CHAPTER 3

RESEARCH METHODOLOGY

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Research is a methodological and rigorous investigation of a phenomenon using scientific principles. The precision of research findings relies on the appropriateness of the research methodology, research instruments, and statistical methods employed for data analysis (Kothari, 2004). This chapter focuses on the research methodology, including the research method, population, sample and sampling technique, tools for collection of data, statistical techniques for data analysis, and conclusion. This section outlines the specific procedures that are implemented during the research. This chapter lays down the foundations for the complete framework of the research work.

3.2 Philosophical Paradigm of Research

This study adopts the Pragmatic paradigm to investigate the research problem. The pragmatic paradigm of research originates from pragmatic philosophy, which is extensively articulated in the works of John Dewey, Charles Sanders Peirce and William James. It is argued that individual researchers have the autonomy to apply their judgment in decision-making. This means that a set of rigid rules does not bind researchers but rather has the freedom to choose the most appropriate study, methods, techniques, and procedures that correspond with their objectives and requirements. According to Creswell (2009), this flexibility is a vital feature of the pragmatic paradigm, allowing researchers to adapt their approach to the unique demands of their research.

Pragmatism, as a philosophical paradigm for research, is not bound by antecedent events but instead emerges from actions, situations, and their consequences (Creswell, 2014). It encourages a variety of philosophical approaches and methods as a research paradigm (Creswell & Clark, 2011). Researchers can confidently employ methods that are most effective for investigating specific research problems in an appropriate manner (Yvonne Feilzer, 2010). In the pragmatic paradigm of research, research questions are of paramount importance; this perspective asserts that obtaining results through both

qualitative and quantitative methods is crucial for addressing specific types of research inquiries (Bryman, 2006; Maarouf, 2019)

The pragmatic research paradigm is suitable for this study. This study examines institutional practices and Students attitudes toward the implementation of SWAYAM MOOCs in higher education institutions in Assam. The study commenced by articulating research questions, encompassing both qualitative and quantitative dimensions, focused on Institutional Practices and students Attitudes toward SWAYAM MOOCs. The integration of data collection methods has enhanced the capacity to address the research questions. According to Silverman (2005), "no method of research, quantitative or qualitative, is intrinsically better than any other" (p.6). The approach is entirely contingent upon the study's nature and the specific research questions formulated. The researcher in this study employed both quantitative and qualitative methods to collect data from the respondents. The decision to use both methods was based on the nature of the study and the specific research questions formulated. The pragmatic research paradigm enabled the researcher to select suitable research methods for the study. Therefore, the researcher has adopted the pragmatic research paradigm for this study.

3.3 Research Design

The selection of an appropriate research design is crucial in the research process to successfully and efficiently handle the research challenge. Research designs are systematic and methodological approaches that assist researchers in conducting structured and logical research studies. They provide a framework for collecting, analyzing, interpreting, and reporting data, which allows for informed decisions on methods and interpretation. As a result, research designs lead to more robust and reliable findings (Plano et al., 2017). The present study focused on providing a comprehensive description of the institutional practices of SWAYAM MOOCs' implementation in the Higher Education Institutions of Assam and students attitudes towards SWAYAM MOOCs.

