**Mixed Methods Research Design**

A mixed methods research design is a procedure for collecting, analyzing, and “mixing” both quantitative and qualitative methods in a single study or a series of studies to understand a research problem (Creswell & Plano Clark, 2011). The basic assumption is that the uses of both quantitative and qualitative methods, in combination, provid With qualitative research now accepted by educational researchers, and with quantitative research long established as an approach, mixed methods research has become popular as the newest development in research methods and in approaches to “mixing” quantitative and qualitative research a better understanding of the research problem and question than either method by itself.

 Mixed methods research is a good design to use if you seek to build on the strengths of both quantitative and qualitative data. Quantitative data, such as scores on instruments, yield specific numbers that can be statistically analyzed, can produce results to assess the frequency and magnitude of trends, and can provide useful information if you need to describe trends about a large number of people. However, qualitative data, such as open-ended interviews that provide actual words of people in the study, offer many different perspectives on the study topic and provide a complex picture of the situation. When one combines quantitative and qualitative data, “we have a very powerful mix”. For example, by assessing both outcomes of a study (i.e., quantitative) as well as the process (i.e., qualitative), we can develop “a complex” picture of social phenomenon (Greene & Caracelli, 1997, p. 7).

 You also conduct a mixed methods study when one type of research(qualitative or quantitative) is not enough to address the research problem or answer the research questions. More data is needed to extend, elaborate on, or explain the fi rst database. For example, you may want to first explore the data qualitatively to develop an instrument or to identify variables to test in a later quantitative study. You use mixed methods when you want to provide an alternative perspective in a study. An example of this would be an experimental study in which the experiment yields useful information about outcomes, but the additional collection of qualitative data develops a more in-depth understanding of how the experimental intervention actually worked.

**Combining Quantitative and Qualitative Data**

Jick’s (1979) study was more than an examination of mergers; his article used the merger study to illustrate the procedure of triangulating data. Triangulation, a term drawn from naval military science, is the process where sailors use multiple reference points to locate an object’s exact position at sea ( Jick, 1979). Applied to research, it meant that investigators could improve their inquiries by collecting and converging (or integrating) different kinds of data bearing on the same phenomenon. The three points to the triangle are the two sources of the data and the phenomenon. This improvement in inquiries would come from blending the strengths of one type of method and neutralizing the weaknesses of the other

The idea of triangulation had already introduced one purpose for mixing methods—to integrate multiple databases to understand a phenomenon and research problem. You could collect quantitative and qualitative data separately in two phases so that data from one source could enhance, elaborate, or complement data from the other source. In more complicated designs, the data collection could extend from two to three phases or be collected from multiple levels. You could also embed data, with one form of data becoming less important in a design emphasizing the other form of data(Creswell, 2009).Central to this thinking about different models or designs has been the visualization of procedures and the use of a notation system designed by Morse (1991). Shorthand labels for quantitative (quan) and qualitative (qual) simplify the terms.

The mixed method designs are:

◆ The Convergent Parallel Design

◆ The Explanatory Sequential Design

◆ The Exploratory Sequential Design

◆ The Embedded Design

◆ The Transformative Design

◆ The Multiphase Design

**The Convergent Parallel Design**

The purpose of a convergent (or parallel or concurrent) mixed methods design is to simultaneously collect both quantitative and qualitative data, merge the data, and use the results to understand a research problem. A basic rationale for this design is that one data collection form supplies strengths to offset the weaknesses of the other form, and that a more complete understanding of a research problem results from collecting both quantitative and qualitative data. For example, quantitative scores on an instrument from many individuals provide strengths to offset the weaknesses of qualitative documents from a few people. Alternatively, qualitative, in-depth observation of a few people offers strength to quantitative data that does not adequately provide detailed information about the context in which individuals provide information (e.g., the setting). The researcher gathers both quantitative and qualitative data, analyzes both datasets separately, compares the results from the analysis of both datasets, and makes an interpretation as to whether the results support or contradict each other. The direct comparison of the two datasets by the researcher provides a “convergence” of data sources.

*◆ The mixed methods researcher often gives equal priority to both quantitative and qualitative data ( QUAN and QUAL).* The researcher values both quantitative and qualitative data and sees them as approximately equal sources of information in the study. For example, interview data are as important as the scores gathered on an instrument.

*◆ The mixed methods researcher collects both the quantitative and qualitative data concurrently or simultaneously during the study.* Qualitative documents about what the students learn in preschool are reviewed, for example, at the same time that the researcher collects quantitative observations on student behavior using a checklist.

*◆ The mixed methods researcher compares the results from quantitative and qualitative analyses* to determine if the two databases yield similar or dissimilar results.

