A Framework for Mixed-method Research

Sindhu Shantha Nair
Christ University, Bangalore, Karnataka, India

Smritika S Prem
Canada

Abstract
This article presents the basics of mixed-method research as a distinct methodology that uses both quantitative and qualitative research methods to create empirical research. The method of this study is a review. Through a substantive review, this paper explains the basic idea of a mixed-method approach. The article identifies the main components of the mixed-method approach, provides examples, and describes how to conduct mixed-method research. A quantitative study involves collecting, identifying, and analyzing data. A qualitative study uses interviews or focus groups. An integration of both approaches helps a better understanding of the issue. This study brings out the role of mixed-method research to assess further approaches in future research practices. The combination of qualitative and quantitative research will enable a broader reach in empirical studies.

Keywords: Mixed-Method, Quantitative Study, Qualitative Method and Framework

Introduction
The mixed-method research is a distinctive form of research method using both quantitative and qualitative research methods so that strong empirical evidence is obtained. Mixed-method research is carried out on dynamic and unique topics or emerging topics. Qualitative research methods had arisen from sociology and anthropology. Researchers used to study people, social relationships, institutional relationships, and culture by using observations, archived secondary data, or interviews, describe them through the patterns that emerged from the data using clear ontology and epistemology. Quantitative research methods are descriptive study (survey methods through questionnaires), correlational study, causal-comparative study, quasi-experimental and experimental studies. Mixed-method of quantitative and qualitative approaches helps the researcher to gain a deeper understanding and confirmation while enabling the elimination of the weakness of each study if carried out in silos. Another advantage of conducting a mixed-method is that triangulation in terms of data, method, or researches is possible. Triangulation enables the researcher to have multiple perspectives of an occurrence through different techniques more accurately. The mixed-method can be used to corroborate results, clarify findings, to develop a theory, and test it, or to generalize findings from both the approaches. Thus mixed-method research provides strength, complete understanding, context specificity, and causal processes in a way that is better that when carried out using a quantitative study or a qualitative approach alone. This study provides a framework for mixed-method research.
Qualitative Research

The qualitative research method inquires the sample under consideration through an in-depth inquiry into peoples’ experiences, personal stories, or specific purposes. Qualitative research, in its broader perspective, tries to understand, interrogate, and deconstruct (Lather, 1991). Lather (1991) has not specified the need for prediction or generalization; In ‘understand,’ qualitative research gathers the required information based on someone’s’ experiences and reports. In ‘interrogate,’ qualitative research presumes that the experience is rested upon gender, age, race or sexuality, or any identity form and highlighted for inequalities and marginalization. In ‘deconstruct,’ qualitative research intends mostly to break stereotypes, social conditioning.

A qualitative researcher explores and understands in-depth, interrogate differences or deconstruct conditions and need not generalize. The examples given in Table 1 depicts why, in some cases, generalization is not required. Studies focused on a few attributes, or a social cause or social rationale, gender inequality are some to name.

Table 1: Examples of qualitative studies

<table>
<thead>
<tr>
<th>Research</th>
<th>Sample</th>
<th>Type of Study</th>
<th>Generalization needed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The attitude of breast cancer patients in the second stage</td>
<td>Women in X city</td>
<td>Understand</td>
<td>No</td>
</tr>
<tr>
<td>Gender sensitivity in Organization Y</td>
<td>Employees in Organization Y</td>
<td>Interrogate</td>
<td>No</td>
</tr>
<tr>
<td>Social conditioning of Patriarchy in the village Z</td>
<td>Women in village Z</td>
<td>Deconstruct</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration

Based on the purpose, the ontology, epistemology, methods, and representation, the researcher has to wisely and sensibly decide based on the questions, methods, and analysis.

Various Categories of Qualitative Research Studies

There are different types of qualitative research inquiry for research and theories to support it. The basic outline of quantitative research inquiry is in Table 2.