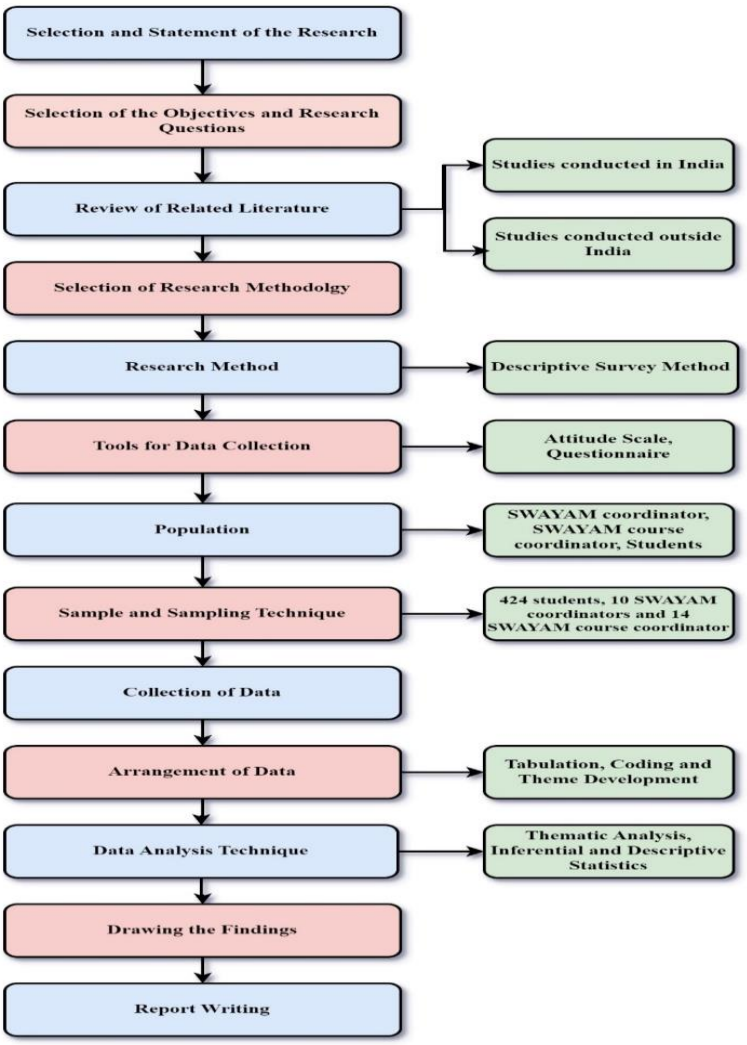
Moreover, the study aimed to evaluate the effectiveness and problems related to the implementation of SWAYAM from the viewpoints of students, the SWAYAM coordinators, and the SWAYAM course coordinators. As per the demand of the study,

the researcher collected both quantitative and qualitative data. Therefore, the researcher adopted a Descriptive Survey Research Design for conducting the research study. Descriptive survey research aims to analyze and interpret the data that has been collected to develop a better understanding of the phenomenon in the present scenario.

3.4 Research Methods

This study aimed to evaluate the institutional practices and students attitudes towards SWAYAM MOOCs implementation in the Higher Education Institutions of Assam. Therefore, the Descriptive Survey Method has been used for the present study.

