

CHAPTER 3
**RESEARCH DESIGN
AND METHODS**

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3.1 Introduction

Research designs mainly a proper logical structure for a perfect inquiry. It is a general plan of how a researcher will answer his research question. It is a major issue in research that helps the preparation of the research design of the research project. The decisions are mostly connected to these questions, such as what, where, how much, by what means which is actually concerning an inquiry or a specific research study constitutes a proper research design. Research design obtains very satisfactory evidence for every research problem. The main function of a research design has originally ensured that the evidence obtained enables the researchers to answer the research question as clearly and vividly as possible. To obtain the relevant evidence entails mostly specifying the type of evidence the researchers need to answer that research question to test a specific theory, evaluate a programme, or exactly describe some phenomenon. The research design is mostly a study that helps to know and give the researcher of some perfect sense of the overall procedure, as well as the perfect kind of relationships among different variables that will be entirely investigated well-designed studies are basically the foundation of the proper scientific knowledge about the particular field in education. It provides the best benefits for the practice of education.

The research methods are normally made of the collection of data and the techniques of data analysis. The research methodology is mainly defined as the method which is systematic and helps to resolve the different techniques, providing an interpretation of related research data (Murthy & Bhojanna, 2009, p.32). There is a basic difference

between the method and methodology in research. The method is mostly based on the techniques which are used to gather evidence and on the other hand, methodology is based on the underlying theory and analysis of how research should proceed further by using such valuable methods. So, it can be said that the research methodology is the most important part of the research to execute the research in a very systematic and scientific manner. The present study is based on the survey method.

The Descriptive survey method is chosen in the present study as it is the best method to answer three types of questions addressed in the present study- descriptive questions, relationship questions, and predictive questions. The data was gathered through an online survey as it is considered best by the researcher for the need of the study.

Best (1986) explained that “descriptive research describes what is now occurring and that it entails the description, recording, analysis, and interpretation of the current situations. It involves some kind of comparison or contrast, and the goal is to identify the link between the non-manipulated variables that are already in existence”.

3.2 Population of the Study

The population may be defined as a group of individuals with similar characteristics. For the present study, the population is the learner of MOOCs from all over India who have successfully completed at least one course in any MOOC on various MOOC platforms are included as the population of the study.

3.3 Sample of the Study

A sample is a small proportion of a population selected for analysis. Sampling is the foundation of research. It is essential for all research studies. The researchers demand a

sample that would truly reflect the whole population. This is the basic characteristic of good sampling. A good sample will produce results very much approaching the population and generalization will be effective. A representative sample can be collected with the use of probability sampling methods but due to certain limitations related to research time limit, cost of research and availability of data, the use of probability sampling is not feasible. Therefore, in the present research, the researcher has used the convenient sampling method which comes under the non-probability sampling method. The researcher uses this sampling to collect data of the students in MOOCs because the sample is taken from a group of people whose data is accessible in consideration of the research limitations. The researcher has taken those students from all over India who have already completed one or more than one MOOC.

First, the researcher contacted 7 course coordinators whose MOOCs are offered on different online platforms. The 4 MOOC course coordinators responded and agreed to participate in the study. The researcher shared the questionnaire with the course coordinators for further sharing with the participants in MOOCs.

The researcher received data from 415 MOOC participants from different platforms of MOOCs out of which only 240 participants who completed at least one MOOC are selected. Out of 240 participants, 132 males and 108 females from different age groups and different educational backgrounds constitute the final sample.

3.4 Tools Used

The selection or construction of a questionnaire to collect data for the study is an essential step in the process of research. Many types of research using readily available standardized tools available in the market to carry out the study, but in some cases, the

available tools are not suitable for the variable selected. In such a situation, the researcher prepares suitable tools to meet their study's needs and work adequately with the subjects selected for the study.

The researcher faced a similar situation of non-availability of required data collection tool, so the researcher developed a self-constructed questionnaire to collect the required information from the study of sample. The tool of student satisfaction, a study variable, has been developed based on available literature and is designed according to the study's objectives. The researcher prepared a questionnaire entitled "Students Satisfaction in MOOCs" for the present study. The tool contains all four quadrants in MOOCs, such as e-tutorial, e-content, discussion forum, assessment, and overall satisfaction as suggested by related literature. The researcher discussed with the specialists of the field and his research supervisor. The detailed process of construction of the questionnaire is discussed below.

