

**MIXED SAMPLING METHOD: AN INNOVATIVE SAMPLING METHOD****Article Particulars**

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**Abstract**

*If any type of social science research, the sampling procedure is an essential aspect. It is the main task of the researcher to identify the representative sample. Normally, little confusion would come up when the researcher selects appropriate sampling method to select sample from population. An ideal sample produces better research output as well as frees from of type I and II errors. The selection of sample mostly depends on the sampling frame or the nature of population. Sometimes sampling bias may affect the representativeness and its results. The knowledge about sampling techniques of the researcher leads a way to identify precise sampling procedure. Because, it has different kinds of sampling techniques under two categories such as probability and non probability sampling methods. These are all are used for a single population. But in two different populations, everyone needs to follow a new and innovative sampling procedure. For solving this problem, the authors of this paper introduce a new and innovative sampling method that is mixed sampling method and it is justified with illustrations.*

**Introduction**

Research is a broad term which is complex as well as systematic process. In research, the research methodology is the heart of the research. A progressive research must be well versed in method, sample, and statistics and so on. The sample occupies a great extend in research methodology because an ideal sample gives the precision and worthiness of the research. The sampling bias may produce wrong results. It may add to type I and type II errors. Sampling is not a cup of coffee for all. It is a complex task to the researcher. Sufficient knowledge about sampling procedures

leads the selection of correct and appropriate sampling method. The correct sample gives the direction of representativeness and reduces the errors. Generally, the ambiguity of the researcher might direct to select inappropriate sampling techniques. The researcher should painstaking in selecting samples with the appropriate sampling procedures. The following paragraphs will help to minimize the ambiguity and aid in selecting appropriate sampling techniques.

### **Why Sample is Essential?**

The researcher cannot measure traits in a whole population. Measuring traits to a population is a time consumable process and it would be a lengthy process when the sampling frame is infinite. It is not possible to measure traits of population when the sampling frame is not available. In social sciences, it is not possible to collect data from every respondent relevant to one's study but only from some fractional part of the respondents. It reduces waste of time. It is a short cut for investigating the whole population. Sampling is an act or process or technique of selecting an appropriate sample. According to Fox "In the social sciences, it is not possible to collect data from every respondent relevant to our study but only from some fractional part of the respondents. The process of selecting the fractional part is called sampling" (as cited in Chandra & Sharma, 2004). Sampling is simply called a process of selecting units from the population. For reducing the unwanted wastages, the representative sample is collected from the population and measures the traits easily. So the sample is an essential factor and to be considered as a main part of the research.

### **Ethical Issues in Selecting Sample**

Most of researcher in educational institutions who wants to finish the research within the duration is traditional one. They fixed their objectives and collect data from easily accessible sample to the researcher. This makes sampling bias of the research and produces less representativeness of the population. The researcher should know about the basic things about sampling procedures which leads to select appropriate sampling techniques. The researcher must have substantial knowledge about the probability and non probability sampling and must know it applications. Not only with sample, researchers should know the population, sampling frame. Because, the sampling frame directs the researcher to select precise sampling techniques. The followings issues occur by misunderstanding of sampling methods by the researcher.

#### *Issues on sampling frame*

Some researchers do not consider the population and its sampling frame. There is a well-built relationship between population, sampling frame and sampling unit. The sampling frame occupies a main place to identify the exact sampling method. Nowadays, the researchers easily decide the sampling method without considering the sampling frame and they felt that how one easily gets data from the sample. These

things lead to select inappropriate sampling methods and it produces undesirable results. Sampling frame acts as primary step in sampling process. The following table 1.1 shows the sample selection with respect to the sampling frame.

**Table 1.1 Sampling Method with respect to Sampling Frame**

S.No	Sampling Frame	Sampling Method	Example
1.	Available	Probability	Teacher Efficacy of Teachers (PG/UG) (Sampling frame is available)
2.	Not Available	Non Probability	Social Attitude of Beggars (sampling frame is not available)

These are applicable to all type of research. Especially, the quasi experimental design has the relaxation if the sampling frame is available. In Quasi experimental design, the randomization of sample does not occur in sample selection. In true experiment, the randomization of sample is must but this is not possible in social science studies.

### Issues on Sample Selection

Sample selection may be misleading the results. The researcher should select proper sampling method based on the purpose of the research. But, the above said methods include more techniques into it. In this place, the researcher carefully forward to select the appropriate sampling method with consideration of the purpose of the research. The researcher only takes care that the time and the cost. They didn't care about the accuracy of the results. A good researcher only follows the systematic procedures to attain better results. So, researcher must care about sampling technique for effective results and it makes high representativeness on populations. The following table 1.2 will help to make clear picture about how to select precise sampling techniques.