Figure No. 3.1 Research Design of the Study



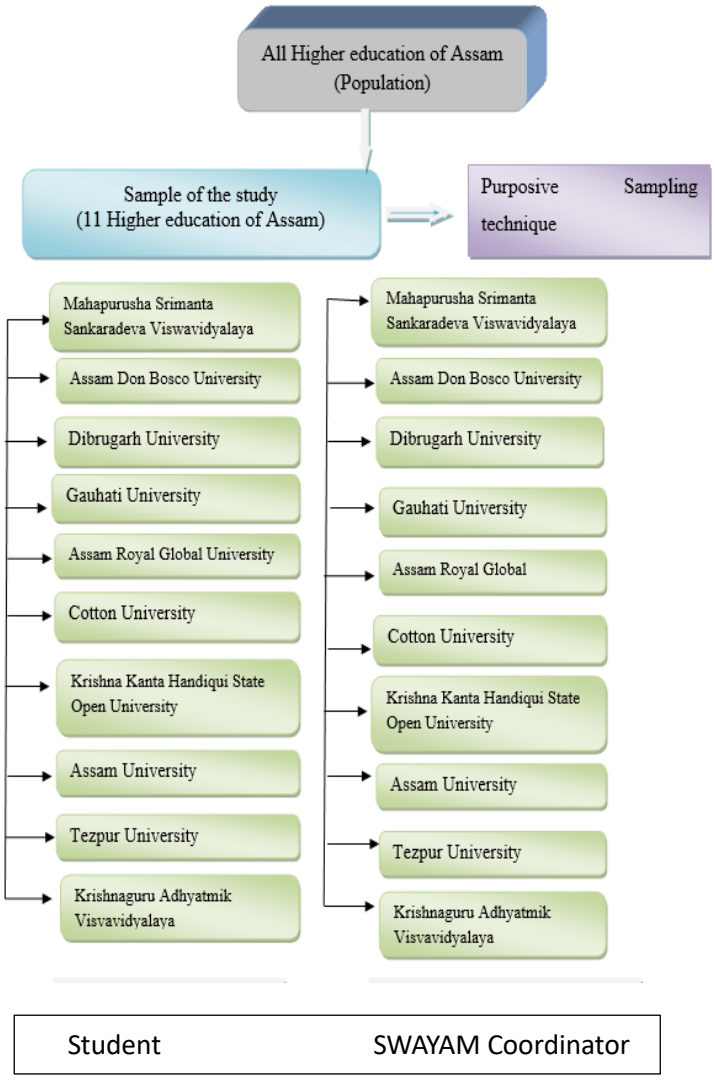
3.5 Population

Population refers to a specific group of people who have standard features and are being investigated by a researcher. A population is a group of individuals that possess at least one distinctive attribute that differentiates them from other individuals (Best and Kahn, 2006). The researcher identified ten higher education institutions in Assam, including Assam Don Bosco University, Dibrugarh University, Gauhati University, Assam Royal Global University, Cotton University, Krishna Kanta Handiqui State Open University, Mahapurusha Srimanta Sankaradeva Viswavidyalaya, Assam University, Tezpur University, and Krishnaguru Adhyatmik Visvavidyalaya as the population of the study where SWAYAM MOOCs courses are adopted. Thereby, the desired population for the present study comprised only these identified ten higher education institutions of Assam. For this research, the study's target population was all the student participants who had completed or participated in at least one or more SWAYAM MOOCs, SWAYAM course coordinators, and SWAYAM coordinators of SWAYAM MOOCs.

3.6 Sample and Sampling Technique

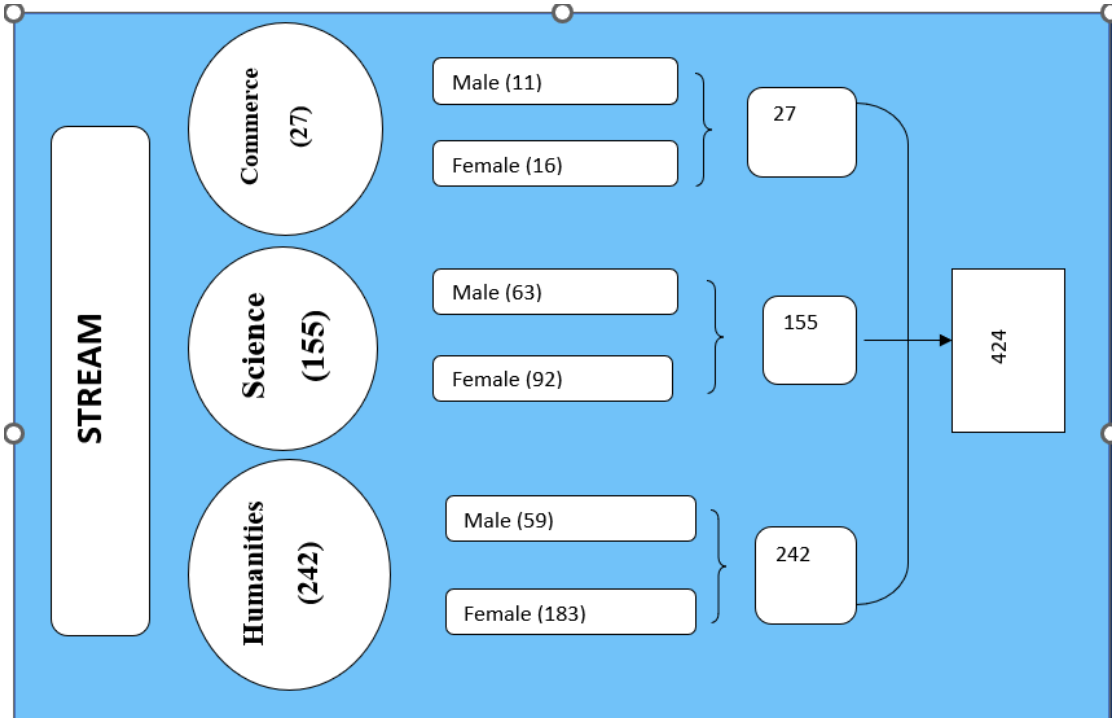
The scientific method systematically identifies a sample as a unit of representation of a population. In this study, the sample consisted of 424 students, 10 SWAYAM coordinators, and 14 SWAYAM course coordinators belonging to those ten higher education institutions that were selected as the final sample of the study. In the first phase, the researcher selected the sample using the purposive sampling technique in the case of choosing only those students who had completed or participated in at least one or more SWAYAM MOOCs. In the second stage, the researcher selected all the 10 SWAYAM coordinators from these 10 higher education institutions. In the third stage, the researcher selected all 14 SWAYAM course coordinators of Assam as the study sample.