Table 2: Qualitative Research Inquiry purpose and Outline

<table>
<thead>
<tr>
<th>Understand</th>
<th>Interrogate</th>
<th>Deconstruct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretivism</td>
<td>Feminism</td>
<td>Postcolonial</td>
</tr>
<tr>
<td>Narrative Inquiry</td>
<td>Marxism</td>
<td>Poststructural</td>
</tr>
<tr>
<td>Phenomenology</td>
<td>Critical Theory</td>
<td>Diaspora</td>
</tr>
</tbody>
</table>


Some of the categories of qualitative research studies are studies based on ‘Interviews,’ ‘Narrative Inquiry,’ ‘Phenomenology,’ ‘Grounded Theory,’ ‘Case Study,’ ‘Ethnography,’ ‘Auto-ethnography,’ and ‘Critical ethnography,’ ‘Art-based approach,’ and ‘Oral History.’

In the Interview study, the inquiry approach is the interview, and the different modes are open-ended interviews, closed-ended interviews, depth interviews, critical incident interviews, and feminist interviews depending upon the purpose of the inquiry. Some of the prominent works in interview methods are from Spradley (1979), DeMarris (2004), Kvale, and Brinkman (2009). In Narrative Inquiry, a researcher tries to understand the study sample and narrate their experience in the modal of a story. The seminal work in the narrative inquiry was by Polkinghorne (1989), and a few other authors are Clandinin (2007) and Kim (2006). In qualitative studies, one of the most used categories is Phenomenology, rooted in philosophy uses reflection on experiences of participants as part or the whole experience of an event. This category is used in exploratory studies, or to articulate a phenomenon which is shared, to understand the experience structure to help the abstraction of the quintessence of the experience. The seminal work in phenomenology was by Husserl (1931), and a few other authors are Elveton (2003), von Herrmann (2013), and Manen (2014). Grounded Theory is a process of inquiry used by researchers to develop a theory rooted in-depth in a structure and system. Whether this approach should be with prior...
experience of the researcher or based on literature is debated upon to date. Generally, the objectivist approach presumes the researcher with less pre-decided data.

In contrast, the constructivist approach urges the researchers to develop their construction of meaning based on the interaction from different sources of participants and data sets. The seminal finding of grounded theory was from Glaser and Strauss (1967), and some other prominent works are from Strauss and Corbin (1998) and Charmaz (2006). The Case Study approach is the analysis of a place, situation, people, issue, success, or failure factors of an organization or business, psychological issues predetermined for the study. This approach makes the concepts clear to the researchers and the readability of the cases. The researcher has to draw boundaries to define the situation. The seminal work on a case study was from Stake (1995), and some other prominent works are from Yin (2003, 2006); Hancock & Algozzine (2006).

Ethnography is an approach through which people and culture are studied for a long time about their way of life, activities, interests, habits, food habits, languages, ongoing phenomenon, social occasions through interviews, documentation, collecting materials from them in the best possible way. Few works on ethnography are from Lecompte and Preissle (1993), Van Mannen (1988), and Wolcott (2008). Auto-Ethnography is an approach of self-reflection of experiences in analysis with the researcher’s context of occurrence of similar experiences. Often this helps in a deeper understanding of depression, social structures, social justice, and documentation. Thus auto-ethnography is a combination of the auto (self-biography) and ethnic (race, culture; ethnicity: human beings) graphics (representing). Some of the works in auto-ethnography are from Ellis and Bochner (1996), Elic (2004), Jones, Adams, and Ellis (2013). Critical ethnography is an ethnographic study wherein the people, race, culture, or societies are critically cross-examined and interrogated to bring out the structures of inequality through interactions. Some of the works of critical ethnography are by Thomas (1993), Carspecken (1995), and Madison (2005). The art-based approach employs the tenets of creative arts to arrive at an artistic representation (dramatic, poetic, pictures, photos) of findings. Much eminent work of art-based approach is Knowles and Cole (2007), Barone and Eisner (2012), and Leavy (2008, 2015). Oral history, is a way of storytelling or story narration of individuals, community, or society propending inequalities, social justice, gender sensitivity, existential pain, distress, or hardships. Few examples are the story of Holocaust survivors, flood victims, women oppressed by toxic masculinity, child abuse, or rape victims. The eminent works for oral history are Perks, and Thomson (1998, 2006), Janesick (2010), Leavy (2011).

**Philosophical Concept**

The philosophical concept for research is positivism, post-positivism, phenomenology, critical theory, feminism, etc.