### Issues on Number of Sample

The sampling method not only decides the representativeness. The counting of sample also inherently decides the representativeness of the sample. It is essential to identify the sufficient number of sample. This mostly depends on the population size or sampling frame. Nowadays the sample size tables and derived formulae are available in online and print. The researcher may use these to get comfortable sample size. The simple and easiest formula is given in book entitled as "Research Methods" by Ahuja (2001) and it's given below,  
According to Slovin's (1960),

**Table 1.2 Sample Methods and its Description**

<b>Sampling Methods</b>	<b>Sampling Techniques</b>	<b>Process</b>	<b>Representativeness</b>
Probability Sampling Method (Randomization is must)	Simple random Sampling	Select the sample by using lottery, random tables etc.	Representative
	Systematic random sampling	First unit is select by random and all others are selecting by fixed intervals (Sometimes it is called as mixed sampling method)	Representative
	Satisfied random sampling	Separated the variables as sub variable and selecting each samples by randomization	More Representative
	Double sampling	First sample is filtered by some criteria (the final sample has taken to study)	More Representative
	Multistage sampling	The filterization is continued more than one time(the final sample has taken to study)	More Representative
	Cluster sampling	Random selection of areas, the all units of the selected area	Much Representative
	Multiphase sampling	The filterization is continued more than one time(the every sample has taken to study)	Most Representative
Non Probability Sampling Method	Purposive sampling	Select the sample purposefully and accidentally available in anywhere in population limit	May or May not Representative
	Convenience sampling	Selection of sample only available to the researcher convenience area not in full of population limit	
	Quota sampling	Conveniently selected the area	
	Snow-ball sampling	Selection of sample is linear that is the sample unit introduce other unit and so on.	
	Volunteer sampling	The interested units wishing be an sample	
	Expert sampling	Sample selected by Expert Advice	

$$\text{Sample Size } (n) = \frac{N}{(1+Ne^2)}$$

Where,

N- Number of units in the population

e - Error chance (0.05/0.01)

### *Issues on number of sample and population*

Generally, most of the study has one type of sample or one population. The sample obtained from the population by using any one technique of probability sampling method or non probability sampling method. If one researcher wants to correlate or study as combined with respect to the number of variables. There is no possible to select sample from one population and other sample from other population using with a single technique. It is not suitable for all researches. They are some criteria should follow with the study has two or more population. The sampling technique should be modified. The details of sampling method for two or more population for a single study are given with illustration.

### **Mixed Sampling Method and Its Need**

Mixed sampling method means that the two different sampling methods are used in a single study. Thus, if one sampling procedures having both probability and non probability sampling methods is called mixed sampling method. It is also called as complex random sampling method. According to Kotahri and Garg (2014), "the mixture of probability and non probability sampling methods is called as complex random sampling designs". They exemplified the systematic sampling, stratified, cluster, multistage and sequential sampling under this complex random sampling design. But real fact, the examples are explained for a single population. For two populations, the two sampling technique which have different characteristics combined as single method is called mixed sampling method. It may be used for single, double and more populations. Most of the researchers did not consider their populations. They are doing the research in a traditional way. They have not been know about which is the appropriate method to follow. For example, the following topics are examples to explain the numbers of populations.

- A study on teachers' job satisfaction and job involvement.
- A study of teacher's emotional intelligence and the influences on students' mental health.
- Correlation between students anxiety and achievement
- An experimental study on computer assisted instruction and its effect on students' academic achievement.

In the above topics, 1, 3 and 4 are having single population. But, topic two has two populations; one is teacher and the other is student. Then how is possible to select single sampling method in two or more population. There is a need to collect relevant data and find concise results by using mixed sampling method. It may be possible for single population. Most of the experimental researcher does not consider the hindrance problem in selecting samples. Most of the researcher simply writes in their

thesis that “the sample of 80 students were (40 for Experimental group and 40 for Control group) selected from X and Y schools by using Z Sampling technique”. It may be probability or non probability. If anyone scrutinizes this, the selection of samples is right but, how the researchers select the schools is the question. If the samples are purposefully selected, there is a limit that the researcher must take all the samples in the schools. The researcher must know what the sampling procedure could be followed. The researcher might say in their thesis, the purposive random or random purposive sampling was adapted to selecting samples. This clearly explained, the school was purposive or randomly selected and the samples are randomly or purposefully selected. In here two sampling method is used in the study one is probability and other is non probability. So it is called as mixed sampling method not a mixed method sampling. Because mixed method sampling is only occurs that the study have two methods such as quantitative and qualitative. It is mostly suitable two or more population in a single study. Nonetheless, the right way to write the above statement that “the sample of 80 students were (40 for Experimental group and 40 for Control group) selected by using Z Sampling technique and they are belongs to X and Y schools”. This is correct for purposive or convenience sampling in a single stage. Sometimes, there is a possibility to select samples in two occasions by using any one of sampling method. The following paragraph explains the importance of mixed sampling method and its justification.