Figure No. 3.2: Details of Distribution of the Collected Data



SWAYAM Course Coordinator

Figure 3.3. Streamwise distribution of sample of Students



3.7 Tools Used for Data Collection

In any research, well-structured and systematically developed tools are the most crucial part. The stated objectives are addressed, and information related to it is gathered through the tools developed by the researcher. In this study, the following tools were developed for collecting data.

Table. 3.2 Objective wise tools used for the Data Collection

Objective	Tools For Data Collection
To study the attitude of students towards MOOCs implementation in the Higher Education Institutions of Assam.	• Attitude Scale for Students
To study the institutional practices towards MOOCs implementation in the Higher Education Institutions of Assam with reference to prescribed norms of UGC.	• Questionnaire for SWAYAM Coordinator • Questionnaire for SWAYAM Course Coordinator

To find out the challenges faced by the stakeholders towards MOOCs implementation in the Higher Education Institutions of Assam.	• Questionnaire for Students • Questionnaire for SWAYAM Course Coordinator • Questionnaire for SWAYAM Coordinator
To study different remedial measures suggested by the stakeholders regarding the different problems that they faced related to MOOCs.	

3.8 Description of the Tools Used for The Study

3.8.1 Development of the Attitude Scale for Students

The development of the attitude scale for students usually requires a systematic process. The researcher conducted an in-depth literature review for constructing the attitude scale about SWAYAM MOOCs for students. The researcher extensively reviewed several sources, including books, journals, reports, abstracts, dissertations, and Ph.D. theses for developing the attitude scale. The first draft of the scale comprises a compilation of 70 statements. These items were categorized into four distinct dimensions such as the relevance of SWAYAM MOOCs, course content, learning strategies, assessment and feedback. The 5-point Likert Scale has been developed to measure the attitude of students towards SWAYAM MOOCs. In the next stage, the researcher discussed with different experts to develop the attitude scale for this research study. As a result, the number of items was reduced from 70 items to 43 items which has been considered as the final draft for the item analysis. The scale comprises both positive and negative items. The scoring technique for the positive items ranges from "strongly agree" given a score of 5, "agree" is assigned a score of 4, "neutral" is assigned a score of 3, "disagree" is assigned a score of 2, and "strongly disagree" is assigned a score of 1. Regarding negative items, the above scoring procedure is reversed. The score obtained by the respondent will indicate the level of the student's attitude toward the SWAYAM MOOCs.

3.8.1.1 Item Analysis

The researcher selected 30 students from two different universities using a purposive sampling technique to participate in a pilot study. The results received in the pilot test were sorted in descending order, i.e., from the highest score to the lowest score. From the total sample, 27% of students from the high-scoring group and 27% of students from the low-scoring group were selected to assess each item on the scale. For each item, the t-values and significance scores have been calculated to evaluate the responses from the participants of the low-scoring and high-scoring groups. The t-values and significance scores of the 43 items are presented in the following Table 3.3

Table 3.3 Independent sample t-test and p-values of lower and higher groups of students

Item No	**t-value**	**Sig.**	**Acceptance/Rejection**
1	-2.397	.031	Accepted
2	.215	.13	Accepted
3	-2.701	.017	Accepted
4	-2.880	.012	Accepted
5	-2.646	.019	Accepted
6	-7.00	.000	Accepted
7	**.00**	**1.00**	**Rejected**
8	-3.384	.004	Accepted
9	-4.082	.001	Accepted
10	-2.376	.032	Accepted
11	-5.000	**.** 000	Accepted
12	-4.320	.001	Accepted