**Positivism Paradigm and Applicability**

Positivism is the consideration of that which is scientific and empirically verified with logical proof. Auguste Comte (1789-1857) coined positivism, arguing that research ought to progress from theism and metaphysics to a positivistic approach with dominant scientific inquiry, positive assertion of theories from the scientific method. The accuracy and certainty of scientific inquiry assumptions surged in 1990 with mathematical functions and operations (Crotty, 1998).

**Post Positivism**

It is interesting to note that positivism considered the research and the researcher not to be dependent, post-positivism supposed that the observations are influenced by the background knowledge, theories, and the researcher’s values. Seminal work on post-positivism was by Sir Karl Popper (1934), who contended falsification against the verification of positivism and stated that unobservable truths or beliefs are non-verifiable. Still, at the same time, the possibility to reject false beliefs provided the phrasing has the flexibility of falsification. Kuhn provided a paradigm shift to positivism logic, explaining that not only individual theories but also world views ought to reposition, displace, or switch with evidence. While post-positivism does not reject scientific evidence, it reforms positivism to
reinvent the positivist approach and assumptions of objectivism and methodological experiments, which is in social sciences.

**Interpretivism**

The philosophy of Interpretivism emerged from the critique of positivism on reality through social constructions of shared meanings, instruments, consciousness, or language (Myers, 2008). Idealism is the philosophical emphasizing in Interpretivism and aligns the diversity in approaches such as constructivism, phenomenology, and hermeneutics. Interpretivism appreciates differences between people, focuses on the meaning, and the methods used are multiple to bring out the various aspects.

**Interpretivism Approaches**

1. Phenomenology is the philosophy that tries to understand a phenomenon of the past through experiences and find new ways to understand that experiences from new insights (Crotty, 1998)
2. Hermeneutics is the philosophy of interpretation and understanding, mostly used to interpret and understand biblical texts.
3. Symbolic interactionism is the philosophy that tries to understand the objects through shared meanings using symbols to construct reality.

The difference between positivism and Interpretivism (Pizam and Mansfeld, 2009) is in Table 3.

**Table 3: The Difference between Positivism and Interpretivism**

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Positivism</th>
<th>Interpretivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>General, average, and representative</td>
<td>Specific, unique and deviant</td>
</tr>
</tbody>
</table>

**Table 4: Qualitative Research Methodology**

<table>
<thead>
<tr>
<th>Narrative Inquiry</th>
<th>Phenomenological inquiry</th>
<th>Grounded theory inquiry</th>
<th>Case Study</th>
<th>Ethnographic inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thematic</td>
<td>Transcendental</td>
<td>Objectivist</td>
<td>Single instrumental</td>
<td>Realistic</td>
</tr>
<tr>
<td>Biographical</td>
<td>Existential</td>
<td>Constructivist</td>
<td>Collective/Multiple</td>
<td>Critical</td>
</tr>
<tr>
<td>Autobiographical</td>
<td>Hermeneutic</td>
<td></td>
<td>Intrinsic</td>
<td>Virtual</td>
</tr>
<tr>
<td>Life history</td>
<td></td>
<td></td>
<td></td>
<td>Digital</td>
</tr>
<tr>
<td>Oral history</td>
<td></td>
<td></td>
<td></td>
<td>Visual</td>
</tr>
<tr>
<td>Art-based</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Fundamentals of Qualitative Research, Bhattacharya (2017)
Data Collection Methods

In the Interview method, the researchers often use conversations, casual interactions, critical interactions, etc. to understand the experience, situation, the topic of concern or a problem through formal semi-structured interviews, depth, and open-ended interviews, informal open-ended interviews, or natural conversations (Bhattacharya, 2017). The types of interview questions are in Table 5.