### **Is the Mixed Method Sampling Suitable for Double Population or More?**

Yes. The mixed method is mostly suitable for if one study have double and more population. Mixed sampling method is an innovative sampling method. It means that the sampling method that includes probability and non probability sampling methods. It is entirely different from the mixed method sampling. Normally, the researchers' don't know the exact sampling procedures to adapt to their studies. For example, most of the researchers have taken the achievement mark as dependent variable with respect to the teacher variable. In this, two populations are used in a single study. But, the researcher does not consider the student population when they select the sample. The researcher simply selects the teacher by using any one sampling technique and simply they take achievement marks of students. In real, there is a sampling technique behind that and the inherent sampling procedure might be identified. In fact, the teachers were selected by one sampling technique and how the students' marks were collected; here the researcher selects the students' marks who are studying with to the respective teacher. Thus, it is evident that two sampling procedures could be followed. This is problem occurs in research which have two or more populations. The following passages explain mixed sampling method and its justification.

*Illustration 1*

If one researcher wants to correlates the teacher factor and student factor. The study entitled “A study on Teachers emotional intelligence and Students mental health”.

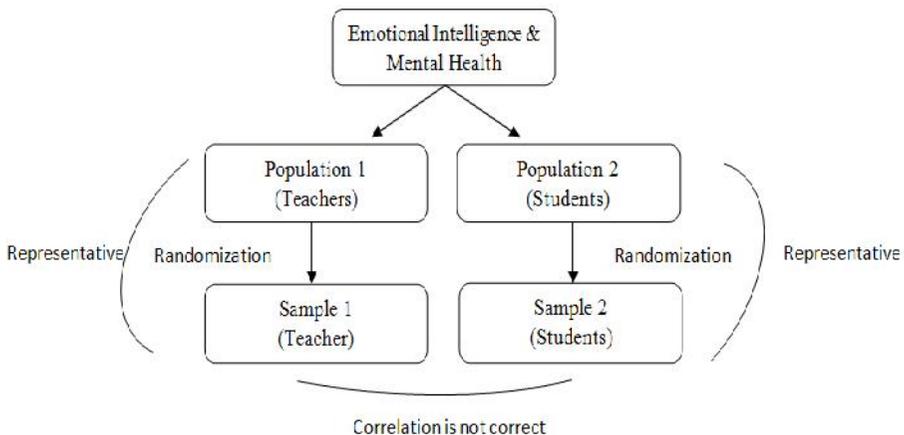
In here, the study has two populations. One is teacher and the other is students. There are many possibilities to select sample. Table 1.3 shows the representativeness and effectiveness of mixed sampling method.

**Table 1.3 Representativeness and Effectiveness of Mixed Sampling Method**

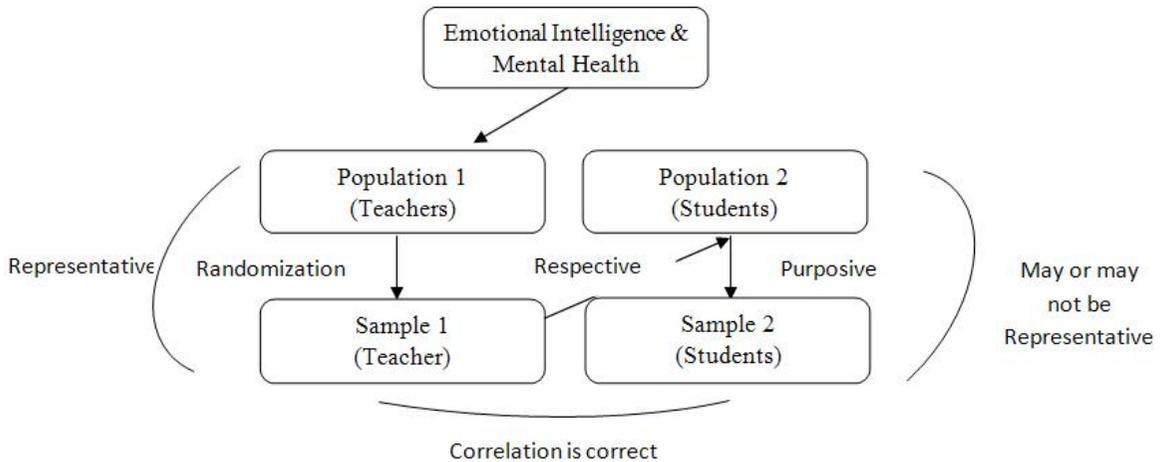
Population		Type of sampling	Representativeness to the Respective Population	Effectiveness in Results
Teacher	Student			
Probability	Probability	-	High	Low or high
Probability	Non Probability	Mixed sampling method	Low or high	High
Non Probability	Non Probability	-	High	Low or high
Non probability	Probability	Mixed sampling method	Low or high	High

If the sample of teacher was selected probability like simple random sampling and the students are selected was simple random sampling. It produces the teacher has selected one part and the students has selected in the other part. This produce less accuracy or irrespective of results or it may not representative. If the teacher and the students are selected in same schools the correlation between teacher Emotional intelligence students mental health is highly accurate. Otherwise, if the teacher and the students were selected in different school by using random sampling separately the how it is possible to make correlation. It is not bad when probability sampling occurs but it is not good. The following figures 1.1 and 1.2 explains clearly.