13	-2.701	.017	Accepted
14	-2.338	.035	Accepted
15	-3.972	.001	Accepted
16	-2.346	.034	Accepted
17	-3.864	.002	Accepted
18	-4.292	.001	Accepted
19	-7.201	.000	Accepted
20	-2.333	.035	Accepted
21	-2.411	.030	Accepted
22	-2.688	.018	Accepted
23	-2.393	.031	Accepted
24	-3.384	.004	Accepted
25	**-.432**	**.672**	**Rejected**
26	-2.393	.031	Accepted
27	-4.194	.001	Accepted
28	-2.397	.031	Accepted
29	-2.966	.010	Accepted
30	-4.194	.001	Accepted
31	-3.000	.010	Accepted
32	-3.194	.006	Accepted

33	-2.263	.040	Accepted
34	-2.443	.028	Accepted
35	-2.523	.024	Accepted
36	-2.393	.031	Accepted
37	-2.397	.031	Accepted
38	-2.393	.031	Accepted
39	-2.909	.011	Accepted
40	-4.583	000	Accepted
41	**.424**	**.678**	**Rejected**
42	-2.443	.028	Accepted
43	-2.291	.038	Accepted

*Values marked in bold are non-significant

The researcher conducted an independent sample t-test and compared the sig value to 0.05. The results indicate that three items scored above the 0.05 level of significance, which means that the items do not show any significant difference between the low and high groups. Item analysis helps select items that could effectively make a difference between low and high groups. As it was not fulfilled in this analysis process, the researcher rejected item number 7, 25, and 41, which are given in bold letters. Following item analysis, forty items comprise the final draft of this tool.

3.8.1.2 Reliability

Following the process of item analysis, the researcher was required to determine the reliability of the tool. The reliability of tools was analyzed using the test-retest method. The final version of the scale is validated and standardized on 30 students. After a gap of 2 weeks, again the same tool was administered to the same group of students. Statistical Package for Social Science (SPSS)'s Pearson Formula was used to calculate

the coefficient of correlation for this tool, and the result was 0.81, which is significant at a 0.05 level of significance. The results were considered statistically significant and showed a high degree of reliability.

3.8.1.3 Validity

For this research, the researcher established the content validity of the tool. For content validity, the Attitude Scale was shared with eight experts to get their feedback on the validity and accuracy of the tools. Changes were made according to their suggestions. Some grammatical mistakes were identified by the experts who tried to simplify the sentences. They also modified the structure of the scale for better clarity and some questions were removed as per their suggestions.

3.8.1.4 Norms

To establish z-score norms, the researcher administered the tool to a group of 35 students. To interpret the raw scores received from this part of the tool, statistical calculations were done to find out the mean and standard deviation so that norms could be prepared. The mean, standard deviation, and N are: **Mean:** 163.51 **SD:** 11.078 **N:** 35

Table 3.4 Z-score norms for attitude scale for students.

Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score
189	2.30	176	1.13	163	-0.05	150	-1.22
188	2.21	175	1.04	162	-0.14	149	-1.31
187	2.12	174	0.95	161	-0.23	148	-1.40
186	2.03	173	0.86	160	-0.32	147	-1.49
185	1.94	172	0.77	159	-0.41	146	-1.58
184	1.85	171	0.68	158	-0.50	145	-1.67
183	1.76	170	0.59	157	-0.59	144	-1.76
182	1.67	169	0.50	156	-0.68	143	-1.85
181	1.58	168	0.41	155	-0.77	142	-1.94

180	1.49	167	0.32	154	-0.86	141	-2.03
179	1.40	166	0.22	153	-0.95		
178	1.31	165	0.13	152	-1.04		
177	1.22	164	0.04	151	-1.13		

Table 3.5 Norms for interpretation of z-score and norms for the level of attitude towards SWAYAM Course

Sl. No.	Range of Raw Scores	Range of Z-Scores	Level of attitude
1	186 and above	+2.01 and above	Extremely Favourable Attitude
2	178-185	+1.26 to +2.00	Highly Favourable Attitude
3	170-177	+0.51 to +1.25	Above Moderately Favourable Attitude
4	158-169	-0.50 to +0.50	Moderate Attitude
5	150-157	-0.51 to -1.25	Below Moderately Unfavourable Attitude
6	142-149	-1.26 to -2.00	Highly Unfavourable Attitude
7	141 and below	-2.01 and below	Extremely Unfavourable Attitude