Table 5: Types of Interview Questions

<table>
<thead>
<tr>
<th>Descriptive questions</th>
<th>Grand Tour questions</th>
<th>Specific Grand Tour questions</th>
<th>Task- related Grand Tour questions</th>
<th>Mini Tour questions</th>
<th>Structural questions</th>
<th>Critical questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate information about a specific incident with details</td>
<td>Generate details about everyday experiences in a particular situation</td>
<td>Probing specific incident and related experiences</td>
<td>Rooted in a specific task to generate relevant information</td>
<td>For a specific, mini-unit of experiences</td>
<td>To understand the structure of the environment</td>
<td>To disprove some salient experience of participants.</td>
</tr>
</tbody>
</table>

Source: Fundamentals of Qualitative Research, Bhattacharya (2017)

In the Observation method, the researchers adopt participant observation (Dewalt and Dewalt, 2002) in the form of peripheral, active, or full membership. The process is to gain access and mutual benefit.

Data Analysis in Qualitative Research Method

The inductive analysis is used in qualitative research analysis, wherein inferences are from the data collected. The process does not relate to any assumed hypotheses. The researcher looks into the raw data, code the data (segregating into meaningful information or units), cluster the data, categorize, and identify the data into themes.

Interpretation in Qualitative Research

From the data analysis, narratives can be developed, from segmentation and units, re-analyzing and reflecting on the insights. The various types of representation in qualitative research are thematic, poetic, plays, performances, documentaries, musicals, novels, short stories, photo essays, digital stories, etc. (Bhattacharya, 2017).

Quantitative Techniques

The epistemology of quantitative research is positivism and post-positivism. The ontology specifies the phenomena and is measurable to understand (O’Dwyer and Bernauer, 2014). This background qualifies a quantitative study to be objectified and scientifically independent. The characters of investigation are the variables. For example, to analyze the role of mobile usage in student performance, the variables are mobile usage and student performance. Depending on the study criteria, the variables may be categorical (varies in type) or continuous (type and degree). Based on the topic of interest of the researcher, an issue or problem, the research questions arise, the concepts/ constructs identified from the premise of theoretical underpinnings, and variables of the study are determined. The variables are, in turn, operationalized. The stated research hypotheses are verified through empirical evidence and accepted or rejected.

The quantitative study can be experimental or otherwise. Experimental studies can be pure or quasi, based on the selection of the test and control groups. Non-experimental studies may be categorized into descriptive, predictive, explanatory, cross-sectional, longitudinal, and retrospective (O’Dwyer and Bernauer, 2014). The research design in quantitative research includes measurement, statistical analysis, and interpretation. Statistically, the study can be descriptive based on the predictive or explanatory nature of the study or inferential based on the generalizability of the study.

The quantitative research may be descriptive, explanatory, comparative, or case study. The Data in a quantitative approach is in numbers, which makes it easily computable, unlike the qualitative data expressed in words. This numbered data and computing makes the findings generalizable, repeated, or more reliable. Whereas to repeat the conversations or interviews or observation with the

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49
participants in the qualitative study and to get the data repeatedly are difficult. Existing instrument/s or a questionnaire is using techniques to survey the respondents in concern. This data is coded into numbers and analyzed using statistical analysis software; findings interpreted and is discussed for results and implications.

The quantitative approach is a broader study, and the qualitative method is an in-depth study (Figure 1). Qualitative research helps to seize the depth and diversity (Geertz, 2003).

**Figure 1: Quantitative and Qualitative Research representation**

![Figure 1: Quantitative and Qualitative Research representation](image)

**Source:** adapted from Fundamentals of Qualitative Research, (Bhattacharya, 2017)

### Mixed-Method Advantages

While qualitative research embraces the philosophical underpinnings explained in this article, there is differentiation among researchers about the different perspectives of the theoretical frameworks (Creswell, 2007). Moreover, the quantitative method, with its various designs based on the purpose of description, exploration, or explanation, does not comprise the philosophies or the diversity paradigms encompassed in the qualitative method. The authors do not negate the importance of each approach, either quantitative or qualitative, for the intended purpose of the research, keeping in mind that every study brings out the unknown or fills the gap in the existing knowledge through the researcher’s perception, susceptibility, paradigmatic concerns. Nevertheless, the authors try to state that there is an apparent distinction between the quantitative and qualitative methods; thereby if used, one can complement the other to make the research holistic. “There is no inherent reason why either paradigm cannot accommodate, and be contributed to, by either methodology” (Guba, 1981, p.78). The shared differences in quantitative and qualitative methods were stated by O’Dwyer, and Bernauer (2014) as “qualitative research seeks to discover new knowledge by retaining complexities as they exist in natural settings, whereas quantitative research seeks to discover new knowledge by simplifying complexities in settings that tend to be more contrived.”

