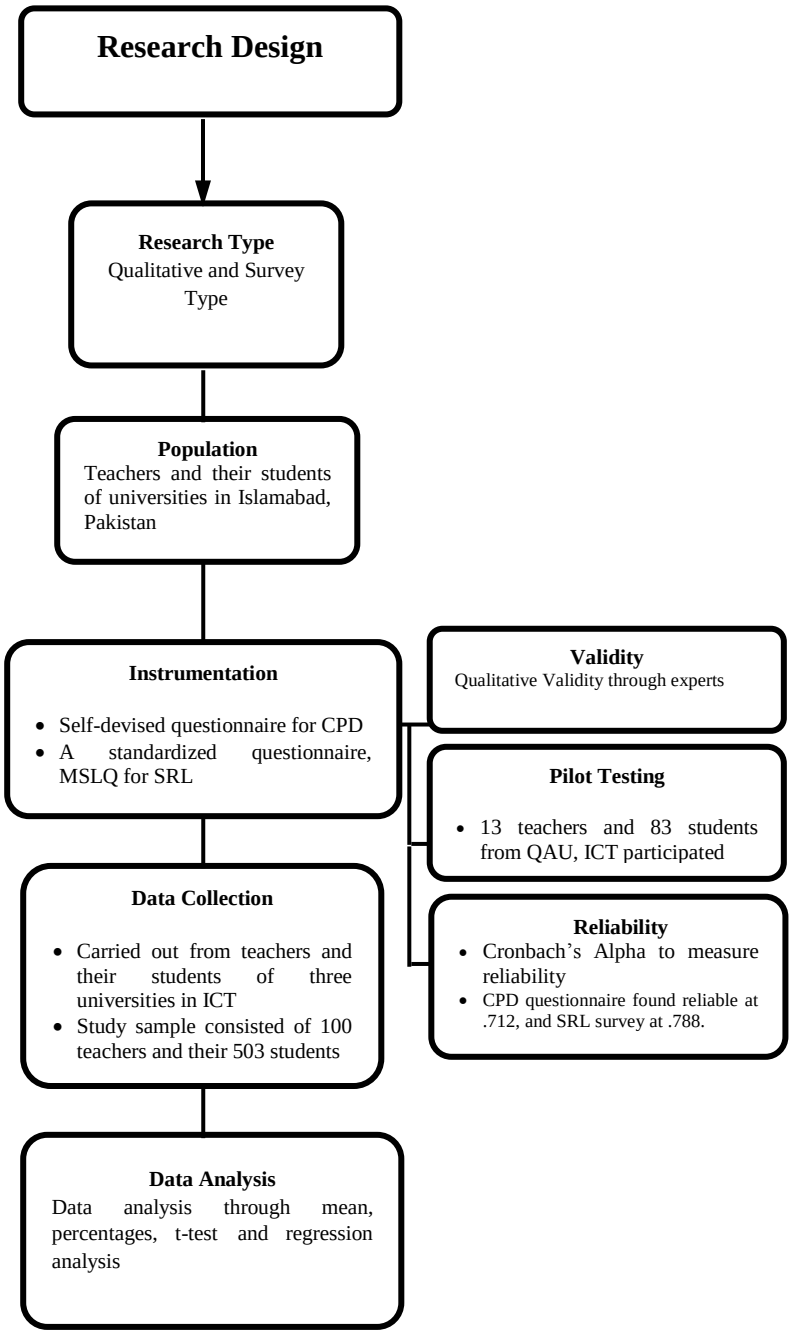

Figure 3.1. Research Design

3.2 Population

Population of a research project is the total number of people whom a researcher selects for the conduct of a study, with a view to achieve those research objectives which have been devised to be achieved. All teachers and students of public sector universities which had faculties of Social Sciences and Management Sciences, and were present in ICT formed the study target population. The list of all such universities was obtained from HEC website. As per the available data, a total of 20 universities were working in ICT, which were chartered by the Commission. However, five public sector universities of Islamabad which had Management and Social Sciences Faculties were shortlisted as target population.

Considering the resource and time constraints, the faculty members and students of Management and Social Sciences Faculties of three universities were randomly selected to measure CPD of the university teachers and SRL of the students of those teachers. Social Sciences and Management Sciences faculty members of Air University, Islamabad (129), Bahria University, Islamabad (137) and NUML, Islamabad (223) totalled at 489 teachers and 8563 students were registered in these faculties.

Table No. 3.1 List of Full Time Faculty and Enrolment Data in 3 x Public Sector Universities of Islamabad

Public Sector Universities	Faculty	Students Enrolment
Air University	129	1805
Bahria University	137	2047
NUML	223	4711
Total:	**489**	**8563**

Data obtained through HEC, Pakistan web page. Details given in **Appendix 'C'** and **'D'**

https://www.hec.gov.pk/english/services/students/PCD/Documents/UniversityFulltimeFaculy.pdf

3.3 Sample

The sample of the study was drawn from Management Sciences and Social Sciences faculties of public sector universities of ICT. The study sample included three universities of Islamabad, which were Air University, Bahria University and NUML. With the help of purposive and systematic random sampling techniques, sample for the conduct of present study was selected. To conduct the research, some common departments of SS (Education, English, IR, Psychology and Media Studies), and MS Faculty were shortlisted. These Faculties had 489 faculty members, and total 8563 students were enrolled. According to Gay, Mills and Airasian (2012) in case of correlational studies, 30 is the minimum number for selecting a sample. The same is held by Borg and Gall (as cited in Cohen, Manion & Morrison, 2007). According to Cohen et al. (2007), for various educationists, thirty is the lowest acceptable number to study a variable, and they suggested considerably more. Gay, Mills and Airasian (2012) also consider that if the population size is above or beyond 5000, then 500 would be a sufficient sample size. For research purpose, BS Program (7^{th} and 8^{th} Semesters) was selected because adequate number of students to conduct this study was present at this level in randomly selected three universities. To measure CPD, the study sample was chosen through purposive sampling to consist of 100 teachers from these three universities. Around five students were selected through systematic random technique from the class of each of those hundred teachers (503 students).

3.4 Overview of Research Variables

The present study was based on two research variables, which included CPD of the university teachers and SRL of the university students.

3.4.1 Continuous Professional Development

CPD is a wide-ranging concept but it has often been made limited to formal training and coaching, however many theorists have highlighted that this is a limited and formal interpretation of the concept. This concept does not stick to set of formal activities, rather it liberates teacher's professional learning from the bounds of time and space. More activities in formal and informal domains form part of the teachers' professional development activities.

Lieberman (1996) presented a model of CPD in which various activities contributing to the factor were made part of. In his classification model of CPD, he divided it into three spheres, CPD through formal means or direct learning, i.e. professional courses, workshops, seminars etc. Second type of CPD is attained through coaching, mentoring, peer learning and action research. As stated by him, third type is through external linkages in different directions, which are established through contact with learning communities and interactions made with other institutes.

3.4.2 Self-Regulated Learning

Pintrich's (2000) SRL model is termed 'general framework for SRL'. It is called a framework because, unlike other SRL models, it is in the form of a table. Pintrich's work on SRL is mainly characterized by the theme of motivation. The factor of motivation and adoption of learning strategies has a direct link. It is assumed by Pintrich that learners are in a position to effectively monitor their cognition. They can also monitor and control their personal level of motivation for that learning task. One common aspect has been viewed by us in all SRL models. All models consider students as active learners who promptly participate in their own learning. They formulate learning goals, adopt suitable strategies and monitor progress towards the achievement of those goals. The Pintrich scale has

two main categories, i.e., motivational scales and learning strategies scales, which have been further divided into sub scales. Most of Pintrich studies indicate that motivated and self-regulated learner is his main interest. He dilated upon students' motivation and found relationship between students' motivational level, SRL and their academic achievements.

3.5 Instruments for Data Collection

CPD of the teachers has been measured with the help of a self-devised questionnaire which was designed to cover three CPD domains. On the other hand, SRL of the university students has been measured by using a standardized questionnaire named MSLQ. Various portions of this questionnaire will also be explained. In addition to these, reliability of both these tools will also form part of this chapter.

3.5.1 CPD Questionnaire

A questionnaire has been developed by the researcher to measure the CPD of the teachers at university level. It was prepared covering Lieberman's three domains of teachers' CPD. Lieberman (1996), in her classification model of CPD, divided it into three spheres, CPD through formal means or direct learning, i.e. professional courses, workshops, seminars etc. Second type of CPD, as per Lieberman model, is attained through coaching, mentoring, peer learning and action research. As stated by her, third type is through external linkages established through contact with learning communities and interactions made with other institutes. The questionnaire developed to measure CPD contained three parts and the respondents had to respond on a Likert Scale with five points (for CPD questionnaire, see **Appendix 'O'**). Following are the details of CPD domains and corresponding statements:

Table No. 3.2 Statement Details – CPD Questionnaire

Section	No of Items	Statements Serial
Direct Learning Part	5	1-5
Learning in Professional Environment	20	6-25
Out-of-Institute Learning	10	26-35
Total Items	**35**	**1-35**

3.5.2 Motivated Strategies for Learning Questionnaire (MSLQ)

For present research, the researcher adopted the SRL framework, developed by Pintrich (2000) to measure the aspects of SRL of the university students. MSLQ is normally selected because it is in public domain, easily scored and specifically for undergraduate students (Broadbent, 2017). This framework divides the process into four stages, i.e., forethought, monitoring, control and reflection. In the domain of each phase, four areas namely cognitive, motivational and affective, behavioural and contextual cover the self-regulatory activities. This questionnaire was divided by Pintrich (2000) into two parts, i.e., Motivational Strategies Scale and Learning Strategies Scale. There were originally 81 items in this research instrument. After the experts' opinion, some items being repetitive in nature were dropped, and finalized questionnaire had a total of 56 statements in it (for SRL questionnaire, see **Appendix 'P'**). Following parts were included in the tool:

Table No. 3.3 Statement Details – SRL Questionnaire

Strategies	No. of Items
Motivational Strategies	22

Learning Strategies	34
Total	**56**

3.6 Validation of Research Instruments

The validation of research tools helps in identifying gaps and bringing significant changes by incorporating experts' opinion. Present research was meant to find the effect of CPD teachers at university level on SRL of the students. For the purpose, two tools were used for the data collection. To measure the CPD of university teachers, a tool was developed which was based on the CPD framework given by Lieberman (1996). And to measure the SRL of the university students, a standardized research tool developed by Pintrich, i.e., MSLQ was used. CPD tool and SRL questionnaire were validated by a group of three education experts. The details of worthy members of the instruments-validation panel are given in **Appendix 'G'**. Main observations of the validating experts were:

- Use of abbreviations/ contractions to be avoided.
- Possible options against each enquiry to be mentioned in demographic part.
- Sub-sections are required to be made.
- Clear instructions are required to be mentioned.
- First person 'I' is to be made to start a statement instead of possessive pronoun 'My'.
- Indicated grammatical/ syntax errors to be removed.
- Some statements were indicated to be made clearer for better understanding of the respondents.

- Some phrases/ words were to be replaced/ added.
- A few statements were indicated to be irrelevant/ repetitive.
- More than one points of emphasis in a statement were indicated to be removed/ adjusted in additional statements.

3.6.1 Validation of CPD Questionnaire

CPD questionnaire was developed by the researcher covering Lieberman's three domains of teachers' CPD. Lieberman (1996), in her classification model of CPD, divided it into three spheres. After the recommendations of the validity experts and pilot study, few items were dropped or amended. Details are given below:

- **Direct Learning of University Teachers Part**

  There were five items in the questionnaire. Initially complete statements were not included in the Part. After observation by the validating expert, complete statements were made part.

- **Part related to 'Learning in Professional Environment'**

  A total of twenty statements were included in this part. Initially this part consisted of 23 statements however 20 were shortlisted to be included in final version of the data collection tool.

- **Out-of-Institute Learning Part**

  Initially 13 statements were framed to cover this segment of CPD, but 10 were finalized for inclusion in the research instrument.

3.6.2 Validation of SRL Questionnaire

In the present study, to measure the aspect of SRL of the university students, the researcher adopted the SRL framework, developed by Pintrich (2000). Pintrich (2000) developed MSLQ to measure SRL, which has been adopted for present research. This questionnaire was divided by Pintrich (2000) into two parts, i.e., Motivational Strategies Scale and Learning Strategies Scale. There were originally 81 items in this research instrument. After the experts' opinion, some items being repetitive in nature were dropped, and finalized questionnaire had a total of 56 statements in it.

- **Demographic Detail**

  The respondents, in this section of the questionnaire, were required to provide some demographic details. Experts asked to mention possible options against each enquiry in demographic part.

- **Motivational Strategies Scale**

  Motivational strategies originally have 31 items. In present research instrument, this section was represented by 22 statements.

- **Learning Strategies Scale**

  Thirty-four statements in the questionnaire belonged to this learning strategy scale, while MSLQ had 50 statements covering all sub-scales of Learning Strategies.

3.6.3 Language Validation

The questionnaires were also forwarded to a worthy panel of language experts (details of the panel members at **Appendix 'H'**) for proof reading and checking language syntax. Both the questionnaires were forwarded to each member of the

validation group, accompanying covering letters (See **Appendix 'I'**). After necessary review, the experts mailed back the questionnaires. They had mentioned certain suggestions regarding structure, language and contents of the research tools. The received observations were duly incorporated and drafts of the questionnaires were finalized. The signed validation certificates (See **Appendix 'J' & 'K'**) and proofreading certificates (See **Appendix 'L' & 'M'**) were also received back.

3.7 Pilot Study

Once the research tools for measuring CPD of university teachers and SRL of their students in Capital Territory Islamabad were validated through the panel of experts, the pilot study was carried out. This pilot study was conducted in Social Sciences Faculty of Quaid-i-Azam University, Islamabad. This pilot study was conducted on purposively selected 13 university teachers and 83 of their students. Initially 18 university teachers from Social Sciences faculty were contacted who had undergone some forms of CPD. Fifteen of the teachers showed their readiness for participation in the research project. Out of those 15, thirteen teachers could be available for the collection of data. All questionnaires were received complete in all respects. Now the students of these thirteen teachers were approached for collection of data regarding SRL. In each of these thirteen classes, 8 students were randomly selected and were given copies of SRL questionnaire. Some 105 students were required to complete the tool. Out of these, 91 questionnaires were received back; eight of them were rejected owing to incomplete information. Thus 83 questionnaires were found complete in all aspects, with response rate of 79%. The responses were fed into SPSS, 22nd Edition.

The reliability scores of the research tools attained in pilot testing are listed below in Table 3.4.

Table No. 3.4 Statistical Reliability of Research Instruments

Tool	Reliability	Items
CPD Questionnaire	.712	35
Questionnaire to measure SRL (MSLQ)	.788	56

3.8 Reliability of the Research Tools

The reliability of CPD questionnaire and tool for SRL (MSLQ) was assessed through a pilot study. Through CPD questionnaire, responses of university teachers who had undergone CPD were recorded, and SRL questionnaire was used to collect responses of students of those teachers were obtained. The pilot study results were tabulated in SPSS, 22nd Edition. The responses from the respondents were subjected to analysis to reliability of sub-variables in both the questionnaires. Despite good reliability, few changes, additions and deletions were made in the statements of both the data collection tools. It was found that CPD questionnaire was reliable at .712. Section-wise reliability measure of this questionnaire is given in Table 3.5. SRL questionnaire was found to possess reliability at .788 (measured through Cronbach Alpha). Reliability of different sections of SRL data collection tool is mentioned in Table 3.6. The figures quoted above showed that both the tools were fairly reliable while talking about item-total relationship.

It is imperative to indicate here that these tools for data collection were designed with specific socio-cultural background of Pakistan. It can also be asserted that the results obtained are primarily in the above-mentioned context. If some researcher attempts to replicate these tests for same sort of study, in different socio-cultural context, results generated could have some degree of error. Both the questionnaires were accompanied by detail guidelines for the respondents which explained background of the data collection,

and assurance to them regarding ethical considerations being followed by the researcher (for guidelines, see **Appendix 'N'**).

Table No 3.5 Reliability Measure of Sub-Scales of CPD Questionnaire

Section	No of Items	Cronbach's Alpha
Direct Learning	5	.673
Learning in Professional Environment	20	.738
Out-of-Institute Learning	10	.726
Total Items	35	.712

The scale reliability was measured by applying Cronbach Alpha. The scale was found reliable at .712, which is an acceptable figure.

Table No. 3.6 Reliability Measure of Sub-Scales of SRL Questionnaire

Strategies	No of Items	Cronbach's Alpha
Motivational Strategies	22	.785
Learning Strategies	34	.792
Total Items	56	.788

The reliability of SRL questionnaire was measured at .788, which is a stronger figure in terms of reliability measure.

3.9 Ethical Considerations of the Study

Every research is conducted under certain established research ethics which provide guiding principles for the conduct of research. In case of present research, reference letters were obtained from NUML, Islamabad and these letters were presented

to the universities offices included in the study sample to grant permission for data collection. Thus, appropriate procedure was adopted through proper channel. Respondents were approached in these universities in very congenial environment. The questionnaires contained portions concerning demographic information of the respondents, but respondents were not required to disclose their identity by asking their names or by seeking any other information leading to their personal identity. When the data was being collected for the study, a voluntary response from the respondents was ensured. In the beginning of the questionnaire, the reason to obtain the response of the respondents was explained to remove any ambiguity. It was also assured to the respondents that the responses given by them were meant for research purpose only and would not be disclosed for any other purpose.

3.10 Collection of Data and Its Analysis

Present study used two questionnaires to gather data. In order to collect data regarding CPD of university teachers a self-devised questionnaire was used, while SRL of the university students was measured by using a standardized questionnaire, termed as MSLQ. The responses of the respondents were then fed into SPSS, 22nd Edition. To analyse the collected data, various tests were applied to the data recorded in SPSS. The tests which were applied were Cronbach's Alpha (for reliability measure), mean, percentages, t-test and regression analysis. The analysis of the data helped in deriving findings, conclusions and recommendations of the research which are presented in Chapter V. The data along with tests applications have been presented in Chapter IV. Table No. 3.7 presents the tests which have been used to test various hypothesis of present study.

Table No. 3.7 Objectives – Hypotheses Alignment & Types of Used Tests

Ser. No.	Objectives	Statements of Hypotheses	Type of Tests Used
1.	To identify level of CPD among university teachers.	-	Frequency, Percentages, and Mean
2.	To assess the level of students' university self-regulated learning.	-	Frequency, Percentages, and Mean
3.	To compare demographic differences, i.e. gender and teaching experience regarding CPD of university teachers.	H_0^1: There is no significant gender-based difference between male and female university teachers regarding CPD.	Independent t-test
		H_0^{1a}: There is no significant gender-based difference between male and female university teachers regarding sub-scales of CPD.	
		H_0^2: There is no significant teaching experience difference between university teachers regarding CPD.	Independent t-test
		H_0^{2a}: There is no significant teaching experience difference between university teachers regarding sub-scales of CPD.	
4.	To compare gender-based difference regarding self-regulated learning of students at university level.	H_0^3: There is no significant gender-based difference between male and female students regarding self-regulated learning, at university level.	Independent t-test
		H_0^{3a}: There is no significant gender-based difference between male and female University Students regarding sub-scales of self-regulated learning.	

5.	To determine effect of CPD of teachers on their students' SRL at university level.	H_0^4: There is no significant effect of CPD of teachers on students' self-regulated learning at university level.	
		H_0^{4a}: There is no significant effect of CPD of university teachers with regard to direct learning on their students' self-regulated learning related to sub variables of Motivational Strategies, i.e. Intrinsic Goal Orientation, Extrinsic Goal Orientation, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Regression Analysis
		H_0^{4b}: There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' self-regulated learning related to sub variables of Motivational Strategies, i.e. Intrinsic Goal Orientation, Extrinsic Goal Orientation, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Regression Analysis
		H_0^{4c}: There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' self-regulated learning related to sub variables of Motivational Strategies, i.e. Intrinsic Goal Orientation, Extrinsic Goal Orientation, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Regression Analysis

H_0^{4d}:	There is no significant effect of CPD of university teachers with regard to direct learning on their students' self-regulated learning related to sub variables of Learning Strategies, i.e. Rehearsal, Elaboration, Organisation, Critical Thinking, Meta-Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Regression Analysis
H_0^{4e}:	There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' self-regulated learning related to sub variables of Learning Strategies, i.e. Rehearsal, Elaboration, Organisation, Critical Thinking, Meta-Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Regression Analysis
H_0^{4f}:	There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' self-regulated learning related to sub variables of Learning Strategies, i.e. Rehearsal, Elaboration, Organisation, Critical Thinking, Meta-Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Regression Analysis

CHAPTER 4

ANALYSIS AND INTERPRETATION OF DATA

The data which has been collected from the teachers and students of universities in Islamabad Capital Territory, has been analysed, interpreted and discussed in this chapter. This information has been gathered to analyse the effects of university teachers' CPD on SRL of their students. Once the data was collected, it was analysed in various manners to meet the research objectives which were framed in the beginning of this research. Each step of the data analysis has been methodically explained. Research in education has mostly been carried out through descriptive mode. This mode of research has been used to find relationship between different variables and study their mutual effects (Loeb et al., 2017). So, this present study has also been a descriptive one. The research is aimed at finding effect of teachers' CPD on SRL of students. In descriptive method of research, data is gathered through survey techniques (Sural, 2018), and then data is tabulated, interpreted, and explained as per the study objectives. The interpretations of the data provide patterns for further interpretation. The quantitative research method has been employed in this study. In order to analyse the data of this study, statistical software, SPSS, 22nd Edition was used. Analysis of the gathered data was done in a manner that the research objectives of the study could be achieved.