**The Explanatory Sequential Design**

Instead of collecting data at the same time and merging the results, a mixed methods researcher might collect quantitative and qualitative information sequentially in two phases, with one form of data collection following and informing the other.An explanatory sequential mixed methods design (also called a two-phase model; Creswell & Plano Clark, 2011) consists of first collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results. The rationale for this approach is that the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection, is needed to refine, extend, or explain the general picture.

◆ The mixed methods researcher places a priority on quantitative data(QUAN) collection and analysis. This is done by introducing it first in the study and having it represent a major aspect of data collection. A small qualitative (qual) component typically follows in the second phase of the research.

◆ The mixed methods researcher collects quantitative data first in the sequence. This is followed by the secondary qualitative data collection. Researchers often present these studies in two phases, with each phase clearly identified in headings in the report.

◆ The mixed methods researcher uses the qualitative data to refine the results from the quantitative data. This refinement results in exploring a few typical cases, probing a key result in more detail, or following up with outlier or extreme cases.

 This design has the advantage of clearly identified quantitative and qualitative parts,an advantage for readers as well as for those designing and conducting the study. Unlike the convergent design, the researcher does not have to converge or integrate two different forms of data. This design also captures the best of both quantitative and qualitative data—to obtain quantitative results from a population in the first phase, and then refine or elaborate these findings through an in-depth qualitative exploration in the second phase. The difficulty in using this design, however, is that the researcher needs to determine what aspect of the quantitative results to follow up on. This follow-up means deciding on the participants to sample in the second qualitative phase as well as the questions to ask in this follow-up phase that builds on the initial quantitative phase. Also, this design is labor intensive, and it requires both expertise and time to collect both quantitative and qualitative data.

**The Exploratory Sequential Design**

Rather than first analyzing or collecting quantitative data as is done in the explanatory design, the mixed methods researcher begins with qualitative data and then collects quantitative information. The purpose of an exploratory sequential mixed methods design involves the procedure of first gathering qualitative data to explore a phenomenon, and then collecting quantitative data to explain relationships found in the qualitative data. A popular application of this design is to explore a phenomenon, identify themes, design an instrument, and subsequently test it. Researchers use this design when existing instruments, variables, and measures may not be known or available for the population under study.

◆ The mixed methods researcher emphasizes the qualitative data (QUAL) more than the quantitative data (quan). This emphasis may occur through presenting the overarching question as an open-ended question or discussing the qualitative results in more detail than the quantitative results.

◆ The mixed methods researcher has a sequence to data collection that involves first collecting qualitative data followed by quantitative data. Typically in these designs, the researcher presents the study in two phases, with the first phase involving qualitative data collection (e.g., interviews, observations) with a smallnumber of individuals, followed by quantitative data collection (e.g., a survey) with a large, randomly selected number of participants.

◆ The mixed methods researcher plans on the quantitative data to build on or explain the initial qualitative findings. The intent of the researcher is for the quantitative data results to refine and extend the qualitative findings by testing out an instrument or survey developed using the qualitative findings or by testing a typology or classifi cation that developed from the qualitative findings. In both cases, the initial qualitative exploration leads to detailed, generalizable results through the second quantitative phase.

One advantage of this approach is that it allows the researcher to identify measures actually grounded in the data obtained from study participants. The researcher can initially explore views by listening to participants rather than approach a topic with a predetermined set of variables. However, it has the disadvantage of requiring extensive datacollection as well as the time required for this process is long. The testing of an instrument adds considerably to the length of time this design requires to be implemented. It also asks researchers to make decisions about the most appropriate qualitative data (e.g.,quotes, codes, themes) to use in the follow-up quantitative phase of the study.

**The Embedded Design**

A second form of mixed methods design is similar to both the parallel and the sequential design, with some important differences. The purpose of the embedded design is to collect quantitative and qualitative data simultaneously or sequentially, but to have one form of data play a supportive role to the other form of data. The reason for collecting the second form of data is that it augments or supports the primary form of data. The supportive data may be either qualitative or quantitative, but most examples in the literature support adding qualitative data into a quantitative design. For example, during a quantitative experiment, the researcher may collect qualitative data to examine how participants in the treatment condition are experiencing the intervention. Also, the researcher may collect qualitative data either before or after the experiment to help support the experimental study. Collecting data before the experiment can help to design an intervention that is tailored to the participants. Collecting data after the experiment can help to explain and follow up on the quantitative outcome results. As another example, during a correlational study, the researcher may gather secondary qualitative data to help understand the reasons for the correlational results. In some embedded designs, the procedures are sequential, with the secondary form of data gathered before the experiment (or the correlational study) begins (e.g., to help determine the best means for recruiting participants) or after it concludes (e.g., to follow up and help explain the results).