The dichotomy between quantitative and qualitative methods need not deter a researcher’s commitment to carry out quality work; as the Nobel prize winner Albert Szent-Gyorgyi (1893-1986) rightly posited, “Discovery consists of seeing what everybody has seen and thinking what nobody has thought.” This argument raises the pertinent question of whether the research approaches of quantitative and qualitative characteristic is to solve problems or to find and solve problems. Walcott (1994, p.401) clearly states this dilemma as in “The idea that research is viewed as a problem setting, rather than problem-solving did not set too well when I first encountered it.” Many times, researchers are diverted to the methodology to narrow down to a researchable problem that the incorporeal existence of potential...
methods for myriad possibilities of quality research is overlooked.

The Framework of Empirical Inquiry for Quantitative and Qualitative Research is in Table 6.

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Trustworthiness, Credibility</td>
</tr>
<tr>
<td>Data</td>
<td>Words</td>
</tr>
<tr>
<td>Analysis</td>
<td>Coding, Narrative or both</td>
</tr>
<tr>
<td>Process</td>
<td>Segmentation</td>
</tr>
</tbody>
</table>

Table 6: Framework of Inquiry

Table 7: Strength and Weakness of Qualitative and Quantitative Research

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength</td>
<td>Weakness</td>
</tr>
<tr>
<td>Substantial and deep understanding of complexities</td>
<td>Reflexivity</td>
</tr>
<tr>
<td>Lived experiences</td>
<td>Scarcity of quantitative information</td>
</tr>
<tr>
<td>Art-based researches help educators and social sciences</td>
<td>Allow generalizations (if samples are representative)</td>
</tr>
<tr>
<td>More time-consuming in some researches</td>
<td>Less time-consuming in some researches</td>
</tr>
</tbody>
</table>

Bringing together the Research

Quantitative research focuses on the generalization of findings (external validity) across respondents, which is basically through representation from probability sampling. Qualitative research focuses on the description of respondents based on the situation, which may be transferable to several clusters. A mixed approach can bridge the gap between the studies. Both methods have unique roles and can complement each other. The differences can be used as strengths to understand the research in width and depth to bring out substantial new knowledge systematically without any boundaries between the quantitative and qualitative paradigms.

Discussion

The research world is very vast, and a prudent researcher has to carry out research in all possibilities rather than the easy way out or settle for less. There exists a multitudinous array of research problems in the natural world which, if it is researched, is very much self-fulfilling and benefitting the society at large. Whether the researcher has a qualitative inclination or quantitative, indulging in both to use a mixed-method of research will enable the researcher to engage in extensive research with distinct research focused tools, explore the phenomena of both quantitative and qualitative research methods (Gardner, 1983). Moreover, as mentioned by
Vygotsky, the primal numbers in quantitative and words in qualitative methods for the same focus, to unearth renewed, refreshed, regenerated, or remodeled knowledge will produce improvised and creative discernment (Karpov & Haywood, 1998). A mixed-Method study can augment and analyze complex problems through the utilization of both qualitative and quantitative methods. The purpose of the research decides the methods, whether it is explorative, explanatory, grounded theory, theory testing, or generalization. This article gives a basic framework for understanding mixed-method research and the advantages of using it. The disadvantages can be the complex research design, the time required for conducting both methods, resources required, integrating, and interpreting the findings. Despite any disadvantages mentioned, a mixed-method provides strength, comprehensive understanding, develop research instruments with better construct validity, causal processes, and develop a theory.

**Conclusion**

The combination of qualitative and quantitative research will enable a broader reach in empirical studies. While the quantitative research method will rise to scientific research, the qualitative research method is exploratory, providing the phenomenology, reasons, opinions, or motivations and may help to develop ideas or frame hypotheses for further quantitative research or complement or confirm the quantitative research. A combination of methods may also help in the gap analysis.

**References**


Author Details

Sindhu Shantha Nair, Christ University, Bangalore, Karnataka, India, Email ID: sindhusonnet@gmail.com

Smritika S Prem, Canada, Email ID: smritika246@gmail.com