The questionnaires were validated through a panel of education experts whose valuable feedback was later used to improve the research tools. The experts who validated the data collection tools included Dr Hukam Dad Malik, Head of Education Department, NUML, Islamabad, Dr Quratul-Ain-Hina, Assistant Professor, Department of Education, NUML, Islamabad, and Dr Allah Rakha Saghir, Visiting Faculty Member, Department of Education, NUML, Islamabad. The questionnaires were also validated by language

experts who checked them for grammar, language and syntax errors. The panel of language experts included Major Sonia Kanwal, Major Muhammad Khalil and Major Abdul Qadir, from Department of English, Pakistan Military Academy, Kakul, Abbotabad. In the light of the recommendations of the worthy experts, necessary changes were made in the contents of the questionnaires. The tools were finalised and ready for data collection. A pilot study was conducted by the researcher to check the reliability of the data collection instruments. This study was carried out in Social Sciences Faculty of Quaid-i-Azam University, Islamabad. Some thirteen teachers were randomly shortlisted. And 83 students were again randomly selected from classes of those 13 teachers to obtain data for the pilot testing. Pilot testing results were tabulated in SPSS, 22nd Edition and checked for reliability and item-total correlation. After the completion of these statistical procedures on the data of the pilot testing, the full-scale study was carried out. Finalised questionnaires to measure CPD of university teachers and SRL of their students in universities of the Capital Territory Islamabad, were distributed among the study sample. After obtaining responses of the respondents, the data was tabulated in SPSS 22nd Edition for application of statistical tests.

4.1 Analysis Outline

For this study, data about CPD of university teachers was collected from a sample of 100 teachers, and 503 students of those teachers provided feedback on SRL questionnaire. Analysis outline of this collected data is given below:

Section-1 Demographic Characteristics of the Sample

Both the data collection instruments contained the demographic sections in the beginning. These sections provided some significant and relevant information about sample characteristics and highlighted the sample formation, revealed through respondents' responses.

Section-2 Study of Means and Percentages of Responses – CPD Questionnaire

CPD Questionnaire was used to gather the response of the respondents concerning the CPD practices in universities in Islamabad. The data gathered through the research instrument has been analysed in this section, using the statistical techniques of mean and percentage.

Section-3 Study of Means and Percentages of Responses – SRL Questionnaire (MSLQ)

Analysis of the SRL questionnaire has been carried out in this section. This questionnaire contained 56 statements and was used to measure SRL of the university students. The gathered data was tabulated and analysed through mean score of the statements and percentages of responses.

Section-4 Study of Demographic Variables of both teachers and their Students

Demographic variables of gender and teaching experience of the teachers, and gender variable of students, at university level have been studied in this section. This analysis has been based on data calculated by using statistical techniques of t-test.

Section-5 Study of Effects of Teachers' CPD on their Students' SRL

To measure effect of university teachers' CPD on their students' SRL was the main objective of present study. This effect has been calculated by using statistical techniques of Regression Analysis. The results obtained through analysis have been analysed.

Section-1

4.2 Sample Demographic Characteristics

Analysis of sample university teachers' demographic data in the domains of gender, teaching experience and qualification has been carried out in succeeding paragraphs.

The CPD of university teachers has been measured using a self-devised questionnaire. This questionnaire was based on CPD framework of Lieberman (1996). All teachers and students of public sector universities which had faculties of Social Sciences and Management Sciences, and were present in ICT formed the study target population. The list of all such universities was obtained from HEC website. As per the available data, a total of 20 universities were working in ICT, which were chartered by the Commission. However, five public sector universities of Islamabad which had Management and Social Sciences Faculties were shortlisted as target population. Considering the resource and time constraints, the faculty members and students of Management and Social Sciences Faculties of three universities were selected to measure CPD of the university teachers and SRL of the students of those teachers. Social Sciences and Management Sciences faculty members of Air University, Islamabad (129), Bahria University, Islamabad (137) and NUML, Islamabad (223) totalled at 489 teachers and 8563 students were registered in these faculties. Sample size to measure CPD of the university teachers was fixed at 100 teachers. Borg and Gall (as cited in Cohen, Manion & Morrison, 2007, p. 102) considered that co-relational researches require a sample size not less than thirty. According to Cohen et al. (2007), for various educationists, thirty is the lowest acceptable number to study a variable, and they suggested considerably more. Gay, Mills and Airasian (2012) also consider that if the population size is above or beyond 5000, then 500 would be a sufficient sample size. Gay, Mills and Airasian (2012)

also consider that if the population size is above or beyond 5000, then 500 would be a sufficient sample size. The sample of the study was drawn from Management Sciences and Social Sciences faculties of public sector universities of ICT. With the help of purposive and systematic random sampling techniques, sample for the conduct of present study was selected. To conduct the study, departments of Social Sciences Faculty (Education, English, IR, Psychology and Media Studies), and Management Sciences Faculty were selected. These Faculties had 489 faculty members, and total 8563 students were enrolled. The study sample consisted of 100 university teachers selected through purposive sampling technique. Around five students were systematic randomly selected from the class of each teacher selected in these universities of public sector.

Demographic information was also gathered from the sample university teachers, and it revealed that there were 56 female teachers who were part of the sample, and 44 male teachers were included in the study sample.

Table No. 4.1 Analysis of University Teachers' Demographic Data vis-à-vis Gender (N=100)

Variable		N	%
Gender	Male	44	44
	Female	56	56

This gender distribution is displayed in Figure 4.1, which shows that 56% female teachers participated in the study and participation percentage of the male teachers was 44%:

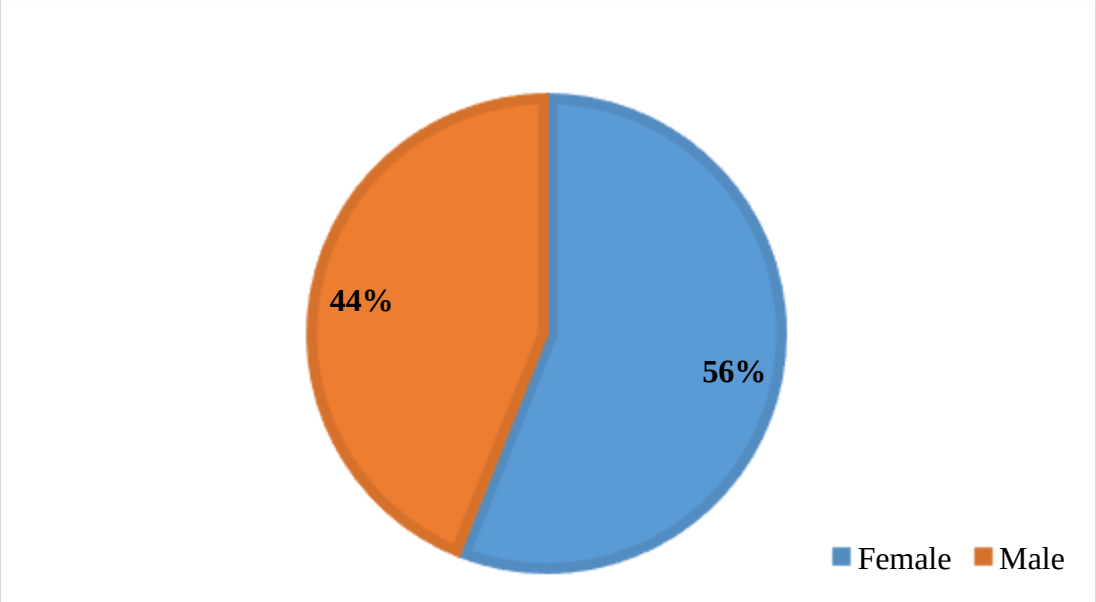

Figure 4.1. Gender Distribution of Sample University Teachers

In the demographic information part, participants of the research were also inquired about their academic qualification. The respondent university teachers were given few options (Post Doctorate, PhD, M.Phil., and Masters degree).

Table No. 4.2 Analysis of University Teachers' Demographic Data vis-à-vis Qualification (N=100)

Variable		N	%
Qualification	Masters	0	0
	M.Phil	42	42
	PhD	58	58
	Post Doc	0	0

The demographic information collected through the questionnaire indicated that out of sample size of hundred teachers, 42 held M.Phil. degree (some 42% of the sample). A total of 58 university teachers had a PhD degree. In the sample of the study, 58% had

Doctorate degree. However, the demographic data showed that none of the respondent teachers had achieved Post-Doctorate qualification. Details shown in Figure 4.2:

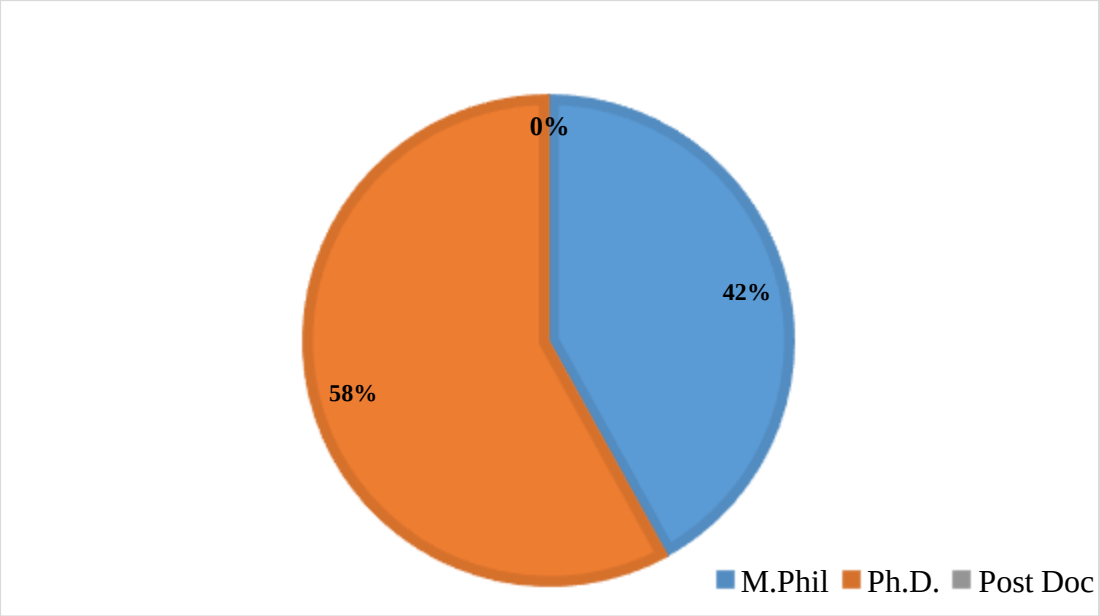

Figure 4.2. Academic Qualification Distribution of Sample University Teachers

Through the questionnaire, the respondent university teachers of ICT were also asked to indicate their teaching experience duration. They were asked if they possessed teaching experience at the university level up-to 5, 10, 15, or more years.

Table No. 4.3 Analysis of University Teachers' Demographic Data vis-à-vis Teaching Experience (N=100)

Variable		N	%
Teaching Experience	1-5 Years	36	36
	6-10 Years	64	64
	11-15 Years	-	0
	16 Years & More	-	0

Through data it was found that 36 respondents (36%) among sample size of 100 university teachers fell in experience category of 0 – 5 years, and 64 respondents (64%) were ranging from 6 – 10 years of teaching experience. No one among the respondents indicated teaching experience of more than 10 years. Data has been displayed in Figure 4.3:

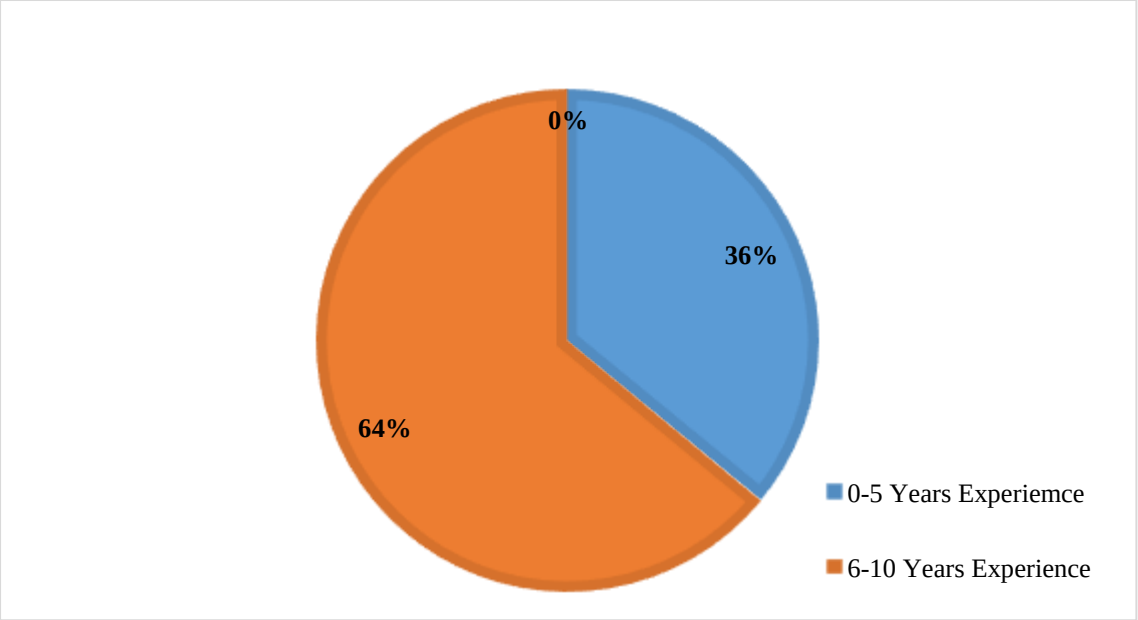

Figure 4.3. Teaching Experience Distribution of Sample University Teachers

Analysis of demographic data of sample university students in the domains of gender and institutions has been tabulated in Table 4.4.

Table No. 4.4 Analysis of University Students' Demographic Data (N=503)

		N	%
Gender	Female	342	68
	Male	161	32
Institution	Air University	169	34
	Bahria University	158	31
	NUML	176	35

The study was aimed at measuring effect of university teachers' CPD on SRL of their students. SRL of the university students in universities of the ICT was measured with the help of a standardized questionnaire (MSLQ) which was developed by Pintrich (2000). As mentioned earlier, the universities of the ICT became population of this research. List of all universities functional in the area was obtained from HEC website. As per the data provided by the HEC, there were total 20 universities working in Islamabad Capital Territory, which were chartered by the Commission. Target population of the study was three public sector universities with Management and Social Sciences Faculties, which were, Air University, Bahria University and NUML. In total 8563 students were enrolled in Management and Social Sciences faculties of these three universities, located in Islamabad. For research purpose, BS Program (7^{th} and 8^{th} Semesters) was selected to gather the data. BS programs were selected because adequate number of students to conduct this study was present at this level in these three universities which were randomly selected to form the study sample.

To measure SRL of university students, around five students were selected through systematic random technique from the class-rooms of those 100 university teachers who were purposively selected to measure CPD. In total, 545 students of these universities were short-listed to measure SRL. Through purposive and systematic random sampling, the sample of the study was drawn from Management and Social Sciences faculties of those universities of Islamabad, the capital city. To conduct present research, departments of Social Sciences Faculty (Education, English, International Relations, Psychology and Media Studies), and Faculty of Management Sciences were selected. To measure SRL of the university students, the sample of 545 university students were selected with the help of systematic random sampling. These students were part of the classes of the teachers who were purposively short-listed to participate in the study for

measuring CPD (around five students selected through systematic random technique from the class of each teacher purposively selected in these public-sector universities). The questionnaire which was used to gather response concerning SRL contained a portion regarding demographic details about the respondents.

The demographic data collected from the sample university students showed that there were 342 female students who were part of the sample, and 161 male students were included in the study sample (Figure 4.4). So, some 68% female students were part of the study, while participation percentage of the male students was 32%. Gender differences were studied in present research mainly due to three reasons: To find out presence of any inequalities, to improve average responses of the students, and to obtain better idea about students' learning behaviours (OECD, 2009).

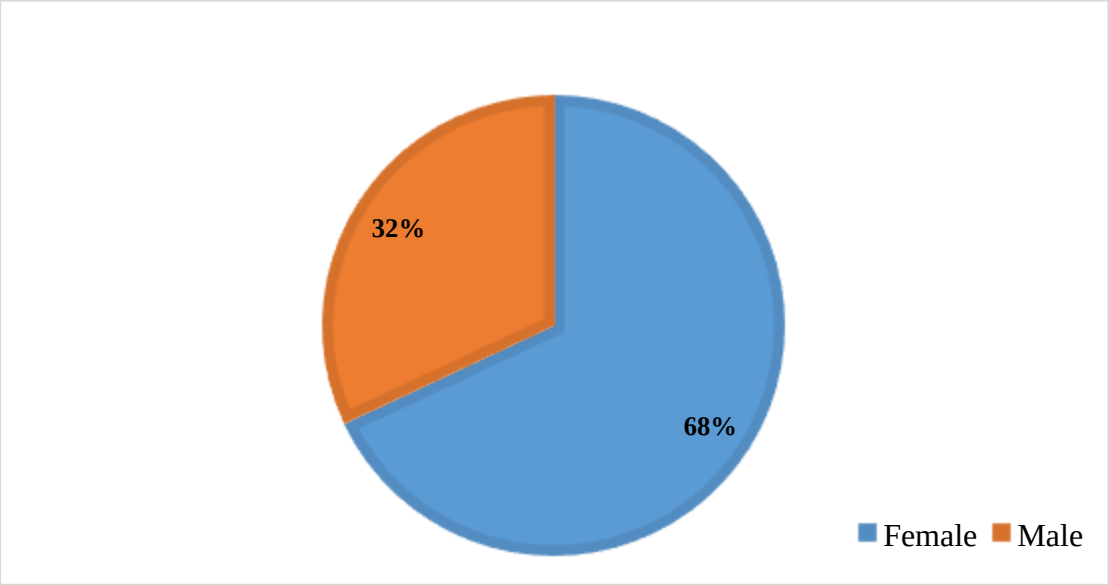

Figure 4.4. Gender Distribution of Sample University Students

The demographic information displayed in Figure 4.5 revealed that 169 students from Air University (34% of the sample size) participated in the study. While 158 students from Bahria University and 176 students from NUML, Islamabad were

respondents in data collection for the conduct of this study. Their participating ratios are 31% and 35% respectively:

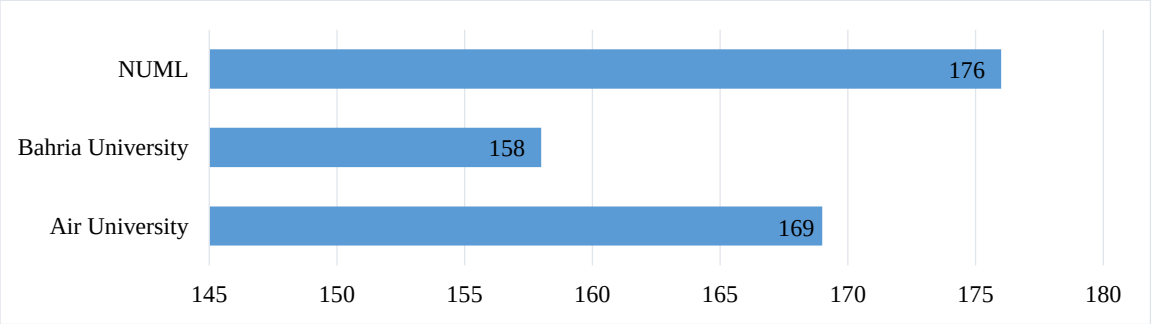

Figure 4.5. Institution-wise Distribution of Sample University Students

Section-2

4.3 Study of Means and Percentages of Responses – CPD Questionnaire

The CPD questionnaire consisted of three domains of CPD model. There were total of 35 statements in the research tool, which were meant to measure these domains of CPD. The responses of the respondent university teachers were solicited on a Likert Scale, having five points of responses. Respondents showed their response in these categories: 'Never True - 1', 'Rarely True - 2', 'Sometime True - 3', 'Often True - 4' and 'Always True - 5'.