3.9 Questionnaire on Institutional Practices Towards SWAYAM MOOCs

The present study also employed a questionnaire to investigate the institutional practices toward SWAYAM MOOCs implementation in Higher Education Institutions. The researcher developed a semi-structured questionnaire to study the Institutional Practices. The Questionnaire has three dimensions, namely (a) Adoption of SWAYAM MOOCs, (b) Awareness of SWAYAM MOOCs, and (c) Promotion of SWAYAM MOOCs. After finalizing the dimensions of the tool towards the institutional practice

of SWAYAM MOOCs, the researcher has conducted an extensive review of the literature for preparing items for the Questionnaire. Along with the previously mentioned dimensions, 40 questions were prepared, both close-ended and open-ended. The purpose of each part of this tool was to collect authentic responses from the participants. After the items had been formulated, the Questionnaire was sent out to experts who have specialized expertise in both research and MOOCs. From the comments provided by the experts' items on this tool were modified accordingly. The experts also pointed out a few items that were added to the tool. Following this modification, the final Questionnaire has 34 items related to three themes.

3.10 Questionnaire on the problem and challenges towards SWAYAM MOOCs

Three questionnaires were developed by the researcher for the students, SWAYAM coordinators, and the SWAYAM course coordinators to gather information regarding the challenges they encounter with SWAYAM MOOCs and suggestions for the successful implementation of the SWAYAM programme. The Questionnaire has four dimensions namely-(a) course content, (b) Learning strategies, (c) assessment, (d) discussion forum. After seeking expert opinion and establishing content validity, the researcher eliminated and reframed specific questions and prepared the final draft.

3.11 Procedure of Data Collection

The researcher conducted field visits to all 10 Higher Education Institutions in Assam to gather primary data for the study. The data was collected from January to August 2023. Before starting field research, due permission was obtained from the Head of the Department. The department's permission letter is submitted to the faculty members concerned with the study. During the quantitative phase of data collection, the attitude scale towards SWAYAM MOOCs was shared with the students who have completed or participated in at least one or more SWAYAM MOOCs. During the qualitative phase of data collection, the researcher also scheduled appointments with the SWAYAM coordinator and SWAYAM course coordinator to obtain data from them. Each interaction session lasts for a length ranging from 20 to 30 minutes.

3.12 Techniques Used for Data Analysis

This study uses both quantitative and qualitative data analysis methodologies to analyze the acquired data. The table below presents objective-wise data analysis technique.

Table 3.6 Statistical techniques used in this research study

OBJECTIVE	Techniques used for Data analysis
To study the attitude of students towards MOOCs implementation in the higher education institutions of Assam	➢ Descriptive Statistics: Percentage, Frequency ➢ Mann-Whitney U test ➢ Kruskal-Wallis test
To study the institutional practices towards MOOCs implementation in the higher education institutions of Assam with reference to prescribed norms of UGC.	➢ Descriptive Statistics: Percentage
To find out the challenges faced by the stakeholders towards MOOCs implementation in the higher education institutions of Assam.	➢ Descriptive Statistics: Percentage ➢ Thematic analysis
To study different remedial measures suggested by the stakeholders regarding the different problems that they faced related to MOOCs.	➢ Descriptive Statistics: Percentage ➢ Thematic analysis

3.13 Statistical Techniques for Data Analysis

For conducting this research, the researcher adopted the following statistical methods:

3.13.1 Quantitative data analysis:

- Percentage used in the analysis of the responses given by the students, SWAYAM course coordinator, and SWAYAM coordinator in different tools namely attitude scale for students, Questionnaire for the SWAYAM coordinator, and SWAYAM course coordinator.

- A Mann-Whitney U test is used to find out the significant differences between students in terms of different variables. This technique was used for the data which are collected from the students.
- The Kruskal-Wallis test was used to find out the significant differences between students in terms of locality and stream. This technique was used for the data collected from tools, namely the attitude scale toward SWAYAM MOOCs.

3.13.2 Qualitative data analysis:

This study followed the six phases of thematic analysis as outlined by Braun and Clarke (2006), using NVivo software, a widely used qualitative data analysis software program. This six-step framework proposed by Braun & Clarke (2006) is considered to be the most robust approach to thematic analysis, owing to its provision of a well-defined and practical framework, as noted by Maguire & Delahunt (2017). The collected responses have been transcribed into a Microsoft Word document and subsequently loaded into the NVivo software for further analysis.

Figure 3.4 Six-phase Thematic Analytic process (adapted from Braun & Clarke, 2006, 2012)