On the other hand, the researcher will adopt a tool for student engagement, another variable. Deng et al., 2020 developed a tool on student engagement in MOOCs. They developed a scale named MOOC engagement scale (MES) (Deng et al., 2020) for full academic and research purposes. The MES should be used in the contexts where survey respondents or participants are taking MOOCs or have taken at least one MOOC before. Twelve questions were adopted to assess the engagement of learners in MOOCs. The MOOC engagement measure (MES) (Deng et al., 2020) was recently created and validated as a tool for assessing students' behavioural, cognitive, emotional, and social involvement in MOOCs. The appropriate Cronbach's alpha values (Chang & Chen, 2011) of behavioural, cognitive, emotional, and social involvement were 0.72, 0.70, 0.73, and 0.83, respectively, in this investigation. The MOOC engagement scale's

total Cronbach's alpha rating is 0.83, indicating a good level of internal consistency (Fraenkel & Wallen, 2003).

3.4.1 Construction of the Tool

The researcher did not find the standardized questionnaire of student satisfaction. Therefore, it was planned to develop the questionnaire to study the level of student satisfaction in the context of four quadrants in MOOCs. The researcher followed the steps during the construction of the questionnaire entitled students satisfaction in MOOCs as mentioned below:

3.4.2 Procedures for Construction of the Tool

There are general principles and procedures of construction of the tool described under the following headings and these are:

- Planning
- Item writing
- Preliminary draft
- Pilot study
- Item analysis
- Reliability
- Content validity
- Final draft

- **Planning:** The researcher prepared a questionnaire related to students' satisfaction and it aims to find out satisfaction among students regarding MOOCs. Due considerations were given to the variables tested and the different aspects involved, the items to be included, evaluation procedure etc. were planned in consultation with the experts.
- **Item writing:** The researcher created several elements addressing the tool's content, namely, student happiness in MOOCs, after a comprehensive and rigorous review of books, articles, journals, magazines, research publications, and newspaper stories connected to student satisfaction. An in-depth examination of the research issue was conducted to determine the primary elements of the study, which was used to develop the questionnaire. Based on the goals and underlying research, specific factors to be assessed were determined. The questionnaire's items are designed to gather data on student satisfaction.
- **Preliminary draft:** The researcher prepared 27 items for measuring student satisfaction. The items were edited and carefully worded with instructions of the tool. The final manuscript of the preliminary draft was sent to the supervisor and four other professors of different departments of CUH and other universities. Overlapping and ambiguous items were modified based on their suggestions. Then, the necessary modification, the preliminary draft was printed.
- **Pilot study:** To check the tool's usefulness and determine the deficit, a pilot study was conducted. Fifty students were included as respondents for the study. After the trial questionnaire was modified, reliability was assessed using the SPSS-22 software and content validity of the questionnaire was established.

- **Item analysis:** For choosing the related and reliable items to the tool, the researcher used the data collected from 50 students who have completed at least one MOOC or pursued any MOOC and computed Cronbach's alpha value(Chang & Chen, 2011).

$$\alpha = \frac{K}{K - 1} * \left(1 - \frac{\sum_{i=0}^K s_i^2}{s_t^2} \right)$$

Table 3.1 Before the Item Analysis Cronbach Alpha Value

Cronbach's alpha	Cronbach's alpha based on standardized items	Number
.967	.965	27

Above table 3 shows that 0.967 is Cronbach's alpha (Chang & Chen, 2011), which is a high level of internal consistency of the tool.