Following are the details of CPD domains and corresponding statements. Descriptive statistics were applied to all the statements of the CPD questionnaire. Frequencies of responses, percentages of responses and means have been calculated. For complete statements of the questionnaire, see **Appendix N.**

Table No. 4.5 Results Summary – Direct Learning (N=100)

Sr. No	Statement	Option (%)					Mean
		Never True	Rarely True	Sometime True	Often True	Always True	
1.	I found institution-based training workshops to be effective.	0	6	22	38	34	4

2.	I found external workshops to be effective.	2	4	12	54	28	4.02
3.	I found educational conferences to be effective.	0	4	28	36	32	3.96
4.	I found short courses to be effective.	2	6	14	42	36	4.04
5.	I found seminars to be effective.	2	4	14	38	42	4.14

The statements were included to measure teachers' opinion about some common aspects of direct learning which is a part of CPD. The obtained data revealed that the statements concerning effectiveness of seminars yielded higher mean scores. Like other traditional forms of formal CPD, a seminar is an issue-oriented and focused activity. The efficacy of these seminars is enhanced through their conduct pattern and professional competence of the resource persons. A seminar is conducted in a way that it becomes more interactive in its form. The statements related to direct learning gave an average mean score of 4.03. Direct learning was rated high average when respondents gave their estimation about effectiveness of internal and external workshops, educational conferences, short courses and seminars. Table 4.5 displays the average mean score of the respondent teachers, in case of statements concerning direct learning, ranging from 3.96 – 4.14. The data tabulated in the table suggests that the university teachers of ICT considered the effectiveness of CPD through direct learning as 'Often True'.

Table No. 4.6 Results Summary –Learning in Professional Environment (N=100)

Sr. No	Statement	Option (%)					Mean
		Never True	Rarely True	Sometime True	Often True	Always True	
1.	My University management is providing enough opportunities for teachers' professional development.	0	4	14	42	40	4.18
2.	My institute has conducive environment to provide chances of professional development.	0	4	14	42	40	4.18
3.	My teaching methodology has improved, after I gained professional training.	0	12	14	36	38	4.00
4.	My last completed action research is still relevant for me.	2	10	16	34	38	3.96
5.	I would like to attend a professional conference even if I have to pay from my own side.	0	10	14	38	38	4.04

6.	My University has enough resources to implement what I learnt in professional development courses.	0	6	20	40	34	4.02
7.	My colleagues are a good intellectual company to help me gain professional development.	0	6	14	38	42	4.16
8.	My work environment is helpful in professional development.	0	10	22	34	34	3.92
9.	I find enough opportunities to have professional discussions with my colleagues.	2	6	22	34	36	3.96
10.	My time-table facilitates me to carry out activities of professional development.	0	14	22	40	24	3.74
11.	My staff-room is very comfortable one to discuss professional matters.	2	10	22	36	30	3.82
12.	My colleagues have friendly attitude, so I can discuss professional	0	6	16	34	44	4.16

	matters with them.						
13.	My colleagues are willing to listen to me regarding problems I face in class-room.	0	8	12	46	34	4.06
14.	Action research is encouraged in my Department.	4	10	24	28	34	3.78
15.	My University has well-spelled out CPD policy.	2	38	24	24	12	3.06
16.	My peers are able to satisfy me when we discuss current trends in our field of knowledge.	2	12	20	36	30	3.80
17.	I have enough time to discuss concepts and teaching ideas with my colleagues.	0	16	16	40	28	3.80
18.	University environment (including administration) are very supportive of professional development.	0	10	20	36	34	3.94
19.	My senior colleagues are available, so I can discuss	0	16	20	38	26	3.74

	my professional issues with them.						
20.	My University plans many educational trips for professional development.	4	16	38	24	18	3.36

To measure CPD through 'learning in professional environment' in the teachers teaching in public-sector universities of ICT, there were twenty statements in the questionnaire. 'Learning in professional environment' is another variant of CPD in this study to measure CPD of the university teachers of ICT. The respondent teachers going through learning in professional environment have been found indulged in peer learning, coaching, mentoring, action research, evaluation etc. These instances of learning formed part of their CPD. The responses for statements concerning 'learning in professional environment' yielded average mean score of 3.88. 'Learning in professional environment' is also meant to bring focus on individual needs arising while working in a specific organization. Close collaboration with peers, guidance and mentoring would be held in this category, with primary focus on specific individual and organizational needs and requirements. Statements dealing with this form of CPD also enabled the teachers to actively participate in their own CPD and gain deeper understanding of teaching practices. Data tabulated in Table 4.6 showed an average mean score ranging from 3.06 – 4.18, of the respondent teachers, in case of responses of the respondents to statements concerning their learning in their institution. Information given in the table indicates that the university teachers of ICT opted for 'Often True' regarding their CPD taking place in their institution.

Table No. 4.7 Results Summary – Out-of-Institute Learning (N=100)

Sr. No	Statement	Option (%)					Mean
		Never True	Rarely True	Sometime True	Often True	Always True	
1.	Once I leave University after office hours, I find sufficient time to join any learning community.	4	44	28	18	6	2.78
2.	I know a lot many people in other universities to interact with on professional matters.	6	36	30	24	4	2.84
3.	My domestic issues are not too many and I can find time to attend to any educational networking.	4	42	30	12	12	2.86
4.	Visits to other institutes for professional development are productive.	0	30	22	26	22	3.40
5.	I need to visit other institutes to enhance my professional knowledge.	2	38	34	16	10	2.94
6.	A lot of professional	2	40	32	16	10	2.92

	knowledge can be learnt from other people outside my university.						
7.	In my social circle outside the University, there are many people to attract me intellectually.	0	38	36	16	10	2.98
8.	Other institutions are always very welcoming for intellectual collaboration.	0	44	26	20	10	2.96
9.	I have so many friends in other universities who are related to my profession.	0	40	40	14	6	2.86
10.	My resources are enough to support my professional growth outside my university.	0	38	36	24	2	2.90

The ten statements given in Table 4.7 were made part of the questionnaire to measure CPD through out-of-institute learning in the teachers of the public-sector universities of ICT. Out-of-institute learning measures community-oriented learning of the teachers which occurs when they interact with other professional, join various groups and broaden their experiences. Respondents going through out-of-institute learning have been found forming part of certain communities where they could share experiences,

discuss issues and dilate upon professional strategies. They could mutually attain emotional stimulation and attain intellectual enrichment. Average mean score for the statements concerning out-of-institute learning was 2.94. Out-of-institute learning also refers to a collaborative learning practice which could be used to bring some longer-term shifts in teaching practices and help teachers develop shared sense of identity about their profession. Statements dealing with out-of-institute learning were related with teachers' interaction with other institutions and professional of the field. Table 4.7 displays the average mean score ranging from 2.78 - 3.40, regarding the out-of-institute learning of the respondent teachers. The lowest average mean score for this form of CPD was 2.78. Through the data tabulated in the table, it is found that the teachers teaching in ICT universities showed responses as 'Sometime True' in case of CPD through out-of-institute learning.

Table No. 4.8 Means of CPD Questionnaire Sub-Variables (N=100)

Section	No of Items	Sub-Variables Mean	Response
Direct Learning	5	4.03	Often True
Learning in Professional Environment	20	3.88	Often True
Out-of-Institute Learning	10	2.94	Sometime True
Overall	35	3.61	Often True

Table 4.8 is related to the means of sub-variables of CPD. The data tabulated in the table indicates that mean for ‘Direct Learning’ is 4.03, which indicates most of the respondents consider the statements related to the section as ‘Often True’. On the other hand, section mean for ‘Learning in Professional Environment’ is 3.88, showing that majority of the respondents has shown their preference for ‘Often True’ in this category. Lastly, means of the statements in case of sub-variable ‘Out-of-Institute Learning’ is 2.94, with the response ‘Sometime True’.

Section-3

4.4 Study of Means and Percentages of Responses – SRL Questionnaire (MSLQ)

The questionnaire to measure SRL of the university students was based on a standardized questionnaire, i.e., MSLQ. This devised questionnaire consisted of 56 statements and covered two sub-scales – motivation and learning strategies. These sub-scales were further divided into number of sub categories (details given in Table No. 4.46). The students of sample universities were asked to respond on a Likert Scale having five options. Respondents were required to show their response in these provided options: 'Never True - 1', 'Rarely True - 2', 'Sometime True - 3', 'Often True' - 4' and 'Very True - 5'.

Following are the details of SRL strategies, sub-categories and corresponding statements. Descriptive statistics were applied to all the statements of the SRL questionnaire. Frequencies of responses, percentages of responses and means have been calculated. For complete statements of the questionnaire, see **Appendix O.**

4.4.1 Motivational Strategies (SRL Questionnaire) Analysis

The Motivational Strategies sub-scale consists of six sub-categories, which are: Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance, and Test Anxiety. Descriptive analysis of Motivational Strategies is given in succeeding tables.

Table No. 4.9 Results Summary - Motivational Strategies (N=503)

Sr. No	Statement	Option (%)					Mean
		Never True	Rarely True	Sometime True	Often True	Always True	
1.	To learn new things, prefer study material that is really challenging (IGO)	3	9	26	32	30	3.78
2.	Satisfied that, during studies, try to understand content thoroughly (IGO)	1	7	23	33	36	3.96
3.	If possible, choose assignments to learn, not to get good grades (IGO)	3	10	20	28	40	3.90
4.	Want to do well to show ability to people around (EGO)	10	31	32	17	10	2.86
5.	Getting a good grade is most satisfying (EGO)	2	7	25	31	35	3.89
6.	Want to get better grades than others (EGO)	1	6	19	32	42	4.07
7.	Much interested in contents	1	9	21	36	33	3.91

	of the course (TV)					
8.	It is important to learn this course material (TV)	24	35	22	12	7	2.42
9.	Important to understand subject matter of present course (TV)	2	8	27	34	29	3.78
10.	Like subject matter of this course (TV)	3	7	20	31	39	3.97
11.	Own fault if do not learn course material (CB)	1	6	17	37	39	4.06
12.	Trying hard, can understand study material (CB)	1	7	26	37	29	3.85
13.	If study appropriately, will be able to learn course material (CB)	22	40	18	13	7	2.44
14.	Believe to obtain excellent grade (SELP)	2	7	21	34	37	3.97
15.	Expect to do well in class (SELP)	6	16	32	26	20	3.39
16.	Confident to understand the most complex material (SELP)	1	5	21	31	42	4.07

17. Certain to master skills taught in class (SELP)	1	3	21	39	36	4.05
18. Considering own skills, can do well in a difficult course (SELP)	2	7	23	29	39	3.98
19. Taking a test, think of other items difficult to answer (TA)	25	40	20	10	5	2.29
20. Taking a test, think about failure (TA)	2	7	28	34	29	3.82
21. Heart beats while appearing in an exam (TA)	3	7	19	34	37	3.96
22. Feel uneasy and upset while taking an exam (TA)	1	5	19	31	44	4.11

To measure SRL through 'Motivational Strategies' in the students of the public-sector universities of ICT, 22 statements were made part of the questionnaire. Motivational Strategies is first sub-scale of SRL which is being used in this study to measure this form of learning among the students of ICT universities. The study respondents who adopted motivational strategies while going through SRL, have been found indulged in Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance, and Test Anxiety (sub-scales of Motivational Strategies). Motivation has been an integral part of many theoretical frameworks.

Motivation here is a learner's internal drive to achieve her learning task. Motivational Scales has further three components, which are value, expectancy and affective components. For statements related to Motivational Strategies, average mean score was 3.67. Motivational Strategies are also meant to be significant for students' academic achievements. Motivation of the students highlights their tendency of higher goal setting, pursuing the goals with greater urge, eagerly devising plans and tactics, and purposefully evaluating their SRL. In this aspect of learning, learners actively participate in their own learning and statements in this section also inquired from the students about their deeper understanding of SRL practices. Data of the responses concerning use of motivational strategies by students in their SRL which is tabulated in Table 4.9 showed the average mean score ranging from 2.29 – 4.11. It led to the conclusion that the students at public sector university level demonstrated 'Often True' regarding their use of Motivational Strategies while being engaged in SRL.

4.4.2 Learning Strategies (SRL Questionnaire) Analysis

The Learning Strategies sub-scale has nine sub-categories, which are: Rehearsal, Elaboration, Organisation, Critical Thinking, Meta-Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking. Descriptive analysis of Learning Strategies is given in succeeding tables.

Table No. 4.10 Results Summary – Learning Strategies (N=503)

Sr. No	Statement	Option (%)					Mean
		Never True	Rarely True	Sometime True	Often True	Always True	

1.	While studying, practice rehearsing the material (Reh)	3	7	21	35	34	3.92
2.	Memorize key words to memorize important concepts (Reh)	2	9	28	34	27	3.75
3.	List down important terms to memorize (Reh)	2	9	23	32	34	3.87
4.	While studying, pull together information from different sources (Elab)	1	7	19	29	45	4.11
5.	Try to relate ideas in a subject with those in other subjects (Elab)	5	13	30	31	22	3.53
6.	While studying, write summaries of main ideas (Elab)	6	12	27	31	24	3.56
7.	Try to understand material by making connections (Elab)	3	7	21	32	37	3.95
8.	While studying, make outline to organize	1	7	28	30	34	3.87

	thoughts (Org)						
9.	While studying, go through class-notes (Org)	3	7	23	38	29	3.82
10.	Go over class-notes to make outline (Org)	4	16	28	31	21	3.52
11.	Think of evidence of the taught material (CT)	3	7	28	34	28	3.79
12.	Try to build ideas on study material (CT)	3	14	28	29	26	3.62
13.	Think of alternatives when hear a conclusion (CT)	2	11	26	31	30	3.76
14.	Build ideas on what is learnt (CT)	6	12	29	30	23	3.50
15.	Important points not missed (MCSR)	4	7	21	35	33	3.85
16.	Change style if study material is difficult (MCSR)	2	10	23	34	31	3.81
17.	Pose questions to self to understand study material (MCSR)	1	7	25	36	32	3.91

18. Could understand all (MCSR)	2	9	27	38	24	3.73
19. Deliberate what is supposed to be learnt (MCSR)	3	11	25	32	29	3.75
20. Determine concepts not understood well (MCSR)	2	9	19	29	41	3.99
21. Sort out later if confused in taking notes (MCSR)	2	7	26	36	29	3.83
22. Study in a place where can concentrate (TSE)	2	9	24	34	31	3.83
23. Make good use of study time (TSE)	2	8	27	30	33	3.83
24. Easy to stick to study schedule (TSE)	1	8	20	32	39	3.98
25. Attend this class regularly (TSE)	2	8	22	33	35	3.91
26. Find enough time to review before exams (TSE)	4	10	26	30	30	3.71
27. Do not feel so bored or lazy to quit (ER)	5	11	25	34	25	3.64

28. Work hard even do not like the material (ER)	2	10	19	36	33	3.87
29. Keep working till end even if material is uninteresting (ER)	2	7	25	32	34	3.89
30. Explain material to a friend (PL)	3	9	23	32	33	3.83
31. Work with class-fellows to complete work (PL)	2	6	25	34	33	3.90
32. Ask teacher for help if not understood (HS)	3	11	21	31	34	3.83
33. Ask fellows for help if can not understand (HS)	1	4	17	27	51	4.24
34. Try to identify fellows who can help (HS)	2	7	22	32	37	3.94

These thirty-four statements were included to measure SRL through 'learning strategies' among students of public sector universities of the Islamabad. The statements were included in the questionnaire to measure those aspects of SRL which are adopted by students while learning through learning strategies. Through the gathered data it was revealed that in case of some sub-categories of learning strategies, the obtained mean scores were higher. These sub-categories included 'time & study environment', 'organization' and 'metacognitive self-

regulation'. Like other sub-scale of SRL, 'Learning Strategies' have two main sets of strategies. These are cognitive and metacognitive strategies, and resource management strategies. Which consist of number of sub-categories. Here learners are considered as active learners, who formulate goals for learning, adopt suitable strategies and monitor their progress. It is assumed by Pintrich that learners are in a position to effectively monitor their cognition. They can also monitor and control their personal level of motivation for that learning task. For the statements which were related to learning strategies, average mean score was 3.79. It is also displayed through the data tabulated in Table 4.10 that average mean score, in case of Learning Strategies ranges from 3.50 – 4.24. It can also be assumed that the public-sector university students of ICT considered the use of SRL through 'Learning Strategies' as 'Often True'.

Table No. 4.11 Means of SRL Questionnaire Sub-Sections (N=503)

Strategies	Sub Category	Mean	Response	Sections Responses & Means
Motivational Strategies (22 statements)	Intrinsic Goal Orientation	3.71	Often True	Often True Mean=3.67
	Extrinsic Goal Orientation	3.94	Often True	
	Task Value	3.96	Often True	
	Control Beliefs	3.99	Often True	
	Self-Efficacy for Learning and Performance	3.94	Often True	
	Test Anxiety	2.50	Sometime True	

	Rehearsal	3.79	Often True	
	Elaboration	3.82	Often True	
	Organization	3.88	Often True	
	Critical Thinking	3.79	Often True	
Learning Strategies (34 statements)	Metacognitive Self-Regulation	3.88	Often True	Often True Mean=3.79
	Time and Study Environment	3.93	Often True	
	Effort Regulation	3.59	Often True	
	Peer Learning	3.63	Often True	
	Help Seeking	3.81	Often True	
Over-all Mean and Response (56 statements)		**3.73**	**Often True**	

Data tabulated in Table 4.11 shows that section mean for 'Motivational Strategies' is 3.67, which indicates most of the respondents consider the statements related to the section as 'Often True'. On the other hand, section mean for 'Learning Strategies' is 3.79, showing that majority of the student respondents have expressed their preference for 'Often True' in this category.

Section-4

Inferential statistics were applied in the study to test the study hypotheses. Results are tabulated and discussed below.

4.5 Study of Demographic Variables of Teachers at University Level

"H_0^1: There is no significant gender-based difference between male and female university teachers regarding CPD."

Table No. 4.12 Difference between CPD of Male & Female University Teachers (N=100)

Gender	N	Mean	t	df	Sig.
Female	56	126.78			
Male	44	126.77	.004	98	.997

Significance level: 0.05

Data tabulated in Table 4.12 indicates that't-value' (.004) is insignificant at 0.05 significance level, so the null hypothesis stated above is accepted. From the results quoted above, it can be concluded that there is insignificant gender-based difference between male and female university teachers regarding CPD. Gender does not seem to be a factor in determining the effect of CPD.

"H_0^{1a}: There is no significant gender-based difference between male and female university teachers regarding sub-scales of CPD."

Table No. 4.13 Difference between Male & Female University Teachers on the Sub-scales of CPD (N=100)

Sub-Scales of CPD Questionnaire	Female (N=56) Mean	Male (N=44) Mean	t	Sig.	df
Direct Learning	19.32	21.27	3.07	.003	98
Learning in Professional Environment	77.57	76.59	.410	.684	98
Out of Institute Learning	29.89	28.91	.627	.533	98

Significance level: 0.05

Data given in Table 4.13 displays that Female university teachers receive less Continuous Professional Development through Direct Learning, however their mean scores are higher as compared to Male Teachers in the sub-scales of Learning in Professional Environment and Out of Institute Learning. The 't-values' of the Continuous Professional Development sub-scale, direct learning (3.07) is significant at significance level of .05. However, 't-values' of the sub-scales, learning in professional environment and out of institute learning (.410 & .627) are not significant at significance level of 0.05. Therefore, the null hypothesis stated above regarding sub-scales of CPD is over-all accepted, except for direct learning.

"H_0^2: There is no significant teaching experience difference between university teachers regarding CPD."

Table No. 4.14 Difference between CPD of University Teachers with Varying Teaching Experience (N=100)

Experience	N	Mean	t	df	Sig.
0-5 Years	36	124.27			
6-10 Years	64	128.18	1.137	98	.261

Significance level: 0.05

Data tabulated in Table 4.14 indicates that 't-value' (1.137) is insignificant at 0.05 significance level, so the null hypothesis which states that there is no significant teaching experience difference between university teachers regarding CPD is accepted. It leads to the conclusion that there is no significant difference between CPD of University Teachers with different teaching experience. Teaching experience does not seem to be a factor in determining the effect of CPD, despite the fact that the teachers with 6-10 Years teaching experience had obtained higher mean scores.

"H_0^{2a}: There is no significant teaching experience difference between university teachers regarding sub-scales of continuous professional development."

Table No. 4.15 Difference between University teachers with varying teaching experience on the Sub-scales of CPD (N=100)

Sub-Scales of CPD Questionnaire	0-5 Years (N=36) Mean	6-10 Years (N=64) Mean	t	Sig.	df
Direct Learning	18.56	21.09	4.10	.000	98
Learning in Professional Environment	75.22	78.22	1.22	.225	98
Out of Institute Learning	30.50	28.88	1.00	.318	98

Significance level: 0.05

Data given in Table 4.15 shows that university teachers with 0-5 Years of teaching experience receive less Continuous Professional Development through Direct Learning and through Learning in Professional Environment, however their mean scores are higher as compared to those teachers who had 6-10 Years of teaching experience in sub-scale of Out of Institute Learning. The 't-values' of the CPD sub-scale, direct learning (4.10) is significant at significance level of .05. However, 't-values' of the sub-scales, learning in professional environment and out of institute learning (1.22 & 1.00) are not significant at significance level of 0.05. Therefore, the null hypothesis is accepted, except for direct learning for which 't-value' is significant.

4.6 Study of Demographic Variables of Students at University Level

"H_0^3: There is no significant gender-based difference between male and female students regarding SRL, at university level."