**Figure 1.1 Model of Normal Sample Selection**



**Figure 1.2 Mixed Model of Sample Selection for Two Populations**

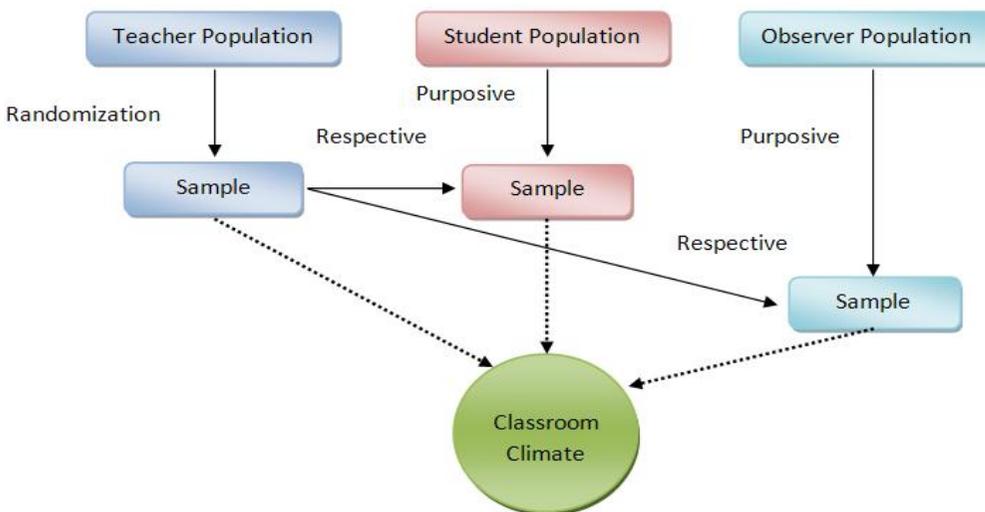


**Illustration 2**

One researcher wants to know status of classroom climate in three dimensional views. They are teacher's view, student's view and observer's view. In this case, there are no possibilities to select samples from three populations by using probability sampling method. Because the classroom climate analyzed with the samples, those should be in same classroom that is teacher, respective students and observers. Otherwise it will be worthless.

In three populations, any one sample could be probability and others two are must be in non probability. If sampling procedures includes both probability and non probability is mixed method sampling. The following figures 1.3 shows pictorial explanation of this.

**Figure 1.3 Mixed Model of Sample Selection for Three Populations**



Mixed sampling method is entirely different from the other sampling techniques such as, double sampling, multiple sampling and mixed method sampling. The detailed explanation as below,

### **Double Sampling Vs Mixed Sampling Method**

In double sampling, the every step of selection must be with probability sampling method (Randomization). It is mostly occurs in a single population. But, the mixed sampling method present when two populations are occurred. In this, the first step is Probability sampling and other is non probability sampling.

### **Multiple Sampling Vs Mixed Sampling Method**

In each and every step of sampling should be with probability sampling method is called as multiple sampling. This sampling technique is mostly used for single population. But, the mixed sampling method presented when two populations are occurred. In this, the first step is Probability sampling and other is non probability sampling.

### **Mixed Method Sampling Vs Mixed Sampling Method**

Mixed sampling is used when the study combined both quantitative and qualitative method. Here, the researcher used a sampling method to quantitative study and another sampling method is qualitative study in same population or different populations. But, in mixed method sampling method is used when the two or more populations are available to a single study. With compare to mixed method sampling based on methods, so it has two methods are used to data collection with compare to mixed sampling method. Because it has only one method to collect data from all samples derived from the different type of populations.

### **Conclusion**

Research methodology having systematic procedures and is a heart of the research. Sampling is the one of the essential part to produce accurate and valid results. The care about sampling procedures leads the representativeness of the results to the population. The researcher must know what the exact sampling procedure could be adapted to our study. Mixed sampling method is an innovative sampling method. This is used to a single or double population and it produces effective correlation when two populations are used in a single study. Finally, the authors of this document hoped that the reader might get brief knowledge about mixed sampling method and it may produce new revolution in research methodology.

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