Table 3.2 Item-Total Statistics

Item-Total Statistics

No. of Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
VAR00001	53.97	528.852	.913	.	.965
VAR00002	53.77	535.476	.850	.	.965
VAR00003	53.94	542.232	.765	.	.966
VAR00004	53.63	554.182	.652	.	.967

VAR00005	53.83	541.029	.833	.	.965
VAR00006	53.77	550.182	.622	.	.967
VAR00007	53.49	537.316	.803	.	.966
VAR00008	53.60	535.541	.803	.	.966
VAR00009	53.71	552.681	.634	.	.967
VAR00010	53.80	542.576	.779	.	.966
VAR00011	53.51	549.610	.558	.	.968
VAR00012	53.77	545.829	.728	.	.966
VAR00013	53.54	546.020	.715	.	.966
VAR00014	53.69	536.928	.889	.	.965
VAR00015	53.71	540.681	.864	.	.965
VAR00016	53.46	538.785	.791	.	.966
VAR00017	53.54	535.373	.858	.	.965
VAR00018	53.83	536.029	.872	.	.965
VAR00019	53.60	539.188	.743	.	.966
VAR00020	54.09	553.963	.705	.	.966
VAR00021	54.09	554.375	.696	.	.966
VAR00022	53.54	571.432	.265	.	.970
VAR00023	53.97	554.264	.663	.	.967
VAR00024	53.83	563.382	.441	.	.968
VAR00025	53.97	553.852	.653	.	.967
VAR00026	53.91	556.551	.595	.	.967
VAR00027	53.97	556.382	.546	.	.967

Note: The bold items indicate deleted items

The above table shows the items or statements 9, 11, 22, 24, 26, and 27, resulting in a lower Cronbach's Alpha. Therefore, the researcher wanted to remove the items or statements 9, 11, 22, 24, 26, and 27. Finally, the tool consists of 21 items after the item analysis process.

After finalizing the item analysis strategies, the researcher prepared the final draft of the tool. Out of the total 27 items, 6 items were rejected and 21 items were selected for the final draft of the tool. Therefore, the ultimate draft of the tool consists of 21 items on a five-point scale.

- **Reliability of the tool:** The test-retest method was used for calculating the reliability of the tool. The researcher used the test-retest method for the reliability of the tools. In the present study, the researcher employed Cronbach's alpha to establish the tool's reliability. The reliability of the tool is 0.985

Table 3.3 After the Item Analysis Cronbach Alpha Value

Cronbach's alpha	No. of Items
.985	21

Above table 3.2 shows that .985 is Cronbach's alpha, which indicates a high level of internal consistency of the tool. Therefore, the tool is reliable.

- **Content Validity:** After preparing the final questionnaire, the tool's content validity is ascertained based on expert judgment. The experienced guides, educational technology experts, senior faculty in the computer science department, and instructors of MOOCs were provided copies of the questionnaire, objectives of the study, and a description of the tool's dimensions. Experts have expressed their

judgment on each proposed item to a high degree of satisfaction. Hence, the content validity of the questionnaire was established.

- **Final Draft:** For each classification, all favourable utterances were given a score ranging from a maximum of two to a minimum of one. The tool's final draught consists of 21 components. The tool's scoring technique is outlined below.

Table 3.4 Scoring Pattern of Rating Scale of Student Satisfaction

Responses	Scores
Strongly disagree	1
Disagree	2
Neither agree nor disagree	3
Agree	4
Strongly agree	5
Minimum Scores:25	Maximum Scores:125

Above the table shows that scoring of student satisfaction tool or questionnaire is done according to the instruction given as each item has two responses which agree and disagree. For all close-ended items, 1 & 2 were given for agreeing and disagreeing, respectively.

3.5 Administration

The tools were administered to the students in MOOCs who have completed at least one course in MOOCs. The researcher sent three reminders for seeking cooperation in completing the questionnaire. Finally, it took 50 days to collect data from the respondents, and in the end, the researcher got 240 filled-up questionnaires from respondents.

3.6 Variables of the study

The researcher has adopted these two variables- student satisfaction and student engagement. The researcher has adopted the following demographical variables for the present study to do the analysis. Such as gender (male and female), and educational background (pursuing UG, UG, pursuing PG, PG, pursuing Ph.D., M.Phil/Ph.D., professional courses).

3.7 Statistical Techniques

In the present study, the researcher used Pearson's coefficient of correlation, mean, standard deviation, student 't'-test, ANOVA, and principal component analysis (PCA) for data interpretation and analysis with the help of SPSS statistical software and Microsoft Excel 2007.

This chapter goes through the sample study approach, the tools utilised in the research, and the statistical methods employed in the investigation. The following chapter contains the analysis, interpretation, and discussion.