Table No. 4.16 Difference between Self-Regulated Learning of Male & Female Students at University Level (N=503)

Gender	N	Mean	t	df	Sig.
Female	342	207.91			
Male	161	215.70	3.95	501	.000

Significance level: 0.05

Data tabulated in Table 4.16 shows that 't-value' (3.95) is significant, so the null hypothesis is rejected. It is thus concluded that there is significant gender difference between SRL of male & female students at University level. Gender seems to be a factor in determining effect of SRL in terms of Motivational Strategies and Learning Strategies, with female university students obtaining lower mean scores.

"H_0^{3a}: There is no significant gender-based difference between male and female University Students regarding sub-scales of Self-Regulated Learning."

Table No. 4.17 Difference between Male & Female University Students on the sub-scales of Self-Regulated Learning (N=503)

Sub-Scales of SRL Questionnaire	Female (N=342) Mean	Male (N=161) Mean	t	Sig.	df
Motivational Strategies	79.93	81.86	2.36	.019	501
Learning Strategies	127.99	133.84	4.33	.000	501

Significance level: 0.05

Data given in Table 4.17 indicates that Female university students receive less Self-Regulated Learning in comparison with Male students in the sub-scales of Motivational Strategies and Learning Strategies (Female mean scores of 79.93 & 127.99 against Male mean scores of 81.86 & 133.84). The 't-values' of the SRL sub-scales (2.36 & 4.33) are significant at significance level of 0.05. Therefore, the null hypothesis is rejected.

Section-5

4.7 Study of Effects of Teachers' CPD on their Students' SRL

"$\mathbf{H_0^4}$: There is no significant effect of CPD of teachers on students' self-regulated learning at university level."

Table No. 4.18 Effect of CPD (N=100) on SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Continuous Professional Development	Self-Regulated Learning	.041	.284	.778	.002

Significance level: 0.05

a. Independent Variable: CPD (Direct Learning, Learning in Professional Environment, Out of Institute Learning)
b. Independent Variable: SRL (Motivational Strategies, Learning Strategies)

Data in Table 4.18 shows that R^2 value is 0.002 which indicates that Continuous Professional Development which is the independent variable of the study, causes .2% variation in Self-Regulated Learning, and rest of such learning is caused due to some other factors. The β coefficient (0.041) is not significant at 0.05 level of significance. It also indicates that CPD of teachers is positively related with SRL of the students. Thus, the null hypothesis is accepted.

Table No. 4.19a Effect of CPD (N=100) on Motivational Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Continuous Professional Development	Motivational Strategies (SRL)	.121	.845	.402	.015

Significance level: 0.05

Data in Table 4.19a indicates that R^2 value is 0.015 which indicates that Continuous Professional Development which is independent variable of the study, causes 1.5% variation in Motivational Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient value is positive, at .121 which is insignificant at 0.05 level of significance. It indicates that CPD of teachers is positively related with motivational strategies. Thus, the null hypothesis is accepted.

Table No. 4.19b Mean Difference of Continuous Professional Development (N=100) & Motivational Strategies - SRL (N=503)

Sub Variables	Mean	β	t	Sig.
Intrinsic Goal Orientation	11.04	.020	.141	.888
Extrinsic Goal Orientation	11.80	.140	.981	.332
Task Value	15.80	.063	.435	.666
Control Beliefs	11.90	.122	.850	.399
Self-Efficacy for Learning & Performance	19.54	-.004	.029	.977
Test Anxiety	10.16	-.166	1.168	.248
Motivational Strategies	80.24	.121	.845	.402
Continuous Professional Development	126.78			

Significance level: 0.05

In Table 4.19b, means differences of Motivational Strategies and its factors have been displayed, along with CPD of university teachers. The means of Motivational Strategies is 80.24 and that of CPD is 126.78. The data in table also indicates that β – values for various sub-variables are .020 for Intrinsic Goal Orientation, .140 for Extrinsic Goal Orientation, .063 for Task Value, .122 for Control Beliefs, -.004 for Self-Efficacy for Learning & Performance, and -.166 for Test Anxiety. It means that Self-Efficacy for Learning & Performance and Test Anxiety are negatively associated with CPD.

Table No. 4.20a Effect of Continuous Professional Development (N=100) on Learning Strategies - SRL (N=503)

Independent Variable	**Dependent Variable**	**β (Coefficient)**	**t**	**Sig.**	**R Square**
Continuous Professional Development	Learning Strategies (SRL)	.144	1.010	.317	.021

Significance level: 0.05

Data in Table 4.20a shows that R^2 value is 0.021 which indicates that the independent variable of present research, i.e. Continuous Professional Development causes 2.1% variation in Learning Strategies (a sub-variable of SRL), and rest of such learning is caused due to some other factors. The β coefficient is .144 which is positive but insignificant at 0.05 level of significance. It indicates that teachers' continuous professional development is positively related with learning strategies, a sub-variable of SRL. Thus, the hypothesis is accepted.

Table No. 4.20b Mean Difference of Continuous Professional Development (N=100) & Learning Strategies - SRL (N=503)

Sub Variables	Mean	β	T	Sig.
Rehearsal	11.30	.065	.452	.653
Elaboration	15.22	.073	.505	.616
Organisation	11.60	-.032	.222	.825
Critical Thinking	15.10	.047	.324	.747
Meta Cognitive Self-Regulation	27.14	-.037	.258	.797
Time & Study Environment	19.60	-.049	.339	.736
Effort Regulation	11.04	.287	2.078	.043
Peer Learning	7.22	.174	1.227	.226
Help Seeking	11.40	.195	1.375	.176
Learning Strategies	129.62	.144	1.01	.317
Continuous Professional Development	126.78			

Significance level: 0.05

In Table 4.20b, means differences of Learning Strategies and its factors have been displayed, along with CPD of university teachers. The means of Learning Strategies is 129.62 and that of CPD is 126.78. The data tabulated above indicates that β – values for various sub-variables are .065 for Rehearsal, .073 for Elaboration, -.032 for Organisation, .047 for Critical Thinking, -.037 for Meta Cognitive Self-Regulation, -.049 for Time &

Study Environment, .287 for Effort Regulation, .174 for Peer Learning, and .195 for Help Seeking. It also means that sub-variables Organisation, Meta Cognitive Self-Regulation, and Time & Study Environment are inversely associated with CPD of teachers, while most of the sub-variables of Learning Strategies (Rehearsal, Elaboration, Critical Thinking, Effort Regulation, Peer Learning and Help Seeking) are positively linked with CPD.

"**H_0^{4a}**: There is no significant effect of CPD of university teachers with regard to direct learning on their students' self-regulated learning related to sub variables of Motivational Strategies."

Table No. 4.21 Effect of Direct Learning - CPD (N=100) on Motivational Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Direct Learning (CPD)	Motivational Strategies (SRL)	.169	1.184	.242	.028

Significance level: 0.05

Data in Table 4.21 indicates that R^2 value is 0.028 which indicates that Direct Learning (a sub-variable of CPD, independent variable of the study), causes 2.8% variation in Motivational Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient is .169 and is insignificant at significance level of 0.05. This fact reveals that direct learning of teachers has positive relationship with motivational strategies. Thus, the null hypothesis is accepted.

"H_0^{4b}: There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' self-regulated learning related to sub variables of Motivational Strategies."

Table No. 4.22 Effect of Learning in Professional Environment - CPD (N=100) on Motivational Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Learning in Professional Environment (CPD)	Motivational Strategies (SRL)	.021	.147	.884	.000

Significance level: 0.05

Through the data in Table 4.22 it is revealed that R^2 value is 0.000 which indicates that Learning in Professional Environment (a sub-variable of Continuous Professional Development, independent variable of the study), causes no variation in Motivational Strategies (a sub-variable of SRL), and such learning is the result of some other factors. The β coefficient is .021 which is positive and insignificant at 0.05 level of significance. It indicates that learning in professional environment of teachers is directly related with motivational strategies. Thus, the null hypothesis given above is accepted.

"H_0^{4c}: There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' self-regulated learning related to sub variables of Motivational Strategies."

Table No. 4.23 Effect of Out-of-Institute Learning - CPD (N=100) on Motivational Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Out-of-Institute Learning (CPD)	Motivational Strategies (SRL)	.217	1.541	.130	.027

Significance level: 0.05

Data in Table 4.23 indicates that R^2 value is 0.027 which indicates that Out of Institute Learning (a sub-variable of Continuous Professional Development, independent variable of the study), causes 2.7% variation in Motivational Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient is .217 which is positive and insignificant at 0.05 level of significance. It shows that out of institute learning of teachers is positively related with motivational strategies. Thus, the null hypothesis stated above is accepted.

"H_0^{4d}: There is no significant effect of CPD of university teachers with regard to direct learning on their students' self-regulated learning related to sub variables of Learning Strategies."

Table No. 4.24 Effect of Direct Learning - CPD (N=100) on Learning Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Direct Learning (CPD)	Learning Strategies (SRL)	.113	.791	.433	.013

Significance level: 0.05

Data in Table 4.24 indicates that R^2 value is 0.013 which indicates that Direct Learning (a sub-variable of Continuous Professional Development, independent variable of the study), causes 1.3% variation in Learning Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient is .113 which is positive and insignificant at 0.05 level of significance. This statistical calculation reveals that direct learning of teachers has positive relationship with learning strategies. Thus, the null hypothesis is accepted.

"H_0^{4e}: There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' self-regulated learning related to sub variables of Learning Strategies."

Table No. 4.25 Effect of Learning in Professional Environment - CPD (N=100) on Learning Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Learning in Professional Environment (CPD)	Learning Strategies (SRL)	.201	1.419	.162	.040

Significance level: 0.05

Data in Table 4.25 indicates that R^2 value is 0.040 which indicates that Learning in Professional Environment (a sub-variable of Continuous Professional Development, independent variable of the study), causes 4.0% variation in Learning Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient is .201 which is positive and insignificant at 0.05 level of significance. It indicates that learning in professional environment of teachers is directly related with motivational strategies. Thus, the null hypothesis is accepted.

"H_0^{4f}: There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' self-regulated learning related to sub variables of Learning Strategies."

Table No. 4.26 Effect of Out-of-Institute Learning - CPD (N=100) on Learning Strategies - SRL (N=503)

Independent Variable	Dependent Variable	β (Coefficient)	t	Sig.	R Square
Out-of-Institute Learning (CPD)	Learning Strategies (SRL)	.054	.371	.712	.003

Significance level: 0.05

The R^2 value of 0.003 shown in Table 4.26 indicates that Out of Institute Learning (a sub-variable of CPD, independent variable of the study), causes 0.3% variation in Learning Strategies (a sub-variable of SRL), and rest of such learning is the result of some other factors. The β coefficient is .054 which is positive and insignificant at 0.05 level of significance. It indicates that out of institute learning of teachers is directly related with learning strategies. Thus, the null hypothesis given above is accepted.

Table No. 4.27 Summary of Hypotheses Testing

Sr No.	Hypothesis Statement	Outcome
1.	There is no significant gender-based difference between male and female teachers regarding CPD.	Accepted
2.	There is no significant gender-based difference between male and female university teachers regarding sub-scales of CPD.	Accepted
3.	There is no significant teaching experience difference between university teachers regarding CPD.	Accepted
4.	There is no significant teaching experience difference between university teachers regarding sub-scales of CPD.	Accepted
5.	There is no significant gender-based difference between male and female students regarding SRL, at university level.	Rejected
6.	There is no significant gender-based difference between male and female University Students regarding sub-scales of SRL.	Rejected
7.	There is no significant effect of CPD of teachers on students' self-regulated learning at university level.	Accepted
8.	There is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Motivational Strategies, i.e., Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Accepted

9.	There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Motivational Strategies, i.e., Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Accepted
10.	There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' SRL related to sub variables of Motivational Strategies, i.e., Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety.	Accepted
11.	There is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Learning Strategies, i.e., Rehearsal, Elaboration, Organisation, Critical Thinking, Meta Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Accepted
12.	There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Learning Strategies, i.e., Rehearsal, Elaboration, Organisation, Critical Thinking, Meta Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Accepted
13.	There is no significant effect of CPD of university teachers	

	with regard to out-of-institute learning on their students' SRL related to sub variables of Learning Strategies, i.e., Rehearsal, Elaboration, Organisation, Critical Thinking, Meta Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking.	Accepted

The summary of the tested hypotheses tabulated in Table 4.108 indicates that there were total 13 null hypotheses which were tested in Chapter 4, during data analysis. Out of these, two hypotheses were rejected, and remaining eleven were accepted.

CHAPTER 5

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The present study analyzed the effect of university teachers' CPD on their students' SRL. CPD of the university teachers and SRL of their students was measured and then, effect of teachers' CPD on their students' SRL was studied, as per the study objectives of the research. Five objectives were set for the conduct of this present research. First objective was to identify level of CPD among university teachers. While the second objective of the study was meant to assess SRL among university students. On the other hand, third objective set for the present study was to compare demographic differences (gender and teaching experience) regarding CPD of university teachers. Next, the fourth objective of this research was to compare gender-based difference regarding SRL of students at university level. The 5th and last objective of present study was to determine effect of CPD of teachers on their students' SRL at university level.

This present research was delimited to the university faculty members and students of three universities of ICT, i.e., Air University, Bahria University and NUML. The faculty members and students of faculties of Management Sciences and Social Sciences, related to BS Program were selected for data collection. Sample size for university teachers was 100 and sample size of students from these three universities was 503. In order to measure CPD of the university teachers, a framework developed by Lieberman (1996) was used. It measured level of teachers' CPD in the domains of direct learning, learning in professional environment and out of institute learning. A questionnaire was designed by the researcher, consisting of 35 items, which was based on

this theory of CPD. To measure SRL of the university students, a standardized questionnaire, known as MSLQ, framed by Pintrich (2000) was used, which he based on his SRL model. This framework divided this form of students' learning into Motivational Strategies and Learning Strategies. The study was instrumental in studying the effect of CPD of University teachers on their students' SRL. The research also investigated the effect of gender and job experience of university teachers on their CPD, and impact of gender on SRL of the students. The responses of the respondents were collected with the help of questionnaires used in the survey; to measure the level of variables of the study, the results were tabulated in SPSS, 21st Edition. The statistical analysis of this tabulated data helped to study the effect of CPD of teachers on SRL of their students, at university level.

Available related literature has been reviewed in the domains of teachers' CPD and SRL of students at university level. PD of the teachers has been analysed in detail. Its aim, characteristics and principles have been highlighted. The role of PD in formulation of teachers' perceptions has been studied in this part to understand its true nature. After reviewing literature on PD of teachers in general, then focus shifted to CPD of the teachers at university level. Genesis of CPD has been focused by concentrating on various definitions offered by theorists of the concept. Different types and forms of CPD, its evaluation theories and purposes/ objectives have been evaluated to understand the true nature of teachers' CPD. Then CPD models have been analysed, and in this regard, discussed models are Reid's quadrants of teachers' learning, Kennedy's three frameworks to categorize CPD models, Bell and Gilberts' three aspects, Sparks and Horsley (1989) and Lieberman's (1996) CPD classification. Same wise, SRL holds a significant place in learning spectrum of the students, university students in case of present study. Its theoretical background, nature and the role of social cognitive theory in framing this

concept has been explored here in literature review. Models of SRL and various factors have been reviewed in relevant literature. Sup-processes of SRL and its components form significant part of the studies on the subject, so these concepts have also been reviewed. SRL is achieved through employing various strategies, and these main strategies have been studied in the perspective of related literature. In the last part of the chapter, some studies have been reviewed which focused on impact of professional development of teachers on some learning aspects of their students.

The study revealed that, in national context of Pakistan, there is no effect of CPD of university teachers on SRL of the students. Although the level of CPD in national universities is high, except out of institute learning, yet its effect on SRL of the students is weak.

5.2 Findings

5.2.1 Findings concerning demographic characteristics of the study sample

1. **Study Sample for CPD – University Teachers**

   i. It was found through the demographic data collected from the sample university teachers that there were 56 female teachers who were part of the sample, and 44 male teachers were included in the study sample. So, some 56% female teachers participated in the study and participation percentage of the male teachers was 44%. (Table No. 4.1)

   ii. The demographic information collected through the questionnaire indicated that out of sample size of hundred teachers, 42 held M.Phil. degree (some 42% of the sample). A total of 58 university teachers had a Ph.D. degree. So, in the sample of the study, 58%

had Doctorate degree. However, the demographic data showed that none of the respondent teachers had held Post-Doctorate qualification. (Table No. 4.2)

iii. Through the questionnaire, the respondent faculty members were also required to specify duration of their teaching experience. They were asked if they possessed up-to 5, 10, 15, or more years of teaching experience at the university level. It was found that 36 respondents (36%) among sample size of 100 university teachers fell in experience category of 0 – 5 years, and 64 respondents (64%) were ranging from 6 – 10 years of experience. None amongst the sample respondents had teaching experience of more than 10 years. (Table No. 4.3)

2. **Study Sample for SRL – University Students**

i. It was found that BS Program (7^{th} and 8^{th} Semesters) was selected to gather the data. BS programs were selected because it was found that adequate number of students to conduct this study were present at this level in these three universities which were randomly selected as sample of the study.

ii. In total 503 students of these universities were selected to measure SRL. The demographic data collected from the sample university students showed that there were 342 female students who were part of the sample, and 161 male students were in the study sample. So, participation percentage of female students was 68% and 32% male students participated in the present study (Table No. 4.4).

iii. It was found through the demographic information that 169 students from Air University (34% of the sample size) participated in the study. While 158 students from Bahria University and 176 students from NUML were the respondents in data collection for the conduct of this study. Their participating ratios are 31% and 35% respectively (Table No. 4.4).

5.2.2 Findings based on CPD of University teachers in Universities of Islamabad

The study findings reveal that most of the respondent teachers who were teaching in universities of ICT consider various practices of their CPD as 'Often True', with questionnaire mean of 3.61.

1. **Direct Learning**

   i. It was found through the means of the five statements included in the section (4.00, 4.02, 3.96, 4.04 and 4.14) and the section mean for 'Direct Learning' (4.03), that most of the respondents considered the effectiveness of the direct learning in CPD to be 'Often True'. Direct learning is achieved through some formal practices like seminars, workshops and professional conferences, to be held in own institution and to be organised externally.

   ii. Details given in Table 4.5 displayed university teachers' responses with respect to the effectiveness of the institution-based workshops. It indicated that 72% of the respondents gave their response in the categories of 'Often True' and 'Always True'. While responses frequencies tabulated in Table 4.5 indicated that 82% of the respondents had favoured the categories of 'Often True'

and ‘Always True’ regarding the effectiveness of the external workshops. Details given in the table showed that 68% of the respondent university teachers opted for the categories of ‘Often True’ and ‘Always True’ regarding the effectiveness of the educational conferences. Some 28% of the respondents considered the statement to be ‘Sometime True’.

iii. It was also found through data in Table 4.5 that 78% of the respondent university teachers chose the categories of ‘Often True’ and ‘Always True’ regarding the effectiveness of short courses. Some 28% of the respondents considered the statement to be ‘Sometime True’. While details given in Table 4.5 indicated that majority of the respondents, i.e. 80% gave their response in the categories of ‘Often True’ and ‘Always True’ regarding the effectiveness of the educational seminars.

2. **Learning in Professional Environment**

i. It was found in the study that the section mean for this section of CPD questionnaire was 3.88, which was interpreted as ‘Often True’. It was revealed that a total of twenty statements were included in the questionnaire with regard to ‘learning in professional environment’ as a form of CPD. Means of the statements in this section were found to be 4.18, 3.64,4.00, 3.96, 4.04, 4.02, 4.16, 3.92, 3.96, 3.74, 3.82, 4.16, 4.06, 3.78, 3.06, 3.80, 3.80, 3.94, 3.74, and 3.36.

ii. It was found from data tabulated in Table 4.6 that 82% of the respondents had given their response in the categories of ‘Often

True' and 'Always True' regarding the provision of enough PD activities by university management. Data in Table 4.6 indicated that 60% of the respondents had given their response in the categories of 'Often True' and 'Always True' regarding the conducive environment of the institute. Some 22% of the respondents considered the statement to be 'Sometime True'. However, in Table 4.6, it was found that 74% of the respondents gave their response in the categories of 'Often True' and 'Always True' considering that their teaching methodology improved after they gained professional training. It was revealed through the data in the table that 72% of the respondent university teachers opted for the categories of 'Often True' and 'Always True' regarding the relevance of their last completed action research even to date. The frequencies of the responses given in Table 4.6 indicated that 76% of the respondents chose to respond in the categories of 'Often True' and 'Always True' regarding attending a professional activity even if they had to make payment from their personal side.

iii. It was also found with the help of data in Table 4.6 that 74% of the respondents had given their response in the categories of 'Often True' and 'Always True' considering that their university had enough resources to implement what they learnt in PD. It was revealed through the data in the same Table that 80% of the respondent university teachers favoured the categories of 'Often True' and 'Always True' regarding the presence of their colleagues as good intellectual company. The details of Table 4.6 revealed that

68% of the respondents chose the categories of ‘Often True’ and ‘Always True’ regarding how helpful their work environment was related to their professional learning. Data in Table 4.6 concerning the responses of the university teachers indicated that 70% of the respondents had given their response in the categories of ‘Often True’ and ‘Always True’ related to availability of enough opportunities for professional discussions among peers. Respondents’ responses given in this table revealed 64% of the respondents opting for the categories of ‘Often True’ and ‘Always True’ regarding the time table facilitates to carry-out activities of PD. Some 22% of the respondents considered the statement to be ‘Sometime True’.

iv. It was further found during the present study through data details of Table 4.6 that 66% respondents gave their response in the categories of ‘Often True’ and ‘Always True’ considering that their staff room was comfortable to discuss professional matters. Some 22% of the respondents considered the statement to be ‘Sometime True’. It was revealed through the data in this table that 78% of the respondent university teachers opted for the categories of ‘Often True’ and ‘Always True’ regarding the friendly attitude of colleagues while discussing professional matters. The frequencies of the sample responses given in Table 4.6 indicated that 80% of the respondents had chosen to respond in the categories of ‘Often True’ and ‘Always True’ regarding attending a professional activity even if they had to make payment from their personal side.

