CHAPTER 3

RESEARCH METHODOLOGY

This chapter outlines the detailed description & explanation of the process of how the present research study was conducted. Research methodology basically explains the process of executing or conducting the research study in a systematic and successful way. This chapter includes the research methodology, research design, sampling process, data collection tools, administration of scoring and different statistical techniques employed for the analysis, interpretation and discussion purpose. All these research steps were selected by the researcher on the basis of research questions and objectives of the present study and are discussed in detail in the following sections of the chapter.

Methodology of the study

Methods of conducting the research studies are numerous- ranging from the continuum of quantitative to qualitative research methods and the mixture of these two. The researcher, as per the nature of objectives, hypothesis and research questions of the present study, found that mixed-methodology approach is appropriate. Mixed research methodology includes characteristics of quantitative and qualitative research methods. Also, the two types of data support each other in the interpretation of the results and make them more authentic, whether the results are same or in contradiction with each other. The explanatory sequential - mixed research design was used by the researcher for the in-depth understanding of the research problem. It is a mixed method of research in which the quantitative data is collected first and then followed by qualitative data. In this type of mixed research design, both types of data can be analyzed in parallel for the purpose of interpretation of results. In order to study the research problem quantitatively, the

researcher employed survey - cross sectional - research design which is basically a descriptive method. For the purpose of qualitative study of research problem, the researcher employed grounded theory research design. The researcher, on the basis of TPACK score obtained by the sample teachers identified the teachers who were on above average level on their self assessed TPACK score. The observation and in-depth interviews of these teachers were conducted by the researcher in order to explore their techno-integrated teaching (TPACK) in lesson planning and actual execution of classroom teaching. Further, data was also collected for the purpose of exploring the factors/issues affecting teachers' techno-integrated teaching. The researcher also proposed a suggestive TPACK theory and model which he assumes will work in the context of the study where it was conducted and may also in similar situations. The proposed theory and model may require some further exploration and modification.

Population of the study

The population in research work refers to group/list of individuals having some specific characteristics which distinguish them from the others. The population in this study comprises of teachers in government academic degree colleges of the Jammu and Kashmir state. The total population in the study comprises of the 5912 teachers in 93 govt. degree colleges of higher education in Jammu and Kashmir division.

Sampling procedure

The researcher in this study used a series of sampling procedures for the selection of sample teachers. First, the researcher stratified the government degree colleges of the Jammu and Kashmir state in two strata i.e. colleges in Jammu division and colleges in Kashmir division. Followed by simple random sampling procedure for the selection of 10 degree colleges,5 from Jammu and 5 from Kashmir division. For the random selection of

10 degree colleges, the researcher used an online application known as 'Pick Me'. Pick Me is basically an mobile application which is used for random selection process. The researcher entered the names of all degree colleges in the option provided and clicked on the spin button 10 times. On every spin the pointer stops at one particular name, and accordingly the researcher selected 10 colleges randomly. After that the researcher randomly selected a sample of three hundred twenty (n=320) teachers comprising of 160 male and 160 female teachers. For the qualitative study of research problem, the researcher purposively selected a sample of 10 teachers on the basis of their TPACK score, and conducted their in-depth interviews and classroom teaching observations.

Tools for data collection

As the nature of study is mixed, so is the case of selection of tools for the process of collecting. Investigator used triangulation data collection process i.e. used different data collection tools. 1) Checklist for assessing technology availability and usage of college teachers. 2) Teachers technological, pedagogical and content knowledge scale (TTPACKS) developed by Sharma & Sharma (2017) for assessing the level of teachers techno-integrated teaching knowledge. 2) Semi-structured interview of teachers for the purpose of exploring the factors affecting their techno-integrated teaching in their lesson plans and in actual classroom teaching. 3) Observation for the purpose of assessing teachers' incorporation of technology and its execution in their classroom. All the ethical issues taken into consideration, the researcher collected the primary data from the above mentioned respondents and classrooms through these data collection tools. The scale and checklists were administered to the respondents in person by the researcher. Similarly, the interview process and observation carried out personally by the researcher in an extensive way. The qualitative data was collected intensively from the sample teachers in order to explore all

the necessary dimensions which the researcher think are required for the development of new theory or for the refinement of existing one and finally for the development of new model or the existing one.

TTPACKS

The teachers technological, pedagogical and content knowledge scale (TTPACKS) - standardized scale comprised of 55 items distributed in seven dimensions as shown in the table.