* The mixed methods researcher gives priority to the major form of data collection (e.g., often QUAN) and secondary status to the supportive form (e.g., often qual) of data collection. The secondary form is used in the mixed methods study to support and provide additional information to the primary form.
* The mixed methods researcher collects both the quantitative and qualitative data simultaneously or sequentially. Both forms of data are collected during the study at roughly the same time or in sequence. It is important to understand and describe the purpose for which the secondary data is being collected.
* The mixed methods researcher uses the secondary form of data to augment or provide additional sources of information not provided by the primary source of data. The augmentation is to gather information that typically addresses a different question than asked for by the primary form of data. For example, the collection of qualitative data during an experiment may be to understand the “process” the participants are going through, whereas the quantitative data assesses the impact of the treatment on the outcomes.

The strength of this design is that it combines the advantages of both quantitative and qualitative data. Quantitative data are more effective at recording outcomes of the experiment than identifying through qualitative data how individuals are experiencing the process. It also provides a type of mixed methods design in which the researcher can collect qualitative data, but the overall design still emphasizes quantitative approaches. In some fields new to qualitative research, this role of qualitative data helps to legitimize the use of such forms of data. One challenge in using this design is to be clear about the intent of the secondary database. In addition, the two databases may not be easily compared because the data address different research questions. There is also the possibility that introducing qualitative data collection during an experiment (or correlational study) will influence the outcomes. Strategies need to be put into place to minimize this effect (e.g., collecting qualitative data at the end of the experiment, having participants complete journals of their experience that are turned in after the experiment.

**The Transformative Design**

At a more complex level than the four previous designs, we have the transformative mixed methods design. The intent of the transformative mixed methods design is to use one of the four designs (convergent, explanatory, exploratory, or embedded), but to encase the design within a transformative framework or lens (Creswell & Plano Clark, 2011). This framework provides an orienting lens for the mixed methods design. It informs the overall purpose of the study, the research questions, the data collection, and the outcome of the study. The intent of the framework is to address a social issue for a marginalized or underrepresented population and engage in research that brings about change. Thus, strength of this design is that it is value-based and ideological (Greene, 2007).

◆ The mixed methods researcher uses either a convergent, explanatory, exploratory, or embedded design. The basic designs provide the cornerstone for the transformative design, but the transformative design goes beyond simply the use of the basic design.

◆ The mixed methods researcher uses an overall orienting lens in the study as a transformative framework. This framework may be a feminist perspective, a racial or ethnic perspective, or some other perspective. It is this framework that shapes many aspects of the mixed methods design, such as the framing of the title, the questions, the methods, and the conclusions. The framework basically addresses an issue for an underrepresented group and presents research intended to bring about change for that group.

◆ The mixed methods researcher calls for change that will address the social issue faced by the group under study. A strong key to a good transformative mixed methods study is whether the research calls for reform or changes at the end of the study. This call may be an explicit request for change or steps that will be required to bring about change.

**Multiphase Design**

Like the transformative design, the multiphase design is a complex design that builds on the basic convergent, explanatory, exploratory, and embedded designs. Multiphase mixed methods designs occur when researchers or a team of researchers examine a problem or topic through a series of phases or separate studies. The groups of phases or studies are considered to be a mixed methods design and the intent of the design is to address a set of incremental research questions that all advance one programmatic research objective (Creswell & Plano Clark, 2011). The phases or studies may employ a combination of concurrent or sequential designs and this form of design is popular in large-scale health research and in evaluation research. The strength of this design lies in the use of multiple projects to best understand an overall program objective. Challenges include forming a research team that can work comfortably together given diverse method orientations, making sure that the phases or studies link together, and having all of the studies provide insight into an overall project objective. The major elements of this design are:

◆ The mixed methods researchers use either a convergent, explanatory, exploratory, or embedded design in multiple phases or projects in the study. The multiphase design builds on the basic mixed methods designs and adds to these designs multiple phases or projects conducted over time. Any one phase may have a combination of concurrent and sequential mixed methods designs. In addition, this form of research is most amenable to large-scale funded investigations.

◆ The mixed methods researchers need to clearly identify projects or phases that help address a larger program objective. These researchers also need experience in largescale research. Teams might be composed of individuals with quantitative, qualitative, and mixed methods research skills.

◆ The mixed methods researchers need to interrelate the different phases or projects so that they tie together to address a common research objective. Typically, one phase or project leads to another and, in this sense, the phases or projects build on (or inform) each other throughout the study.