Data in Table 4.6 indicated that 62% of the respondents gave their response in the categories of ‘Often True’ and ‘Always True’ regarding the provision of enough PD activities by university management. Some 24% of the respondents considered the statement to be ‘Sometime True’. Table 4.6 indicated that only 36% of the respondents opted for the categories of ‘Often True’ and ‘Always True’ regarding the existence of well-spelled out CPD policy in university. Some 24% of the respondents considered the statement to be ‘Sometime True’, and 38% of the sample university teachers considered the statement as ‘Rarely True’.

v. It was also found that data tabulated in Table 4.6 revealed that 66% of the respondents had given their response in the categories of ‘Often True’ and ‘Always True’ considering that their peers possess enough knowledge to discuss current trends. It was displayed through the data in Table 4.6 that 68% of the respondent university teachers chose the categories of ‘Often True’ and ‘Always True’ regarding the availability of time to have professional discussions with colleagues. The details of Table 4.6 indicated that 70% of the respondent university teachers opted for ‘Often True’ and ‘Always True’ regarding the university environment to be supportive of PD. Data in the Table concerning the responses of the university teachers indicated that 64% of the respondents had given their response in the categories of ‘Often True’ and ‘Always True’ regarding the availability of senior colleagues to discuss professional matters with them. Data given in

Table 4.6 displayed that only 42% of the respondents chose the categories of ‘Often True’ and ‘Always True’ regarding many educational trips planned by the university. While 38% of the respondents considered the statement to be ‘Sometime True’.

3. **Out-of-Institute Learning**

i. It was found that section mean for this out of institute learning section of the CPD questionnaire was 2.94 (Sometime True). It was also found that 10 statements were included in the questionnaire with regard to ‘out of institute learning’ which is a form of CPD. Means of the statements in this section were found to be 2.78, 2.84, 2.86, 3.40, 2.94, 2.92, 2.98, 2.96, 2.86, and 2.90.

ii. It was also found that data in Table 4.7 concerning the responses of the university teachers indicated, only 24% of the respondents had given their response in the categories of ‘Often True’ and ‘Always True’ regarding the availability of sufficient time for joining any learning community after office hours. Some 28% of the respondents considered the statement to be ‘Sometime True’. Majority of the sample university teachers, i.e., 44% considered the statement as ‘Rarely True’. Responses frequencies given in Table 4.7 displayed that only 28% of the respondents favoured the categories of ‘Often True’ and ‘Always True’ regarding the interaction of university teachers with professionals in other universities. Some 30% of the respondents considered the statement to be ‘Sometime True’. On the other hand, 36% of the sample university teachers considered the statement as ‘Rarely

True'. The data mentioned in this table revealed that only 24% of the respondents chose the categories of 'Often True' and 'Always True' considering that their domestic issues do not create hurdles in attending educational networking. Some 30% of the respondents considered the statement to be 'Sometime True'. 42% of the sample university teachers considered the statement as 'Rarely True'. It was revealed through the data in Table 4.7 that 48% of the respondent university teachers opted for the categories of 'Often True' and 'Always True' regarding the productivity of visits to other universities. Some 22% of the respondents considered the statement to be 'Sometime True' and 30% of the respondents among the sample university teachers considered the statement as 'Rarely True'. The data in Table 4.7 indicated that 26% of the respondents had chosen to respond in the categories of 'Often True' and 'Always True' regarding visiting other institutes to enhance professional knowledge. However, 34% of the respondents considered the statement to be 'Sometime True'. On the other hand, 38% of the sample university teachers considered the statement as 'Rarely True'.

iii. It was also found that Data in Table 4.7 indicated that only 26% of the respondents gave their response in the categories of 'Often True' and 'Always True' regarding gaining professional knowledge from people outside own university. Some 32% of the respondents considered the statement to be 'Sometime True'. Majority of the sample university teachers, i.e., 40% considered the

statement as ‘Rarely True’. Response details of the university teachers given in Table 4.7 indicated that only 26% of the respondents chose the categories of ‘Often True’ and ‘Always True’ regarding presence of people outside the university who attract intellectually. Some 36% of the respondents considered the statement to be ‘Sometime True’. On the other hand, 38% of the sample university teachers considered the statement as ‘Rarely True’. Data tabulated in the Table revealed that only 30% of the respondents opted for the categories of ‘Often True’ and ‘Always True’ considering that other institutions were welcoming for intellectual collaboration. Some 26% of the respondents considered the statement to be ‘Sometime True’. A total of 44% of the sample university teachers considered the statement as ‘Rarely True’. It was revealed through the data in Table 4.7 that 20% of the respondent university teachers had given their response in the categories of ‘Often True’ and ‘Always True’ regarding the presence of professionally related friends in other universities. Some 40% of the respondents considered the statement to be ‘Sometime True’ and 40% of the respondents among the sample university teachers considered the statement as ‘Rarely True’. Details of the responses tabulated in the Table indicated 26% of the respondents opting for ‘Often True’ and ‘Always True’ regarding enough resources to support PD outside the university. However, 36% of the respondents considered the statement to be ‘Sometime

True'. On the other hand, 38% of the sample university teachers considered the statement as 'Rarely True'.

5.2.3 Findings based on SRL questionnaire (University Students in Islamabad)

The study findings related to SRL showed that the respondent students from the universities in Islamabad showed a mix response towards several aspects of this form of learning. Overall mean of the questionnaire was 3.73, which indicated 'Often True' in the response category.

1. **Motivational Strategies**

   i. It was found through mean score of the sub-scale Motivational Strategies (3.67) that majority of the respondent university students from Universities of Islamabad consider the statements to be 'Often True'.

   ii. **Intrinsic Goal Motivation**. Findings of the present study revealed that 'Intrinsic Goal Motivation' mean score was 3.71. Details given in Table 4.9 concerning the responses of the university students indicated that 62% of the respondents opted for the categories of 'Often True' and 'Very True' regarding the selection of challenging study material. About 26% respondents favoured 'Sometime True'. While details given in Table 4.9 indicated that 71% of the respondents gave their response in the categories of 'Often True' and 'Very True' regarding the satisfaction with effort to understand the course contents. About 21% respondents opted for 'Sometime True'. Data tabulated in Table 4.9 was related to the responses of the university students for

the third statement related to Intrinsic Goal Orientation, and it indicated that 46% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ regarding the selection of contents which provide opportunity of learning instead of grades. And 32% respondents opted for ‘Sometime True’.

iii. **Extrinsic Goal Orientation**. Findings of present research also indicated that mean score for responses of the respondents in sub-category, ‘Extrinsic Goal Orientation’ was 3.94 (Sometime True). It was revealed through the data in Table 4.9 that 67% of the respondent university students have given their response in the categories of ‘Often True’ and ‘Very True’ regarding the desire to perform to prove it to people around. 20% of the respondents considered the statement to be ‘Sometime True’. Furthermore, data in Table 4.9 revealed that 71% of the sample chose ‘Often True’ and ‘Very True’ concerning their satisfaction in getting good grade in class. Some 20% of the respondents considered the statement to be ‘Sometime True’. In case of third statement of this sub-category, data in this Table indicated that 71% of the respondent university students favoured the categories of ‘Often True’ and ‘Very True’ regarding their desire to obtain good grades in class. 20% of the respondents considered the statement to be ‘Sometime True’.

iv. **Task Value**. It was found in the study that ‘Task Value’ was measured at mean score of 3.96 (Sometime True). While going through statements related to this sub-category, it was further revealed in Table No. 4.9 that 69% of the respondents gave their

response in the categories of ‘Often True’ and ‘Very True’ considering that they were interested in contents of the course. The details of the table indicated that 76% of the respondent students had chosen to respond in the categories of ‘Often True’ and ‘Very True’ regarding the students considering learning in the course as important. Data tabulated in Table 4.9 indicated that 72% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ regarding the selection of contents which provided opportunity of learning instead of grades. Details given in this table concerning the responses of the university students found that 63% of the respondents chose ‘Often True’ and ‘Very True’ regarding their liking for the course contents. While about 28% respondents opted for ‘Sometime True’.

v. **Control Beliefs**. Study findings also revealed that respondent students’ mean score for the sub-category of ‘Control Beliefs’ was 3.99, which was also ‘Sometime True’. The frequencies of the responses of the sample university students to the first statement, given in Table 4.9, indicated that 66% of the respondents opted to respond in the categories of ‘Often True’ and ‘Very True’ regarding the students considering it own fault if material was not learnt. Some 24% of the respondents considered the statement to be ‘Sometime True’. Responses mentioned in this Table revealed that 68% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ considering that if tried hard enough, contents of the course would be understood. Some 23% of the

respondents considered the statement to be ‘Sometime True’. While data tabulated in Table 4.9 indicated that 75% of the respondents opted for the categories of ‘Often True’ and ‘Very True’ regarding appropriately studying to learn the material.

vi. **Self-Efficacy for Learning and Performance**. It was also found that, regarding the sub-category of ‘Self-Efficacy for Learning and Performance’, the mean score was 3.94, which was interpreted as ‘Sometime True’. Data in Table 4.9 indicated that 69.4% of the respondent university students chose to favour the categories of ‘Often True’ and ‘Very True’ regarding belief to obtain good grades in class. Details given in the table concerning the responses of the university students showed that 74% of the respondents have given their response in the categories of ‘Often True’ and ‘Very True’ regarding the expectation to do well in class. Table No. 4.9 revealed that 62% of the respondents opted for the categories of ‘Often True’ and ‘Very True’ considering that they were confident to understand contents of the course. Some 27% of the respondents considered the statement to be ‘Sometime True’. While details of data in Table 4.9 revealed that 66% of the respondents chose the categories of ‘Often True’ and ‘Very True’ regarding belief to master new skills taught in class. While data tabulated in Table 4.9 indicated that over 74% of the respondent university students opted for the categories of ‘Often True’ and ‘Very True’ regarding their expectation to do well in class.

vii. **Test Anxiety**. It was found that mean score of 2.50 (Rarely True) was recorded for the sub-category of 'Test Anxiety'. Table 4.9 related to this sub-category revealed that 27% of the respondents chose 'Often True' and 'Very True' considering that if they thought of other items while attempting a difficult item in their test. Some 32.2% of the respondents considered the statement to be 'Sometime True'. However, 30.8% of the sample university teachers considered the statement as 'Rarely True'. Data tabulated in this table indicated that some 34.6% of the sample university students considered the statement regarding thinking about consequences of failing during a test, as 'Rarely True' and 24.5% students in sample size of 503 university students selected the option 'Never True'. Details given in Table 4.9 regarding feeling nervous while taking an exam revealed that 40% of the sample university students considered the statement as 'Rarely True', and 22% students selected the option 'Never True'. It was revealed through details given in Table 4.9 that large number of students, i.e., 40% of the sample university students considered the statement regarding feeling upset while taking an exam as 'Rarely True' and 25% students opted for 'Never True'.

2. **Learning Strategies**

i. Mean score of the sub-scale Learning Strategies was found to be at 3.79. This score also revealed that among the respondent students from the universities of Islamabad majority of them considered the statements to be 'Often True'.

ii. **Rehearsal**. The sub-category ‘Rehearsal’ received responses at a mean score of 3.79. Data mentioned in Table 4.10 revealed that 55% of the respondents responded in the categories of ‘Often True’ and ‘Very True’ considering that while studying, they practiced rehearsing. Some 27% of the respondents considered the statement to be ‘Sometime True’. While data in this Table indicated that 70% of the respondent university students opted for the categories of ‘Often True’ and ‘Very True’ regarding their practice of memorizing key words. Data in Table 4.10 indicated that 64.6% of the respondent university students chose to favour the categories of ‘Often True’ and ‘Very True’ regarding preparation of lists of important terms and then memorizing the lists. Some 23% of the respondents considered the statement to be ‘Sometime True’.

iii. **Elaboration**. It was also found in the study that 3.82 mean score was recorded for Elaboration, sub-category of Learning Strategies, with response in category of Sometime True. Responses of the university students tabulated in Table No. 4.10 revealed that 68% of the respondents favoured the categories of ‘Often True’ and ‘Very True’ regarding using information from different sources, while studying. Some 20.7% of the respondents considered the statement to be ‘Sometime True’. Data tabulated in the given Table revealed that 64.8% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ regarding students’ effort to relate ideas. About 24% respondents opted for ‘Sometime True’. It is indicated in Table 4.10 that around 60% of the

respondents opted for the categories of ‘Often True’ and ‘Very True’ related to preparation of summaries of the class notes, and about 25.6% respondents chose ‘Sometime True’. Details given in the Table concerning the responses of the university students indicated that 67.4% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ regarding students’ effort to make connections between concepts. About 28% respondents opted for ‘Sometime True’.

iv. **Organization**. It was also found concerning ‘Organization’ (a sub-category of Learning Strategies) that its mean score was 3.88, referring to ‘Sometime True’. Data tabulated in Table 4.10 revealed 66% of the respondents selected ‘Often True’ and ‘Very True’ regarding preparation of outline by students to understand better. About 23% respondents opted for ‘Sometime True’. The frequencies of the responses of the sample university students to the statement are given in Table 4.10 which indicated that 70% of the respondents chose to respond in the categories of ‘Often True’ and ‘Very True’ regarding going through notes to find important ideas. Data in the table indicated that 63% of the respondent university students opted for the categories of ‘Often True’ and ‘Very True’ regarding their practice of going over class notes to make outline. Some 27% of the respondents considered the statement to be ‘Sometime True’.

v. **Critical Thinking**. It was found out in the study that the mean score for the sub-category ‘Critical Thinking’ was 3.79, resulting

into response of ‘Sometime True’. Data in Table 4.10 indicated that 62.4% of the respondent university students chose the categories of ‘Often True’ and ‘Very True’ regarding their practice of thinking about evidence of taught material. 28% of the respondents considered the statement to be ‘Sometime True’. is related to the responses of the university students for the statement, part of the SRL questionnaire, which was designed to measure such learning in university students in Islamabad. Data tabulated in the given table is related to Learning Strategies as component of the SRL, and to sub-category ‘Critical Thinking’. It indicated that around 61% of the respondents gave their response in the categories of ‘Often True’ and ‘Very True’ related to students’ ability of building own ideas. About 25.8% respondents opted for ‘Sometime True’. Data recorded in Table 4.10 indicated that around 62% of the respondents chose to respond in the categories of ‘Often True’ and ‘Very True’ related to thinking of alternatives while listening to an assertion. About 26.8% respondents opted for ‘Sometime True’. Data tabulated in Table 4.10 displayed that 68% of the respondents favoured the categories of ‘Often True’ and ‘Very True’ regarding students’ effort to build own ideas based on learning. About 22% respondents opted for ‘Sometime True’.

vi. **Metacognitive Self-Regulation**. Mean score of 3.88 (Sometime True) was found in the study for the sub-category of Metacognitive Self-Regulation. The frequencies of the responses of the sample university students to the first statement of the category

are given in Table 4.10 which indicated that 69.6% of the respondents chose the categories of ‘Often True’ and ‘Very True’ regarding the students considering that they did not miss important points. While data in the Table indicated that 66.6% of the respondent university students chose to favour the categories of ‘Often True’ and ‘Very True’ regarding their change in study style if study material was difficult. Data recorded in Table 4.10 revealed that 64.6% of the respondents favoured the categories of ‘Often True’ and ‘Very True’ regarding posing questions to self to ensure understanding. The responses tabulated in Table 4.10 revealed that 67.6% of the sample chose the categories of ‘Often True’ and ‘Very True’ regarding understanding all material being taught. The data in Table 4.10 indicated that around 65% of the respondents responded for the categories of ‘Often True’ and ‘Very True’ related to deliberation about what is supposed to be learnt. About 26.2% respondents opted for ‘Sometime True’. Table 4.10 revealed that 70.4% of the respondents chose the categories of ‘Often True’ and ‘Very True’ regarding determining concepts not understood well. Data tabulated in the table was related to the responses of the university students for the statement and it indicated that 66.2% of the respondents opted for the categories of ‘Often True’ and ‘Very True’ regarding students’ sorting out any issues later if get confused while taking notes. About 25% respondents chose ‘Sometime True’.

vii. **Time & Study Environment**. It was found during the study that mean score of the sub-category, 'Time & Study Environment' was 3.93, with response as 'Sometime True'. While studying the statements, data in Table 4.10 was found to indicate that 74% of the respondent university students had chosen to favour the categories of 'Often True' and 'Very True' regarding students' preference to sit for studying in a place where they could concentrate on their course contents. Responses tabulated in Table 4.10 revealed that 63.6% of the respondent university students gave their response in the categories of 'Often True' and 'Very True' regarding making good use of time. Some 28% of the respondents considered the statement to be 'Sometime True'. Details given in this Table concerning the responses of the university students indicated that 52.3% of the respondents opted for the categories of 'Often True' and 'Very True' regarding the assertion whether it was hard for some students to stick to a study schedule. About 30% respondents chose 'Sometime True'. The data details given in Table 4.10 indicated that 78% of the respondents chose to respond in the categories of 'Often True' and 'Very True' regarding attending the class regularly. Data in the Table indicated that 68.8% of the respondent university students favoured the categories of 'Often True' and 'Very True' regarding finding enough time before exams to review.

viii. **Effort Regulation**. It was found for the next sub-category of Learning Strategies, i.e. Effort Regulation, that its mean score was

3.59. Data in Table 4.10 indicated that around 53% of the respondent university students chose to favour the categories of 'Often True' and 'Very True' regarding not feeling so bored or lazy during class to quit. Some 29.8% of the respondents considered the statement to be 'Sometime True'. Details given in Table 4.10 concerning the responses of the university students indicated that 55% of the respondents gave their response in the categories of 'Often True' and 'Very True' regarding working hard even if material was not liked. About 28.4% respondents opted for 'Sometime True'. Data in the table indicated that around 59% of the respondents showed their response in the categories of 'Often True' and 'Very True' related to finishing off work, even when study material was boring. About 25.2% respondents opted for 'Sometime True'.

ix. **Peer Learning**. The study also found that mean score for 'Peer Learning', another sub-category of Learning Strategies was 3.63. Details of data in Table 4.10 indicated that 61.2% of the respondents favoured the categories of 'Often True' and 'Very True' regarding students' explaining material to friend, during class. Some 27.4% of the respondents considered the statement to be 'Sometime True'. Data tabulated in the Table revealed that 52.7% of the respondents had given their response in the categories of 'Often True' and 'Very True' regarding collaborating with fellows to complete work. Some 28.4% of the respondents considered the statement to be 'Sometime True'.

x. **Help Seeking**. It was found in the study that mean score for 'Help Seeking' was 3.81. Data mentioned in Table 4.10 indicated that 61.6% of the respondents opted for the categories of 'Often True' and 'Very True' regarding students asking the teacher if not understood. About 25% respondents chose to favour 'Sometime True'. It was revealed through the data in the table that 68.8% of the respondent university students gave their response in the categories of 'Often True' and 'Very True' regarding seeking help from fellows if material in class was not understood. Data tabulated in this Table revealed that around 65% of the respondents opted for the categories of 'Often True' and 'Very True' related to students' identifying possible help from fellows. About 21.3% respondents had favoured 'Sometime True'.