Table 3: TPACK scale dimensions

S.No.	Dimensions/Components	Item no.	Total items	Score range (Min-Max)
I.	Technological Knowledge (TK)	1 to 5	5	5 to 25
II.	Pedagogical Knowledge (PK)	6 to 13	8	8 to 40
III.	Content Knowledge (CK)	14 to 21	8	8 to 40
IV.	Technological-Pedagogical Knowledge (TPK)	22 to 32	11	11 to 55
V.	Technological Content Knowledge (TCK)	33 to 38	8	6 to 30
VI.	Pedagogical Content Knowledge (PCK)	39 to 45	7	7 to 35
VII.	Technological, Pedagogical and Content Knowledge (TPACK)	46 to 55	10	10 to 50
Total	Teacher Technological, Pedagogical and Content Knowledge scale (TTPACKS)	1 to 55	55	55 to 275

Table 4: TPACK scoring interpretation table

S. No.	TPACK Raw Score Range	z-Score Range	Grade letter	Level of TTPACKS
1	270 & Above	+2.01 & above	A	Extremely high
2	232 to 269	+1.26 to +2.00	B	High
3	195 to 231	+0.51 to +1.25	C	Above average
4	144 to 194	-0.50 to + 0.50	D	Average
5	107 to 143	-1.25 to -0.51	E	Below average
6	69 to 106	-2.00 to -1.26	F	Low
7	68 & below	-2.01 & below	G	Extremely low

Data collection through interview and observation methods

Initially, the researcher approached the sample teachers and established a rapport with them. The teachers responded that they are integrating technology in their actual classroom teaching not regularly but occasionally. So, the process of conducting the interview and observations was something like on demand interviews and observations. The researcher asked the respondents when you are going to teach through technology incorporation, so that the process of interviewing and observations may become possible. The respondents prepared, managed for that and informed the researchers accordingly. The researcher, before classroom observation, interviewed the teachers about their techno-integrated teaching planning process. After that, the researcher conducted observation of

their execution in actual classroom settings. Finally, the researcher interviewed the teachers again about the factors/issues they encounter in the planning and execution of their techno-integrated teaching. The process of interview and observation primarily focused on how teachers are planning, applying and executing their knowledge and skills that they acquire in their professional practice. Are teachers using their knowledge and skills acquired by them in their lesson planning and classroom practice efficiently? The basic purpose of these two data collection procedures was to understand how teachers are using ICT especially the latest digital technologies in their teaching subject/s, to assess teachers application of 3 knowledge aspects i.e. TK, PK & CK actual classroom settings. Basically, the investigator was interested to explore how teachers are integrating these 3 aspects of knowledge and how they teach through TPACK model, what are the issues the face in doing so. Finally, the researcher was interested to develop a new or modify the existing TPACK model on the basis of grounded data collected by the researcher.

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Techniques for data analysis

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The techniques for data analysis also comprised of multiple techniques. The researcher used statistical techniques of percentage method, frequency rate, t-test and ANOVA for quantitative data. For data collected through interview and observation, constant comparative coding was used.

Frequency and Percentage method

Frequency and Percentage methods are simple descriptive statistical techniques which researchers use for the purpose of analyzing and interpreting the numerical/ nominal data in percentages. The researcher in this study used these methods for the purpose of assessing the college teachers' technology availability and usage.

t-Test & ANNOVA

A t-test is employed in comparing or assessing the variation in two groups, ANNOVA for more than two. The researcher used the t-test for comparing the techno-integrated teaching knowledge of college teachers and for assessing the variation in seven aspects of TPACK among male and female teachers; rural and urban teachers; Jammu division and Kashmir division. ANNOVA was used for assessing the statistical significant mean difference in the scores between teachers of different teaching experiences, teaching subjects and teaching positions and teachers' educational qualifications.

Qualitative data analysis

The Investigator was interested to explore issues teachers face while integrating technology in their planning and execution of content knowledge, and to propose the suggestive theory and model that will enhance the techno-integrated teaching of teachers in the context studied i.e. at higher level of teaching and in the state of J & K. The researcher employed grounded theory research design for this purpose. The basic purpose of grounded research design is to develop theory or to modify the existing one. Here, the researcher was interested to explore whether the existing theory of TPACK is applicable in the specific context where research conducted or need a refinement. The researcher for this purpose selected a sample of 10 teachers who showed high level of TPACK knowledge through purposive sampling. In-depth interviews and classroom observations were employed for data collection procedure. As the data was very extensive, the researcher first used open coding for its analysis. In open coding, every single sentence / statement is coded by the researcher. Open coding of the data leaded to the large number of codes, the researcher followed by axial coding to reduce them in smaller number. In axial coding, similar codes are merged to a single code. The researcher then developed the categories/themes from the

axial codes through constant comparative method of coding. The prominent themes emerged along with their frequencies were highlighted by the researcher in the table no….The researcher on the basis of interrelation of emerged themes developed a proposed theory and model, which he assumes will work in the specific context of the site where research was conducted and may be in similar other situations.