5.2.4 Findings Based on Effect of Demographic Variables

1. **Effect of demographic variable on Teachers' CPD**

i. The mean score representing the CPD of female faculty members of sample universities was 126.78. On the other hand, the same for the male members of universities faculties was 126.77. The t-value, .004 showed that the impact of gender on such Professional Development of university teachers was insignificant being less than significance level of 0.05. Gender does not seem to be an aspect in defining the effect of CPD in terms of direct learning, learning in professional environment and out of institute learning. Data tabulated showed that gender difference had no significant impact on teachers' CPD. (Table 4.12)

ii. The study revealed that female university teachers participated in less CPD through Direct Learning (where mean score of female teachers was 19.32, as compared to 21.27 for male teachers). However, their mean scores were higher (77.57 & 29.89) as compared to male teachers (76.59 & 28.91) in the sub-scales of Learning in Professional Environment and Out of Institute Learning. The 't-values' of the CPD sub-scale, direct learning (3.07) is significant at significance level of .05. However, 't-values' of the sub-scales, learning in professional environment and out of institute learning (.410 & .627) were not significant at significance level of 0.05. Gender does not seem to play a part in defining the effect of CPD in terms of direct learning, learning in professional environment and out of institute learning. (Table 4.13)

iii. The mean score representing the CPD of university teachers having teaching experience of 0-5 Years was found to be 124.27, whereas the CPD of teachers who carried teaching experience of 6-10 Years was measured at a mean score of 128.18. The 1.137 t-value reveals that the influence of teaching experience on such PD of university teachers is insignificant at the significance level of 0.05. Teaching experience does not seem to be a factor in defining the effect of CPD in terms of direct learning, learning in professional environment and out of institute learning, despite the fact that the teachers with 6-10 Years teaching experience had obtained higher mean scores. Data tabulated showed that teaching experience difference had no significant role in teachers' CPD. (Table 4.14)

iv. The study of difference between teachers with teaching experience of 0-5 Years and those teachers having 6-10 Years of teaching experience on the sub-scales of Continuous Professional Development displayed that teachers with 0-5 Years of teaching experience participated in less Continuous Professional Development through Direct Learning and Learning in Professional Environment (where mean score of teachers with 0-5 Years of teaching experience were 18.56 & 75.22 as compared to 21.09 & 78.22 for teachers with 6-10 Years of teaching experience). However, their mean scores were higher (30.50) as compared to teachers with 6-10 Years of teaching experience (28.88) in the sub-scale of and Out of Institute Learning. The 't-values' of the Continuous Professional Development sub-scale, direct learning (4.10) is significant at significance level of .05. However, 't-values' of the sub-scales, learning in professional environment and out of institute learning (1.22 & 1.00) were not significant at significance level of 0.05. Teaching experience does not seem to be a factor in ascertaining the effect of CPD in terms of direct learning, learning in professional environment and out of institute learning. (Table 4.15)

2. **Effect of demographic variable on Students' SRL**

i. The mean score representing the Self-Regulated Learning of female university students is found to be 207.91, while male students had obtained higher mean score representing the Self-Regulated Learning which was 215.70. The 3.95 t-value showed

that the gender impact on such learning of students in universities of ICT was significant at the significance level of 0.05. Gender seems to be a factor in determining effect of SRL in terms of Motivational Strategies and Learning Strategies, with female university students obtaining lower mean scores. With the help of data in this regard, it was revealed that significant impact was caused by gender difference on SRL of university level students. (Table 4.16)

ii. An investigation into difference between female and male University students on the sub-scales of SRL revealed that female university students availed less SRL as compared to male students at university level, in the sub-scales of Motivational Strategies and Learning Strategies (female mean scores of 79.93 & 127.99 against male mean scores of 81.86 & 133.84). The 't-values' of the SRL sub-scales, Motivational Strategies and Learning Strategies were (2.36 & 4.33) significant at significance level of 0.05. Gender seemed to be a factor in determining effect of SRL in terms of Motivational Strategies and Learning Strategies. (Table 4.17)

5.2.5 Findings Based on Effect of Teachers' CPD on Students' SRL

1. It was also found while studying the effect of CPD of university teachers on their students' SRL that an R^2 value of 0.002 was obtained which indicated that the independent variable of the study, i.e., Continuous Professional Development of teachers caused 0.2% variation in Self-Regulated Learning of students, and rest of such learning was caused due to some other factors. The β coefficient (0.041) was found to be

insignificant at 0.05 level of significance. It also indicated that though continuous professional development of teachers did not affect the SRL, yet it was positively related with SRL. (Table 4.18)

2. It was found during the course of study to investigate the effect of teachers' CPD on Motivational Strategies that an R^2 value of 0.015 was calculated which indicated that the independent variable of the study, i.e., Continuous Professional Development caused 1.5% variation in Motivational Strategies (a sub-variable of Self-Regulated Learning), and rest of such learning was caused due to some other factors. The β coefficient was recorded as .121 which was positive and insignificant at 0.05 level of significance. It indicated that continuous professional development of teachers was positively related with motivational strategies. (Table 4.19a)

3. It was also found that the mean score of Motivational Strategies was 80.24 and that of Continuous Professional Development was 126.78. The data in the table also indicated that β – values for various sub-variables of Motivational Strategies were .020 for Intrinsic Goal Orientation, .140 for Extrinsic Goal Orientation, .063 for Task Value, .122 for Control Beliefs, -.004 for Self-Efficacy for Learning & Performance, and -.166 for Test Anxiety. It meant that Self-Efficacy for Learning & Performance, and Test Anxiety were negatively associated with CPD, except Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value and Control Beliefs. (Table 4.19b)

4. It was found that an R^2 value of 0.021 was calculated which indicated that 2.1% variation in Learning Strategies (a sub-variable of SRL) was caused

by the independent variable of the study, i.e., Continuous Professional Development, and rest of such learning was caused due to some other factors. The β coefficient was .144 which was though positive yet insignificant at 0.05 level of significance. It indicated that continuous professional development of teachers was positively related with learning strategies. (Table 4.20a)

5. It was also found in the study that the means of Learning Strategies was 129.62 and that of Continuous Professional Development was 126.78. The data tabulated in the Table indicated that β – values for various sub-variables of Learning Strategies were .065 for Rehearsal, .073 for Elaboration, -.032 for Organisation, .047 for Critical Thinking, -.037 for Meta Cognitive Self-regulation, -.049 for Time & Study Environment, .287 for Effort Regulation, .174 for Peer Learning, and .195 for Help Seeking. It also meant that sub-variables Organisation, Meta Cognitive Self-Regulation, and Time & Study Environment were inversely associated with continuous professional development of teachers, while most of the sub-variables in Learning Strategies (Rehearsal, Elaboration, Critical Thinking, Effort Regulation, Peer Learning, and Help Seeking) were positively linked with CPD. (Table 4.20b)

6. It was found while the study investigated the effect of teachers' CPD through Direct Learning on Motivational Strategies that R^2 value was 0.028 which indicated that Direct Learning (a sub-variable of Continuous Professional Development, independent variable of the study), caused 2.8% variation in Motivational Strategies (a sub-variable of Self-Regulated Learning), and rest of such learning was the result of some other factors.

The β coefficient was .169 which was positive and insignificant at 0.05 level of significance. It indicated that direct learning of teachers was positively related with motivational strategies. (Table 4.21)

7. It was also found while studying the effect of CPD of teachers through Learning in Professional Environment on Motivational Strategies (a sub-variable of Self-Regulated Learning) that R^2 value was 0.000 which indicated that Learning in Professional Environment caused no variation in Motivational Strategies, and such learning was the result of some other factors. The β coefficient was .021 which was positive and insignificant at 0.05 level of significance. It displayed that learning in professional environment of teachers was directly related with motivational strategies. (Table 4.22)

8. It was found through R^2 value of 0.027 that Out of Institute Learning (a sub-variable of Continuous Professional Development, independent variable of the study), caused 2.7% variation in Motivational Strategies (a sub-variable of Self-Regulated Learning), and rest of such learning was the result of some other factors. The β coefficient was .217 which was positive and insignificant at 0.05 level of significance. It indicated that out of institute learning of teachers was positively related with motivational strategies. (Table 4.23)

9. It was found during the course of study to investigate the effect of teachers' CPD through Direct Learning on Learning Strategies that R^2 value was 0.013 which indicated that 1.3% variation in Learning Strategies (a sub-variable of SRL) was caused by Direct Learning (a sub-variable of CPD, independent variable of the study), and rest of such learning was the

result of some other factors. The β coefficient was .113 which was positive and insignificant at 0.05 level of significance. It indicated that direct learning of teachers was positively related with learning strategies. (Table 4.24)

10. It was also found while studying the effect of CPD of teachers on students' SRL, at university level that an R^2 value of 0.040 indicated that Learning in Professional Environment (a sub-variable of CPD, independent variable of the study), caused variation of 4.0% in Learning Strategies (a sub-variable of SRL), and rest of such learning was the result of some other factors. The β coefficient was .201 which was positive and insignificant at 0.05 level of significance. It indicated that learning in professional environment of teachers was directly related with motivational strategies. (Table 4.25)

11. It was found during the course of study to investigate the effect of teachers' CPD through Out of Institute Learning on Learning Strategies that R^2 value was 0.003 which indicated that variation of 0.3% in Learning Strategies (a sub-variable of SRL) was caused by Out of Institute Learning (a sub-variable of CPD, independent variable of the study), and rest of such learning was the result of some other factors. The β coefficient was .054 which was positive and insignificant at 0.05 level of significance. It indicated that out of institute learning of teachers was directly related with learning strategies. (Table 4.26)

5.3 Discussions

This present research was held with a view to investigate the effect of university teachers' CPD on their students' SRL. Five objectives were set up. These objectives were

meant to find the effect of university teachers' CPD on their students' SRL. These objectives are:-

- To identify level of CPD among university teachers.
- To assess the level of university students' SRL.
- To compare demographic differences, i.e., gender and teaching experience regarding CPD of university teachers.
- To compare gender-based difference regarding SRL of students at university level.
- To determine effect of CPD of teachers on their students' SRL at university level.

These objectives assisted the researcher in exploring the effect of teachers' CPD on their students' SRL, at university level. PD of the teachers has direct impact on different aspects of the class-room practices. Darling-Hammond, Hyler and Gardner (2017) also derived that the students whose teachers had gone through PD instances, showed higher learning achievements. This professional development can become effective and can cast significant impact if it is continuous in nature. In this way it will play meaningful and desired role in the learning activities of the students. SRL is again an important mode of learning by students, especially at higher education level. According to Broadbent and Poon (as cited in Broadbent, 2017) SRL strategies are relevant in higher education context. In addition, Dominguez and Marcelo (2017) are of the view that university teachers are needed to create learning environment favourable for self-regulated learning. Some demographic variables of the respondents were also made part of the study to elaborate the nature of the study sample. These helped the researcher to highlight various dimensions of CPD and SRL, which were independent and dependent variables of present study. The demographic variables included gender and teaching

experience. Focussing on above mentioned five objectives set for this research, thirteen hypotheses were framed and tested through statistical applications.

The first objective of the study was to identify level of CPD among university teachers. Lieberman (1996) divided CPD of the university teachers into three domains (direct learning, learning in professional environment and out of institute learning) which have been made three sub-variables of the independent variable, CPD, in this study.

Direct learning is achieved through internal and external conferences, seminars, and professional courses of shorter duration. In present study, the respondents showed positive response towards effectiveness of these CPD practices. Hustler (as cited in Tantranont, 2009) and Goodall et al. (2005) also considers workshops, seminars, conferences, and short courses as the most common forms of CPD for teachers. The study findings in this case reported that the respondent university teachers had high opinion about the efficacy of the seminars. In this regard findings of this present research were aligned with the findings of another study conducted by Cordingley et al. (2003), which considered that any long-term and significant changes cannot be expected in the practices of a teacher through any single event of professional development, e.g., a seminar or a workshop. Goodall et al. (2005) in their research report considered conferences and lectures as the most effective forms of CPD conducted within the institute. The findings of this present study were also aligned with a study in which Pedder, Storey and Opfer (2008) termed seminars as among the most common and effective forms of CPD. As per the findings of present study, after seminars, the respondents opined about the effectiveness of short professional courses. According to Tantranont, 2009, CPD of teachers is multi-directional, with variety of techniques. Short courses are also added to enhance the effectiveness of PD practices. Other researches also consider usefulness of such courses. Clark and Hollingsworth (2002), Ling and Mackenzie (2001), Craft (2000)

and Tantranont, (2009) mentioned professional courses to be amongst common and suitable sources of CPD.

The second domain of CPD was related to learning in professional environment. The respondents in this sub-variable were asked various closed-ended questions related to practices of PD in their institute environment. The findings have shown respondents' satisfaction over role of university management towards providing opportunities of CPD to the faculty members of their institutions. This satisfaction has been shown in terms of availability of opportunities, conducive environment and resources availability, although the responding university teachers scored less about existance of a well-spelled out CPD policy. The findings of this study revealed teachers' perception that their teaching methodology had significantly improved after they had participated in activities related to their PD. This aspect related to teachers' perceptions has been discussed in a number of studies which include Fields (2005), Powell and Terrell (2003), Hinsley (2018) and De Vries et al. (2014). Fields (2005) found that improved teaching practices (as a result of CPD) brought positive changes in the institution learning environment, and students' achievement level. The findings of study by Powell and Terrell (2003) were also aligned with the above quoted finding of present study that impact of CPD can be in two domains, i.e., students' learning level and, secondly improved standards of teaching.

The present study also revealed that teachers found action research to be quite helpful to them. In this regard, the findings of this study are aligned to the findings of another study carried out by Burbank and Kauchack (as cited in Kennedy, 2005) which stated that class-room teaching practices of the teachers would experience change if action research of the teacher was shared in communities of practice or enquiry. Kennedy (2005) also found that action research helped teachers 'to find solutions to critical questions'. It was discussed in this study whether peers and senior colleagues in the

professional environment were helpful, cooperative, professionally sound, and friendly in attitude. The findings revealed a positive trend of satisfaction over cooperative and friendly attitude of the colleagues, but the respondents were mixed in response concerning satisfaction over professional discussions. De Vries et al. (2014) carried out a study which also favored collaborative aspect of the CPD activities within the institute and outside as well. This collaboration with the peers and other professional in the field would be instrumental in improving teaching and learning and could then be utilized to improve practices. Studies conducted by Beatty (2000); Downey (2001); Rhodes and Beneicke (2002) also considered mentoring to be the one which enabled the junior partners to develop self-confidence, and a more vibrant and cohesive environment would emerge, where teachers would enjoy control over their professional development.

The last domain of CPD is related to learning of university teachers out of their institute (through collaborating with other professionals, institutes and by joining professional networking). It was found in the study that the respondents were not participative in availing opportunities of learning through these means of PD. Respondents' mean scores in case of the statements of this sub-variable of CPD were considerably low. This was in contrast with number of researches which considered the social networking and contacts with other institutions by the teacher as effective tools of their PD. Gray (2005) referred to these opportunities of social networking as stimulating and refreshing factors for teachers' professional development. Desimone et al. (2002) also suggested regarding informal CPD activities such as educational networking as to be more effective. Goodall et al. (2005) also reported that amongst the more effective CPD strategies were informal ones, educational networking being a prominent informal CPD component.

The second objective of this study stated to assess the level of university students' SRL. The concept of such learning is wide ranging in its scope, and diverse in choice of place and time. SRL of university students was divided into two sub-variables. These were Motivational Strategies and Learning Strategies.

Further findings of the study revealed that the respondent students considered most of the sub-categories pertaining to Motivational Strategies as somewhat positive (with mean score of the sub-variable at 3.67). The study thus highlighted that the students were indulged in SRL with respect to Motivational Strategies. Mean value of responses was lower in case of 'intrinsic goal orientation', as compared to 'extrinsic goal orientation'. This present study thus revealed that higher level of Motivational Strategies contributes towards higher SRL. This finding of study is aligned with another research carried out by McWraw and Abrami (2001), to ascertain the connection between motivation and goal orientation, and their effect upon the SRL. The results gathered revealed that it appeared to be a reciprocal relationship. McWraw and Abrami (2001) also found that through the presence of motivation, the learner would use such learning strategies which would enable him to achieve desired results. A research by Zimmerman and Schunk (2001; 2008) also established a link between motivation and self-regulation. They found that self-regulated students were metacognitively, motivationally, and behaviorally active.

The second sub-variable of SRL is Learning Strategies. The sub-categories of this sub-scale have recorded even higher mean score, i.e., 3.79 (in comparison with mean score of 3.67 in respect of Motivation Strategies). Such study findings revealed that the university students displayed almost same kind of response towards this sub-variable as was shown towards Motivational Strategies. This finding highlights that the students use some specific learning strategies for the task accomplishment. This finding of present

study is aligned with the findings of Zimmerman (1990) who considered that the students engaged in SRL took learning as a systematic and controllable process; in order to achieve the desired outcomes. This systematic and controllable process is the learning strategy which student is adopting for the goal achievement. Researchers of this form of learning generally agreed that learners who were learning through the process of SRL, were more focused on learning specific to their task or achievement of goals (Boekaerts 1996; Pintrich 2000). The cognitive strategies hold a prominent place in students' learning activities, because here they select and enact what all they have to learn and how they have to learn, significantly highlighting the role of Learning Strategies, their selection and adoption, towards the SRL (Boekaerts 1996; Garcia & Pintrich 1994; Pintrich 2000). The present study also brought out the significant role of both strategies, Motivational and Learning, for the successful completion of this process of students' learning.

The third study objective was set to compare demographic differences, i.e., gender and teaching experience regarding CPD of university teachers. In order to meet this objective, study of effect of gender-based difference between female and male university teachers, on their CPD was carried out with the help of demographic data collected through the questionnaire. Same wise, the effect of varying teaching experience of university teachers on their CPD was also performed. CPD questionnaire was used to collect data for this purpose. Hypothesis No. 1 was related to the effect of demographic variable (gender) on teachers' CPD, at the university level. The null hypothesis stated, 'There is no significant gender-based difference between male and female university teachers regarding CPD'. This hypothesis was tested through data collection and statistical analysis and insignificant gender difference was found regarding CPD. In this regard the finding of the study aligned with the findings of Flecknoe (2000) who also

found that gender difference had no significant impact on the outcomes of CPD programs. To further explore this hypothesis, a sub-hypothesis was also formulated regarding the gender impact on CPD sub-variables. This sub-hypothesis stated, 'There is no significant gender-based difference between male and female university teachers regarding sub-scales of CPD'. This sub-hypothesis was also tested and this null hypothesis stating that there is no significant gender-based difference regarding sub-scales of CPD, i.e. direct learning, learning in professional environment and out of institute learning was accepted.

Hypothesis No. 2 was also related to the third objective of the study. The effect of demographic variable (teaching experience) on CPD of the university teachers has been addressed in this null hypothesis. This hypothesis stated, 'There is no significant teaching experience difference between university teachers regarding CPD'. This hypothesis was also tested, and statistical analysis revealed that there was no significant difference between CPD of University Teachers with varying teaching experience. In order to investigate this hypothesis further, a sub-hypothesis was also framed which was related to study the impact of variable teaching experience on sub-variables of CPD. This sub-hypothesis stated, 'There is no significant teaching experience difference between university teachers regarding sub-scales of CPD'. This sub-hypothesis was also tested and found that there is no significant teaching experience difference between university teachers regarding CPD.

The fourth objective of the study was set to compare gender-based difference regarding SRL of students at university level. The effect of gender difference between female and male university students, on their SRL was carried out with the help of demographic data collected through the questionnaire. Hypothesis No. 3 was related to the effect of demographic variable (gender) on students' SRL. The null hypothesis stated, 'There is no significant gender-based difference between male and female students

regarding SRL, at university level'. This null hypothesis was tested and a significant gender difference was found regarding SRL. So, this null hypothesis was rejected. To further explore this null hypothesis, a sub-hypothesis was also formulated regarding the gender impact on SRL sub-variables, Motivational Strategies and Learning Strategies. This null sub-hypothesis stated, 'There is no significant gender-based difference between male and female University Students regarding sub-scales of SRL'. This sub-hypothesis was also tested and this null hypothesis regarding sub-scales of SRL, i.e., Motivational Strategies and Learning Strategies, was rejected.

The fifth and last objective of the study was to determine effect of CPD of teachers on their students' SRL at university level. These effects were calculated through data collected from university teachers and students, with the help of two questionnaires, i.e., CPD questionnaire and SRL questionnaire (MSLQ). In order to meet this objective, Hypothesis No. 4 was formulated in the study. This null hypothesis stated, 'There is no significant effect of CPD of teachers on students' self-regulated learning at university level'. This null hypothesis was tested and it was revealed that there was no significant effect of CPD of university teachers on SRL of the students. However, it was indicated that CPD of teachers was positively related with SRL. Another study conducted by Supovitz, Mayer, and Kahle (as cited in Supovitz & Turner, 2000) also found that professional development cast significant and noticeable impact on the outlook and attitude of the participating teachers, and their perceptions and attitude of the teachers who had undergone the training session changed significantly towards their class-room practices. Desimone (2009) in his model of teachers' PD also found that it brings changes in their knowledge and beliefs, which will ultimately help them to modify their teaching. In present study, this null hypothesis stating that there is no significant effect of level of CPD of university teachers on students' self-regulated learning was accepted.

In this regard the findings of few other studies have highlighted the findings of this present study. A study by Fields (2005) also found that there was no direct relationship between quality PD of the teachers and students' academic achievements. Sieveke-Pearson (2004) stated that a lot many inter- and intra-personal factors or variables are at work in the learning process that it is difficult to establish any clear causal relationship between the professional training of the teachers and students' learning in the class-rooms. Jackson (2014) in his study could find a statistically significant relationship between teachers' PD and achievement of their students. The study recommended that further studies might be carried out to analyze relationship between teachers' PD and other areas of students' learning. Hinsley (2018) in his study talked about the existence of empirical evidence that professional training of the teachers had a direct impact on the learning of their students.

To further explore this null hypothesis, six sub-hypotheses were also formulated regarding the effect of teachers' CPD through direct learning, learning in professional environment and out-of-institute learning on SRL sub-variables, Motivational Strategies and Learning Strategies. First null sub-hypothesis stated, 'there is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Motivational Strategies'. This sub-hypothesis was tested and it was found that the effect of direct learning through CPD on students' SRL with regard to sub variables of Motivational Strategies was insignificant. However, it was also indicated that direct learning (CPD) of teachers was positively related with motivational strategies. A study by Turner (2006) also found that teachers faced a severe problem in the form of lack of motivation, and further professional training for the teachers was suggested in the domain of motivating the students. Thus, the null sub-hypothesis regarding effect of CPD through direct learning of teachers on students' SRL with regard to sub variable,

Motivational Strategies was accepted. The second null sub-hypothesis, 'there is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Motivational Strategies' was accepted. It indicated that learning in professional environment of teachers was directly related with motivational strategies. The 3rd null sub-hypothesis, 'There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' SRL related to sub variables of Motivational Strategies' was accepted. It indicated that out of institute learning of teachers was directly related with motivational strategies.

The fourth null sub-hypothesis read, 'There is no significant effect of CPD of university teachers with regard to direct learning on their students' SRL related to sub variables of Learning Strategies'. This sub-hypothesis was also tested and it was found that the effect of CPD through direct learning on students' SRL with regard to sub variables of Learning Strategies was insignificant. It was also indicated that CPD of teachers through direct learning was positively related with learning strategies. Thus, the null hypothesis was accepted. Next null sub-hypothesis, the fifth, stated, 'There is no significant effect of CPD of university teachers with regard to learning in professional environment on their students' SRL related to sub variables of Learning Strategies'. It indicated that learning in professional environment of teachers was directly related with motivational strategies, and the null hypothesis was accepted. The 6th null sub-hypothesis was, 'There is no significant effect of CPD of university teachers with regard to out-of-institute learning on their students' SRL related to sub variables of Learning Strategies'. It showed that out of institute learning of teachers was directly related with learning strategies. So, this null hypothesis, was also accepted.

The discussions in preceding paragraphs were based on the literature review and findings of the study. These discussions have highlighted the effect of CPD of teachers on SRL of their students, at university level. The objectives set for the study guided the researcher to explore the effect of teachers' CPD on their students' SRL, at university level. PD of the teachers can become more effective and can cast significant impact if it is continuous in nature. It has direct impact on different aspects of the class-room practices. Darling-Hammond, Hyler and Gardner (2017) also derived that the students whose teachers had gone through PD instances, showed higher learning achievements. On the other hand, dependent variable of the study, SRL is again an important mode of learning by students, especially at higher education level. According to Broadbent and Poon (as cited in Broadbent, 2017) SRL strategies are relevant in higher education context. In addition, Dominguez and Marcelo (2017) are of the view that university teachers are needed to create learning environment favourable for self-regulated learning. So, inter-play of CPD of university teachers and SRL practices of their students was of much significance to research upon, in Pakistan's national context. Demographic variables of the respondent university teachers and students were also analysed. The impact of demographic variables on CPD of teachers and SRL of the students at university level has also been analysed, with reference to the relevant literature.

5.4 Conclusions

A detailed discussion on the study findings has been done in the preceding paras. This discussion was carried out with the help of interpretation of data, study findings and the literature reviewed in the study. These discussions have led the researcher to a number of conclusions. These conclusions will form the basis of recommendations regarding the effect of CPD of university teachers on SRL of their students.

1. Findings of the study led to the conclusion that satisfactory CPD for teachers in the universities of Islamabad is existing. In present study, CPD of university teachers has been divided into three domains. Out of these three domains, PD of the teachers is strongest through direct learning. But the study findings have led to the conclusion that CPD of teachers related to out of institute learning is the weakest. This type of CPD is in the form of linkages with other institutes and professionals, and professional networking. It can be concluded that University teachers in Islamabad have weak professional linkages outside their institution. They know very less people in other universities to interact with, or they find less intellectual satisfaction outside. Other institutions are not very welcoming, and certain personal reasons like time and resource constraints hamper their acquisition of CPD through contacts with other institutes and professionals, and through professional networking.
2. It is also concluded that although respondent teachers showed satisfaction over availability of opportunities and conducive environment in their institution, yet they were dissatisfied over lack of well-spelled out CPD policy.
3. The study also concludes with the help of its findings that SRL practices are being followed by the students of universities in Islamabad. A positive indication of the use of strategies related to SRL has been recorded. Motivational Strategies and Learning Strategies, sub-variables of SRL, are used by the students in their learning process.
4. Insignificant gender-based difference was found between university teachers regarding CPD. So it was concluded that gender difference was

insignificant factor in provision of CPD opportunities in universities in Islamabad. Equal opportunities for female and male teachers existed. However, through findings it can be concluded that female university teachers availed less chances to participate in CPD through direct learning. Opportunities for female teachers in universities of Islamabad, were less to participate in professional courses, conferences, workshops and seminars.

It was further concluded that female faculty members have slightly better scenario with reference to their perception and participation in PD activities in their professional environment and out of institute learning. It can be attributed to social norms and customs of decency and respect for female teachers.

5. Present study also led to the conclusion that teaching experience difference was insignificant factor in provision of CPD opportunities in universities in Islamabad. Equal opportunities for teachers with 0-5 Years of teaching experience and teachers with 6-10 Years of teaching experience existed. However, through findings it can be concluded that only in case of CPD through direct learning university teachers with 0-5 Years of teaching experience had less chances to participate in. Opportunities for such teachers in universities of Islamabad, were less to participate in professional courses, conferences, workshops and seminars. Teachers with 0-5 Years of teaching experience also lacked in CPD in their professional environment. They were not getting enough chances to learn.

It can also be concluded further that teachers with 0-5 Years of teaching experience have better prospects in their out of institute learning as compared to university teachers with 6-10 Years of teaching experience.

This type of CPD is acquired through linkages with other institutes and professionals, and through professional networking. University teachers with 0-5 Years of teaching experience in Islamabad have stronger professional linkages outside their institution. It also shows socially vibrant nature of the young university teachers in Islamabad.

6. Further findings of the study revealed that there is significant gender difference between SRL of students at University level. This finding helped in arriving at the conclusion that gender difference was a significant factor in practice of SRL activities in universities in Islamabad. Equal orientation of SRL for female and male students did not exist. Through findings it can be concluded that female university students were engaged in less SRL in their class-room activities. Female students in universities of Islamabad, had lesser orientation of the SRL strategies, i.e. Motivational Strategies and Learning Strategies.

It can also be concluded further, that on Motivational Strategies and Learning Strategies (sub-variables of SRL) female university students have performed lower as compared to male students with reference to their perception and participation in SRL activities in their class-room activities. Adoption of Motivational Strategies (Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance and Test Anxiety) and Learning Strategies (Rehearsal, Elaboration, Organisation, Critical Thinking, Meta Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking) by female university students is considerably low. It

might be attributed to certain social inhibitions, lack of motivation and initiative and absence of need analysis by their teachers.

7. Present study also guided to the conclusion that CPD of the university teachers in Islamabad has no significant effect on the SRL of their students. It can also be concluded that role of teachers' CPD towards SRL of their students in universities of Islamabad, is quite less. Such learning of the students is mostly caused due to other factors. Such other factors may include institutional culture, curriculum guidelines, teachers' personal attributes etc. However the findings have guided to the conclusion that continuous professional development of teachers is positively related with SRL of the students.

The findings of the study have also concluded that though, as a whole, CPD of teachers is positively related with SRL of the students, and the impact of teachers' PD is positively related to the Motivational Strategies. Present study has concluded that teachers in universities of Islamabad play positive role towards the sub-variables of motivational strategies, except Self-Efficacy and Test Anxiety, where negative relationship is concluded.

It is also concluded that teachers' CPD in universities of Islamabad is not significantly related to Learning Strategies, but it is also concluded that there is a positive relationship between CPD of the university teachers and Learning Strategies, a sub-variable of SRL. The study findings lead to the conclusion that sub-scales of Learning Strategies, i.e., Rehearsal, Elaboration, Critical Thinking, Effort Regulation, Peer Learning, and Help Seeking are positively related to CPD of the teachers in universities of

Islamabad. The CPD practices of the teachers have led them to bring positive changes in these sub-categories of Learning Strategies. On the other hand, Organisation, Meta Cognitive Self-Regulation, and Time & Study Environment are not positively related to CPD.

5.5 Recommendations

The research data of the study, its detailed analysis, study findings, discussion, and finally the drawn conclusions have provided the basis to formulate the recommendations of this present study. It is expected that these offered recommendations will assist the teachers and management of the universities to formulate such CPD practices for their faculty members which can help their students to adopt SRL. The conclusions of the study lead to the following recommendations:

1. In order to boost professional networking and knowledge sharing which will then cast effect on their students' SRL, Inter-universities collaboration may be enhanced and forums may be developed for faculty-to-faculty professional contacts. Universities' managements may work for building up such platforms.
2. University management may ensure more opportunities for female faculty members to take part in short courses, conferences, workshops and seminars, and may remove any obstacles and impediments for female teachers. In this way, their students will have better orientation for the use of SRL techniques.
3. University management may arrange regular, diverse and need-oriented short courses, conferences, workshops and seminars for junior faculty

members (teachers with 0-5 years of teaching experience) in order to enhance their effectiveness and use of SRL techniques in class-rooms.

4. Informal gatherings of all faculty members may be increased. Culture of peer learning and coaching to be encouraged at departmental and faculty levels.
5. Universities may formulate all inclusive and well-laid out CPD policies, for the benefit of their teaching faculties.
6. Strategies may be devised by teachers to deliver their course contents through SRL because SRL suits the needs of students at university level because they are mature learners and adopt various modes of learning.
7. Teachers at university level may stress upon Motivational Strategies (Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control Beliefs, Self-Efficacy for Learning & Performance, and Test Anxiety) and Learning Strategies (Rehearsal, Elaboration, Organisation, Critical Thinking, Meta Cognitive Self-Regulation, Time & Study Environment, Effort Regulation, Peer Learning, and Help Seeking) to augment SRL of their students.
8. In order to enhance orientation of female students in universities of Islamabad regarding the SRL strategies, i.e., Motivational Strategies and Learning Strategies, faculty members may adopt more guided and problem-solving approach for female students towards motivational and learning strategies of SRL and provide them conducive environment to gain competence in SRL techniques.
9. CPD of teachers in universities is positively related with SRL of the students. CPD of these teachers may include focus on SRL of their

students to make such learning practices more productive and across the gender. It will require inclusion of such training sessions in universities' training cycle and by sensitizing the teachers about significance of this form of learning.

10. Deliberately planned training workshops and short courses may be arranged for faculty members, with focus on making the teachers aware of SRL strategies and their exploitation in class rooms.

5.6 Study Limitations

While conducting this research, the researcher faced certain constraints related to lack of time and other resources. These restrictions are thus the limitations of this research:

1. The effects of CPD of university teachers on other aspects of students' learning, their class-room behaviour, students' achievement level etc were not possible to be measured because of the restriction mentioned above.
2. The present research was carried out in three public sector universities of ICT while private sector universities in Capital Territory were not included.
3. As the study was conducted in Islamabad, so all provinces of Pakistan, i.e., Baluchistan, KPK, Punjab, Sind and Gilgit-Baltistan were not covered by the researcher.
4. The researcher also, could not assess the CPD of teachers in different demographic settings as in Colleges and schools, in different provinces of Pakistan, which could not become possible due to time restraints.

5.7 Future Research Prospects

Present study was conducted to assess the effect of CPD of university teachers on their students in universities of ICT. Few future research prospects have been identified during the course of this study. Same wise, the literature review conducted by the researcher also revealed certain other dimensions related to the main study question which due to certain reasons, were not made part of this research, but can be the subject of any future research in this domain:

1. Further research can be carried out to devise techniques for effective use of CPD related formal and informal domains.
2. Future research in this domain can develop and propose a framework for conduct of wholesome CPD of university teachers to augment their professional growth, which would ultimately impact their class-room practices.
3. Research can be carried out to devise techniques for employing SRL in teaching of different subjects at higher education level.
4. It is also suggested that any future research may also include larger number of faculty members, replicating it to other departments and disciplines.

Study Findings – Conclusions – Recommendations Alignment

Ser No	Study Findings	Conclusions	Recommendations
	It was found that section mean for 'out of institute learning' section of the CPD questionnaire was 2.94 (Sometime True). It was also found that 10 statements were included in the questionnaire with regard to 'out of institute learning' which is a form of CPD.	The study findings have led to the conclusion that the aspect of CPD related to out of institute learning is the weakest. University teachers in Islamabad have weak professional linkages outside their institution. It can be concluded that they know very less people in other universities to interact with, they find less intellectual satisfaction outside, other institutions are not very welcoming, or certain personal reasons hamper their acquisition of CPD through professional networking.	In order to boost professional networking and knowledge sharing which will then cast effect on their students' SRL, Inter-universities collaboration may be enhanced and forums may be developed for faculty-to-faculty professional contacts. Universities' managements may work for building up such platforms.

	It was found through mean score of the sub-scale Motivational Strategies (3.67), and 3.79 for Learning Strategies that majority of the respondent university students from Universities of Islamabad consider the statements to be 'Often True'.	The study also concludes with the help of its findings that SRL is being carried out by the students of universities in Islamabad. A positive indication of the use of strategies related to SRL has been recorded.	SRL suits the needs of students at university level because they are mature learners and adopt various modes of learning. Strategies may be devised by teachers to deliver their course contents through SRL.
	The study revealed that female university teachers participated in less CPD through Direct Learning (where mean score of female teachers was 19.32, as compared to 21.27 for male teachers). However, their mean scores were higher (77.57 & 29.89) as compared to male teachers (76.59 & 28.91)	Through findings it can be concluded that female university teachers had less chances to participate in CPD through direct learning. Opportunities for female teachers in universities of Islamabad, were less to participate in professional courses, conferences, workshops and seminars.	More chances needed for female university teachers to participate in CPD through direct learning. University management may ensure more opportunities for female faculty members to take part in short courses, conferences, workshops and seminars, and may remove any obstacles and

	in the sub-scales of Learning in Professional Environment and Out of Institute Learning.		impediments for female teachers.
	The study of difference between teachers with teaching experience of 0-5 Years and those with 6-10 Years of teaching experience on the sub-scales of CPD revealed that teachers with 0-5 Years of teaching experience participated in less CPD through Direct Learning and Learning in Professional Environment.	Through findings it can be concluded that only in case of CPD through direct learning university teachers in universities of Islamabad with 0-5 Years of teaching experience had less chances to participate in professional courses, conferences, workshops and seminars. Teachers with 0-5 Years of teaching experience also lacked in CPD in their professional environment. They were not getting enough chances to learn.	University management may arrange regular, diverse and need-oriented short courses, conferences, workshops and seminars for junior faculty members (teachers with 0-5 years of teaching experience) in order to enhance their effectiveness and use of SRL techniques in class-rooms.
	"	"	Informal gatherings of all faculty members may be increased. Culture of peer

			learning and coaching may be encouraged at departmental and faculty levels.
	"	It is also concluded that although respondent teachers showed satisfaction over availability of opportunities and conducive environment in their institution, yet they were dissatisfied over lack of well-spelled out CPD policy.	Universities may formulate all inclusive and well-laid out CPD policies, for the benefit of their faculties.
	The mean score representing the SRL of female university students is found to be 207.91, while male students had obtained higher mean score which was 215.70. The 3.95 t-value showed that the gender impact on	Through findings it can be concluded that female university students were engaged in less SRL in their class-room activities. Female students in universities of Islamabad, had lesser orientation of the SRL strategies, i.e.	In order to enhance orientation of female students in universities of Islamabad regarding the SRL strategies, faculty members may adopt more guided and problem-solving approach for female students towards motivational and learning

	such learning of students in universities of ICT was significant at the significance level of 0.05. Gender seems to be a factor in determining effect of SRL in terms of Motivational Strategies and Learning Strategies. With the help of data in this regard, it was revealed that significant impact was caused by gender difference on SRL of university level students.	Motivational Strategies and Learning Strategies. It might be attributed to certain social inhibitions, lack of motivation and initiative and absence of need analysis by their teachers.	strategies of SRL and provide them conducive environment to gain competence in SRL techniques.
	It was also found while studying the effect of CPD of university teachers on their students' SRL that an R^2 value of 0.002 was obtained which indicated that the	The findings have guided to the conclusion that CPD of teachers is positively related with SRL of the students. Present study also guided to the conclusion that CPD of the university	CPD of teachers in universities is positively related with SRL of the students. CPD of these teachers may include focus on SRL of their students to make such learning practices more

	independent variable of the study, i.e., CPD of teachers caused 0.2% variation in SRL of students, and rest of such learning was caused due to some other factors. The β coefficient (0.041) was found to be insignificant at 0.05 level of significance. It also indicated that though CPD of teachers did not affect the SRL, yet it was positively related with SRL.	teachers in Islamabad has no significant effect on SRL of their students. It can also be concluded that role of teachers' CPD towards SRL of their students in universities of Islamabad, is quite less. Such learning of the students is mostly caused due to other factors. Such other factors may include institutional culture, curriculum guidelines, teachers' personal attributes etc.	productive and across the gender. It will require inclusion of such training sessions in universities' training cycle and by sensitizing the teachers about significance of this form of learning.
	"	"	Deliberately planned training workshops and short courses may be arranged for faculty members, with focus on making the teachers aware of SRL strategies and their exploitation in

			class rooms.
	It was found during the course of study to investigate the effect of teachers' CPD on Motivational Strategies that an R^2 value of 0.015 was calculated which indicated that the independent variable of the study, i.e., CPD caused 1.5% variation in Motivational Strategies (a sub-variable of SRL), and rest of such learning was caused due to some other factors. The β coefficient was -.121 which was negative and insignificant at 0.05 level. It indicated that CPD of teachers was inversely related with motivational strategies.	The findings of the study have also concluded that, as a whole, CPD of teachers is positively related with SRL of the students, and the impact of teachers' PD is positively related to the sub-variables of motivational strategies, except Self-Efficacy and Test Anxiety, where negative relationship is concluded.	Teachers at university level may stress upon Motivational Strategies, especially Self-Efficacy for Learning & Performance, and Test Anxiety to augment SRL of their students.
		It is also concluded that	Teachers at university

	“	teachers’ CPD in universities of Islamabad is not significantly related to Learning Strategies, but it is also concluded that there is a positive relationship between CPD of the university teachers and Learning Strategies, a sub-variable of SRL, except Organisation, Meta-cognitive Self-Regulation and Time and Study Environment, where negative relationship is concluded.	level may stress upon Learning Strategies, especially Organisation, Meta-cognitive Self-Regulation and Time and Study Environment to augment SRL of their students.

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Appendix A

Letter of Topic and Supervisor Approval

NATIONAL UNIVERSITY OF MODERN LANGUAGES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF EDUCATION

ML.1-4/2017/Edu

Dated: 07-11-2017

To: **Muhammad Ilyas,**
650-PHD/EDU/F16

Subject: **APPROVAL OF PHD THESIS TOPIC AND SUPERVISOR**

1. Reference Academic Branch's Notification No. ML.6-2/17-Syl/Acad dated 31-Oct-2017, the Faculty Board of Studies has approved the following vide its meeting held on 11th & 12th of September 2017.

   a. **Supervisor's Name & Designation**
      i. Dr. Shazia Zameer
      Assistant Professor, Department of Education
      NUML, Islamabad.

   b. **Topic of Thesis**

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

2. You may carry out research on the given topic under the guidance of your Supervisor and submit the thesis for further evaluation within the stipulated time. It is inform you that your thesis should be submit within described period by Jun 2021 positively for further necessary action please.

3. As per policy of NUML, all MPhil/PhD thesis are to be run on turnitin by QEC of NUML before being sent for evaluation. The university shall not take any responsibility for high similarity resulting due to thesis run from own sources.

4. Thesis are to be prepared strictly on NUML's format that can be had from (Coordinator, Department of Education)

Telephone No: 051-9265100-110 Ext: 2090
E-mail: snudrat@numl.edu.pk

Dr. Hukam Dad Malik
Head,
Department of Education

Cc to:
Dr. Shazia Zameer (Supervisor)
Dr. Saira Nudrat (Coordinator – PhD)

Appendix B
Originator's Permission to Use MSLQ

Re: Request for Permission to Use MSLQ in Doctoral Thesis

Katie Schmitt <katielsc@umich.edu>
Fri 8/18/2017 10:55 PM

To: Muhammad Ilyas <ilyas69@hotmail.com>
Cc: Jessica Grden (Google Drive) <jigrden@umich.edu>

Hi Muhammad,

Thank you for contacting us. You have permission to use and modify to your research needs, the MSLQ. Please cite this questionnaire appropriately. Please find a copy of the MSLQ here.

Regards,
Katie

Katie Schmitt
Program Coordinator
Combined Program in Education and Psychology
University of Michigan
(734) 763-0680

Appendix C

Full Time Faculty (ICT) – 2017-18

Ser No	Name of University	Sector	Female		Male		Grand Total
			Non PhD	PhD	Non PhD	PhD	
1.	Air University	Public	37	20	75	73	205
2.	Allama Iqbal Open University	Public	37	28	35	82	182
3.	Bahria University	Public	290	34	333	100	757
4.	Capital University of Science & Technology	Private	18	7	92	49	166
5.	COMSATS	Public	542	192	928	925	2587
6.	Foundation University	Private	201	7	94	20	322
7.	Institute of Space Technology	Public	27	11	87	62	187
8.	International Islamic University	Public	168	75	178	150	571
9.	Muslim Youth University	Private	5	1	17	8	31
10.	National Defence University	Public	13	12	38	22	85
11.	National University of Computer and Emerging Sciences	Private	105	14	192	87	398
12.	National University of Modern Languages	Public	382	60	297	72	811
13.	National University of Science and Technology	Public	157	73	394	388	1012
14.	National University of Technology	Public	0	0	6	5	11
15.	Pakistan Institute of Development Economics	Public	4	8	7	24	43
16.	Pakistan Institute of Engineering and Applied Sciences	Public	9	5	36	90	140
17.	Quaid-e-Azam University	Public	15	42	32	172	261
18.	Ripha International University	Private	168	19	207	106	500
19.	Shaheed Zulfiqar Ali Bhutto Medical University	Public	29	1	54	7	91
20.	Shifa Tameer-e-Millat University	Private	166	7	76	6	255
		Total:	**2373**	**616**	**3178**	**2448**	**8615**

Appendix D

University wise Enrolement (ICT) – 2017-18

Ser No	Name of University	Sector	Male	Female	Grand Total
1.	Air University	Public	3199	1331	4530
2.	Allama Iqbal Open University	Public	196699	231299	427998
3.	Bahria University	Public	10801	5673	16474
4.	Capital University of Science & Technology	Private	3405	934	4339
5.	COMSATS	Public	20995	13106	34101
6.	Foundation University	Private	2696	3132	5828
7.	Institute of Space Technology	Public	1083	308	1391
8.	International Islamic University	Public	15855	15112	30967
9.	Muslim Youth University	Private	192	16	208
10.	National Defence University	Public	1109	571	1680
11.	National University of Computer and Emerging Sciences	Private	7397	1992	9389
12.	National University of Modern Languages	Public	9131	5903	15034
13.	National University of Science and Technology	Public	11434	4636	16070
14.	National University of Technology	Public	0	0	0
15.	Pakistan Institute of Development Economics	Public	452	236	688
16.	Pakistan Institute of Engineering and Applied Sciences	Public	729	138	867
17.	Quaid-e-Azam University	Public	4922	4949	9871
18.	Ripha International University	Private	6380	6079	12459
19.	Shaheed Zulfiqar Ali Bhutto Medical University	Public	310	434	744
20.	Shifa Tameer-e-Millat University	Private	510	936	1446
		Total:	**297299**	**296785**	**594084**

Appendix E
University Reference Letter for Data Collection

National University of Modern Languages
Sector H-9, P.O, Shaigan, Islamabad
Tel: 092-051-925646-50 Fax:092-051-9257679
Email:info@numl.edu.pk
Web:www.numl.edu.pk

No.ML 1-4/2017-Edu

WHOM SO EVER IT MAY CONCERN

a. Mr. Muhammad Ilyas student of Ph.D Education, Department of Education, National University of Modern Languages is engaged in project of Research Work (Data Collection).

b. He may please be allowed to visit your institution / Library to obtain the required information for his Research Work (Data Collection).

c. This information shall not be divulged to any unauthorized person or agency. It shall be kept confidential.

Dr Hukam Dad Malik
Head of Department
Department of Education
National University of Modern Languages, Islamabad

Appendix F

Systematic Random Sampling

Systematic random sampling technique was used to collect students sample data for measuring use of SRL techniques. Cohen, Manion and Morrison, (2007) have provided the technique for use of systematic random sampling. One can decide how frequently to make systematic sampling by a simple statistic – the total number of the wider population being represented divided by the sample size required:

$$f = \frac{N}{sn}$$

f = frequency interval
N = the total number of the students in class
sn = the required number in the sample

Example. In one of the class-rooms, there were total 24 students, and the researcher required 6 students from the class to collect SRL data.

$$f = \frac{24}{6}$$

So, every 4^{th} student from that class list was picked up as part of the sample.

Appendix G

List of Experts for Tool Validation (CPD & SRL Questionnaires)

Ser No	Name	Designation & Institute
1.	Dr. Hukam Dad Malik	Head of Education Department, NUML, Islamabad
2.	Dr. Quratul-Ain-Hina	Assistant Professor, Department of Education, NUML, Islamabad
3.	Dr. Allah Rakha Saghir	Visiting Faculty Member, Department of Education, NUML, Islamabad

Appendix H

List of Experts for Proof Reading (CPD & SRL Questionnaires)

Ser No	Name	Designation & Institute
1.	Major Sonia Kanwal	Instructor, Department of English, Pakistan Military Academy, Kakul
2.	Major Muhammad Khalil	Instructor, Department of English, Pakistan Military Academy, Kakul
3.	Major Abdul Qadir	Instructor, Department of English, Pakistan Military Academy, Kakul

Appendix I
Covering Letters

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

Subject: **Request for Provision of Validity Certificate – CPD Questionnaire**

Respected Sir/ Madam,

It is stated with due respect that I am conducting research on the topic cited at the top of this letter. To measure continuous professional development (CPD) of University teachers, in public and private sector universities of Islamabad, a questionnaire has been developed. This questionnaire is based on CPD framework which was developed by Ann Lieberman. Thorough literature review revealed that this model of CPD is comprehensive and elaborate. Three subsections of the questionnaire are based on three sub-scales of this professional development of teachers, as given by Lieberman (1996). These sub-scales are:

a. Direct learning
b. Learning in professional environment, and
c. Out of institute learning

Copy of the questionnaire is attached for your kind perusal. Your expert opinion regarding content of the questionnaire and other related aspects is solicited, on the attached validity certificate. Your valuable suggestions will be highly appreciated.

Muhammad Ilyas
Department of Education,
National University of Modern Languages,
Islamabad, Pakistan

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

Subject: **Request for Provision of Validity Certificate – SRL Questionnaire**

Respected Sir/ Madam,

It is stated with due respect that I am conducting research on the topic cited at the top of this letter. To measure self-regulated learning (SRL) of students at university level, in public and private sector universities of Islamabad, a questionnaire has been developed. SRL of the students has been measured by adopting framework of Pintrich. Basing on his framework. Pintrich developed Motivated Strategies for Learning Questionnaire (MSLQ). I have modified this standardized questionnaire to adjust it as per own requirements. Thorough literature review revealed that this model of SRL is comprehensive and elaborate. Two major subsections of the questionnaire are based on two sub-scales of this aspect of students' learning, as given by Pintrich (-----). These sub-scales are:

a. **Motivation Strategies**
   - *Value Components.* Goal orientation, and task value
   - *Expectancy Components.* Control beliefs, and self-efficacy
   - *Affective Components*. Test anxiety
b. **Learning Strategies**
   - *Cognitive & Metacognitive Strategies.* Rehearsal, elaboration, organization, critical thinking, and meta-cognitive self-regulation
   - *Resource Management Strategies.* Time & study environment, effort regulation, peer learning, and help-seeking

Copy of the questionnaire is attached for your kind perusal. Your expert opinion regarding content of the questionnaire and other related aspects is solicited, on the attached validity certificate. Your valuable suggestions will be highly appreciated.

Muhammad Ilyas
Department of Education,
National University of Modern Languages,
Islamabad, Pakistan

Appendix J
Validity Certificates (CPD Questionnaire)

CERTIFICATE OF VALIDITY

TOPIC: Effects Of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level

By: Muhammad Ilyas

Supervised By: Dr Shazia Zamir

National University of Modern Languages, H-9, Islamabad, Pakistan.

This is to certify that the research instrument to be used by the researcher towards his thesis has been assessed by me and I find that the instrument has been designed adequately to measure Teachers' Continuous Professional Development, at university level.

It is considered that the research instrument, developed for measurement of teachers' continuous professional development is according to the objectives and hypotheses of the above titled research. It assures adequate construct and content validity according to the purpose of research and can be used for data collection by the researcher with fair amount of confidence.

Name: Dr. Hukam Dad

Designation: Head of Department

Institute: NUML

Signature:

Date: 1-1-18

Stamp:

DR. HUKAM DAD MALIK
HEAD
DEPARTMENT OF EDUCATION
NUML, ISLAMABAD

CERTIFICATE OF VALIDITY

TOPIC: Effects Of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level

By: Muhammad Ilyas

Supervised By: Dr Shazia Zamir

National University of Modern Languages, H-9, Islamabad, Pakistan.

This is to certify that the research instrument to be used by the researcher towards his thesis has been assessed by me and I find that the instrument has been designed adequately to measure Teachers' Continuous Professional Development, at university level.

It is considered that the research instrument, developed for measurement of teachers' continuous professional development is according to the objectives and hypotheses of the above titled research. It assures adequate construct and content validity according to the purpose of research and can be used for data collection by the researcher with fair amount of confidence.

Name: Dr. Qurat-ul-Ain-Hina

Designation: Assistant Professor

Institute: NUML, Islamabad

Signature: _____

Date: 28-12-2017

Stamp:

CERTIFICATE OF VALIDITY

TOPIC:Effects Of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level

By: Muhammad Ilyas

This is to certify that theresearch instrumentto be used by the researcher towards his thesis has been assessed by me and I find that the instrument has been designed adequately to measure Teachers' Continuous Professional Development, at university level.

It is considered that the research instrument, developed for measurement of teachers' continuous professional development is according to the objectives and hypotheses of the above titled research. It assures adequate construct and content validity according to the purpose of research and can be used for data collection by the researcher with fair amount of confidence.

Name: _____

Designation: _____

Institute: _____

Signature: _____

Date: _____

Stamp:

Appendix K
Validity Certificates (SRL Questionnaire)

CERTIFICATE OF VALIDITY

TOPIC: Effects Of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level

By: Muhammad Ilyas

Supervised By: Dr Shazia Zamir

National University of Modern Languages, H-9, Islamabad, Pakistan.

This is to certify that the research instrument to be used by the researcher towards his thesis has been assessed by me and I find that the instrument has been adapted adequately to measure students' self-regulated learning, at university level.

It is considered that the research instrument, adapted for measurement of students' self-regulated learning is according to the objectives and hypotheses of the above titled research. It assures adequate construct and content validity according to the purpose of research and can be used for data collection by the researcher with fair amount of confidence.

Name: Dr. Hukam Dad

Designation: Head of Department

Institute: NUML

Signature:

Date: 1-1-18

Stamp:
DR. HUKAM DAD MALIK
HEAD
DEPARTMENT OF EDUCATION
NUML, ISLAMABAD

CERTIFICATE OF VALIDITY

TOPIC: Effects Of Teachers' Continuous Professional Development On Students' Self-Regulated Learning At University Level

By: Muhammad Ilyas

Supervised By: Dr Shazia Zamir

National University of Modern Languages, H-9, Islamabad, Pakistan.

This is to certify that the research instrument to be used by the researcher towards his thesis has been assessed by me and I find that the instrument has been adapted adequately to measure students' self-regulated learning, at university level.

It is considered that the research instrument, adapted for measurement of students' self-regulated learning is according to the objectives and hypotheses of the above titled research. It assures adequate construct and content validity according to the purpose of research and can be used for data collection by the researcher with fair amount of confidence.

Name: Dr. Quratul-Ain-Hina

Designation: Assistant Professor

Institute: NUML, Islamabad

Signature: _____

Date: 28-12-2017

Stamp:

Appendix L
Certificates of Proof Reading (CPD Questionnaire)

PROOF READING CERTIFICATE (CPD QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess continuous professional development (CPD) of university teachers in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

Name & Signatures SONIA KANWAL

Designation MAJOR / INSTRUCTOR

Institute PMA, KAKUL

Date 24-1-2018

PROOF READING CERTIFICATE (CPD QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess continuous professional development (CPD) of university teachers in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

DEPT OF ENGLISH PMA

Name & Signatures Muhammad Khalil

Designation Major (Instructor)

Institute PMA Kakul

Date 12 January, 2018

PROOF READING CERTIFICATE (CPD QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess continuous professional development (CPD) of university teachers in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

DEPT OF ENGLISH PMA

Name & Signatures Abdul Qadir

Designation Major (Instructor)

Institute PMA Kakul

Date 10 January, 2018

Appendix M
Certificates of Proof Reading (SRL Questionnaire)

PROOF READING CERTIFICATE (SRL QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess self-regulated learning (SRL) of university students in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

Name & Signatures SONIA KANWAL

Designation MAJOR / INSTRUCTOR

Institute PMA KAKUL

Date 24-1-2018

PROOF READING CERTIFICATE (SRL QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess self-regulated learning (SRL) of university students in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

DEPT OF ENGLISH PMA

Name & Signatures Muhammad Khalil

Designation Major (Instructor)

Institute PMA Kakul

Date 12 January, 2018

PROOF READING CERTIFICATE (SRL QUESTIONNAIRE)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

By: Muhammad Ilyas, Ph.D Scholar

Department of Education, National University of Modern Languages, Islamabad

This is to certify that I have checked the questionnaire developed by the researcher to assess self-regulated learning (SRL) of university students in Islamabad, for spelling, grammatical or syntax errors. The instrument can be used for the purpose of data collection with enough amount of confidence.

Name & Signatures Abdul Qadir

Designation Major (Instructor)

Institute PMA Kakul

Date 10 January, 2018

Appendix N

Guidelines for Respondents

(CPD Questionnaire)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

Dear Respondent!

I am working on a research project as per the title mentioned above, being undertaken in pursuance of PhD (Education). This questionnaire pertains to continuous professional development (CPD) practices in your institute and in your social circle. In the Demographic Information Section, certain demographic information are needed to be filled. Your views matter a lot for the research. I would request you to spare few minutes from your precious time and indicate your response for the statements given in this questionnaire. You are requested to indicate your response by ticking the option boxes (ranging from 1-5) placed in front of every statement. It is affirmed that any information/ opinion shared by you will be dealt in complete secrecy, and used for research purpose only.

Muhammad Ilyas,
Ph.D Scholar, Department of Education,
National University of Modern Languages, Islamabad

Guidelines for Respondents
(SRL Questionnaire)

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

Dear Respondent!

I am working on a research project as per the title mentioned above, being undertaken in pursuance of PhD (Education). This questionnaire pertains to self-regulated learning (SRL) practices in your class. In the Demographic Information Section, certain demographic information are needed to be filled. Your views matter a lot for the research. I would request you to spare few minutes from your precious time and indicate your response for the statements given in this questionnaire. You are requested to indicate your response by ticking the option boxes (ranging from 1-5) placed in front of every statement. It is affirmed that any information/ opinion shared by you will be dealt in complete secrecy, and used for research purpose only.

Muhammad Ilyas,
Ph.D Scholar, Department of Education,
National University of Modern Languages, Islamabad

Appendix O

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

CPD Questionnaire

Demographic Information

ID No. _____

1. **Name of University:**

2. **Teaching the Program:**

BS	MS	PhD

3. **Gender:**

M	F

4. **Marital Status:**

Married	Single

5. **Academic Qualification:**

MA	M.Phil	Ph.D	Post Doc	Any Other

6. **Professional Qualification:**

B.Ed	M.Ed	Diploma by HEC	Any Other	None

7. **Teaching Experience:**

Less than a Year	1 – 5 Years	6 – 10 Years	11 – 15 Years	16 – 20 Years	21 – 25 Years	More than 25 Years

8. **How frequently have you participated in CPD, during last three years?**

Less than three times	4-5 times	6 and more times

Part – I **Formal CPD of Teachers**

Sr. No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
6.	I found institution-based training workshops to be effective.					
7.	I found external workshops to be effective.					
8.	I found educational conferences to be effective.					
9.	I found short courses to be effective.					
10.	I found seminars to be effective.					

Part – II **CPD of Teachers in Professional Environment and Out-side Environment**

Sr. No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
21.	My University management is providing enough opportunities for teachers' professional development.					
22.	My institute has conducive environment to provide chances of professional development.					
23.	My teaching methodology has improved, after I gained professional training.					
24.	My last completed action research is still relevant for me.					
25.	I would like to attend a professional conference even if I have to pay from my own side.					

Sr. No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
26.	My University has enough resources to implement what I learnt in professional development courses.					
27.	My colleagues are a good intellectual company to help me gain professional development.					
28.	My work environment is helpful in professional development.					
29.	I find enough opportunities to have professional discussions with my colleagues.					
30.	My time-table facilitates me to carry out activities of professional development.					
31.	My staff-room is very comfortable one to discuss professional matters.					
32.	My colleagues have friendly attitude, so I can discuss professional matters with them.					
33.	My colleagues are willing to listen to me regarding problems I face in class-room.					
34.	Action research is encouraged in my Department.					
35.	My University has well-spelled out CPD policy.					
36.	My peers are able to satisfy me when we discuss current trends in our field of knowledge.					
37.	I have enough time to discuss concepts and teaching ideas with my colleagues.					
38.	University environment (including administration) are very supportive of professional development.					

Sr. No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
39.	My senior colleagues are available, so I can discuss my professional issues with them.					
40.	My University plans many educational trips for professional development.					
41.	Once I leave University after office hours, I find sufficient time to join any learning community.					
42.	I know a lot many people in other universities to interact with on professional matters.					
43.	My domestic issues are not too many and I can find time to attend to any educational networking.					
44.	Visits to other institutes for professional development are productive.					
45.	I need to visit other institutes to enhance my professional knowledge.					
46.	A lot of professional knowledge can be learnt from other people outside my university.					
47.	In my social circle outside the University, there are many people to attract me intellectually.					
48.	Other institutions are always very welcoming for intellectual collaboration.					
49.	I have so many friends in other universities who are related to my profession.					
50.	My resources are enough to support my professional growth outside my university.					

Appendix P

"EFFECTS OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON STUDENTS' SELF-REGULATED LEARNING AT UNIVERSITY LEVEL"

SRL Questionnaire

Demographic Information

ID No._____

Name of University: _____

Studying in Program:	**BS** | **MS** | **PhD**
Gender:	**M** | **F**
Marital Status:	**Married** | **Single**

Part – I (Motivation Scales)

Sr No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
1.	In a class like this, I prefer study material that really challenges me so that I can learn new things.					
2.	I believe I will receive an excellent grade in this class.					
3.	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.					
4.	When I take a test, I think about items on other parts of the test I can't answer.					
5.	It is my own fault if I don't learn the material in this course.					
6.	I expect to do well in this class.					
7.	I am very interested in the content area of this course.					
8.	When I take tests I think of the consequences of failing.					
9.	I am confident I can understand the most complex material presented by the instructor.					
10.	Getting a good grade in this class is the most satisfying thing for me right now.					
11.	It is important for me to learn the course material in this class.					
12.	I am certain I can master the skills being taught in this class.					
13.	I feel my heart beating fast when I take an exam.					
14.	I am satisfied that during my studies I am trying to understand the content as thoroughly as possible.					

Sr No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
15.	When I have the opportunity in this class, I choose assignments that I can learn from even if they don't guarantee a good grade.					
16.	Understanding the subject matter of my present course is very important to me.					
17.	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.					
18.	If I try hard enough, then I will understand the study material.					
19.	I have an uneasy, upset feeling when I take an exam.					
20.	I like the subject matter of this course.					
21.	If I can, I want to get better grades in this class than most of the other students.					
22.	If I study in appropriate ways, then I will be able to learn the material in this course.					

Part – II (Learning Strategies Scales)

Sr No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
23.	During class time I never miss important points.					
24.	When studying in class, I often try to explain the material to a classmate or friend.					
25.	When I study the readings for this course, I outline the material to help me organize my thoughts.					

26.	I usually study in a place where I can concentrate on my course material.					
27.	I do not feel so lazy or bored for this class so I do not quit before I finish what I planned to do.					
28.	When I study for this class, I practice saying the material to myself over and over.					
29.	Whenever I sit to study, I go through the readings and my class notes and try to find the most important ideas.					
30.	I make good use of my study time.					
31.	If study material in my present course is difficult to understand, I change the way I read the material.					
32.	I try to work with other students from this class to complete the course assignments.					
33.	When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.					
34.	I work hard to do well in this class even if I don't like what we are doing.					
35.	I take the study material as a starting point and try to develop my own ideas about it.					
36.	I do not find it hard to stick to a study schedule.					

Sr No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
37.	When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.					
38.	I ask myself questions to make sure I understand the material I have been studying in this class.					
39.	Whatever I have been reading for this class, I understand what it was all about.					
40.	Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.					
41.	I ask the teacher to clarify concepts I don't understand well.					
42.	I memorize key words to remind myself of important concepts in this class.					
43.	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.					
44.	I try to relate ideas in present subject of study to those in others courses whenever possible.					
45.	When I sit to study, I go over my class notes and make an outline of important concepts.					
46.	When studying for a course, I try to determine which concepts I do not understand well.					
47.	I try to build ideas of my own related to what I am learning in class.					
48.	When I study, I write summaries of the main ideas from the readings and my class notes.					

Sr No	Statement	1 Never True	2 Rarely True	3 Sometime True	4 Often True	5 Always True
49.	Even when study materials are dull and uninteresting, I manage to keep working until I finish.					
50.	When I can't understand the material in class, I ask another student in this class for help.					
51.	If I get confused taking notes in class, I make sure I sort it out afterwards.					
52.	I make lists of important terms for this course and memorize the lists.					
53.	I try to understand the material in this class by making connections between the readings and the concepts from the lectures.					
54.	I try to identify students in my class whom I can ask for help if necessary.					
55.	I attend this class regularly.					
56.	I find enough time to review my notes or readings before an exam.					