

# A Discussion of Paradigms and Research Methods

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## Abstract

The aim of this paper is to provide an overall review of the facets which constitute the framework of a research design, from the paradigms to research skills and analysis in a research process. First, the author discusses positivism/post-positivism, constructivism, and pragmatism. The author then examines the paradigms from epistemological, ontological, and methodological viewpoints. Lastly, the author discusses the specific research inquiries that are found in different research designs: quantitative, qualitative, and mixed methods.

**Keywords** : Paradigm, Research method

## I. Introduction

This paper aims to provide a brief discussion of the essential elements for research design. More specifically, this paper examines the paradigms and research methods that are widely employed in most research studies in the area of the social and behavioural sciences. This paper begins with a discussion of the framework of a research design, followed by an examination of three research paradigms; namely positivism/post-positivism, constructivism, and pragmatism. Furthermore, it discusses the research inquiries that are associated with these three paradigms: qualitative research, quantitative research, and mixed-methods research. In addition, the characteristics and types of data collection of each research method will be demonstrated. Finally, this paper presents a suggestion explaining how the choice can be made when deciding a research method for a study.

Section two outlines the framework of the project, which is the first process when beginning a research study. It examines the key facets that should be taken into consideration in the process of a study design. The discussion begins with the research paradigms that lie behind the methodology; the methodology that determines which research methods should be used in the research process; and lastly, the research methods and the techniques that are used for data collection, analysis, interpretation, and presentation. The section of research paradigms is divided into three parts for detailed discussion. These are: positivism/post-positivism, constructivism, and pragmatism. These research paradigms have been widely used in the research area of social and behavioural sciences, and have relevance to quantitative, qualitative, and mixed-method research studies respectively. Section three will demonstrate the characteristics and types of data collection for qualitative, quantitative, and mixed methods, and how researchers approach



a research problem in their own different ways by using these three research types. The conclusion gives a brief review of what has been discussed in this paper.

## II. Research Design

This section discusses the issues that are essential for a research study design. As Crotty indicates, the following should be taken into consideration when designing a study: epistemology, theoretical perspectives, methodology and methods (1998, p.5). Crotty claims that epistemology is “inherent in the theoretical perspective and therefore in the methodology we have chosen” (1998, p.8). Creswell’s (2003) summary of epistemology is that it refers to the “theory of knowledge that is embedded in the theoretical perspective” (p.4), such as subjectivism or objectivism. The theoretical perspective represents the “philosophical stance that lies behind our chosen methodology” (Crotty 1998, p.7) that frames the research question, such as constructivism, positivism, or pragmatism. Methodology is the “strategy or a plan of action” (Crotty 1998, p.7), such as ethnography or survey research. Crotty further claims that “this is the research design that shapes our choice and use of particular methods and links them to the desired outcomes” (1998, p.7). Methods are the specific skills or techniques that are employed in the research process, such as interviews, observations and questionnaires (Creswell, 2003).

In order to provide a full understanding of research design, it is necessary to give a rather detailed discussion for each step. Thus, in the following sections, the three research paradigms, constructivism, post-positivism, and pragmatism will be introduced. Secondly, the three research approaches, qualitative, quantitative, and mixed-methods will be identified in order to explain which approach should be used for a particular study.

The purpose of having the framework when designing a research project is not only to guide the study, but also to take researchers into a consideration or discovery of which approaches should be used in the process. Through the careful examination and consideration of the nature of knowledge claims (assumptions) during the research process, researchers are able to identify which methodology and research methods are appropriate for the study. The following section will discuss three paradigms, including positivism/post-positivism, constructivism and pragmatism, respectively. Also, the views of ontology, epistemology and methodology are outlined under each paradigm.

### 2.1. Paradigms

Mertens indicates that “a paradigm is a conceptual model of a person’s worldview, complete with the assumptions that are associated with that view” (2003, p.139). Also, in the study by Mertens in 1998, she claimed that people’s worldviews were determined by three defining questions, namely ontological, epistemological, and methodological questions (Mertens, 1998). This section will discuss three paradigms along with the perspectives from ontology, epistemology, and methodology.



### 2.1.1 Positivism/Post-positivism

Positivism represents a view which sees that the goal of knowledge is to provide a depiction of the situation that we have been through, and that the purpose of science can be achieved from what can be observed and measured (Trochim, 2006). In Trochim's argument, for positivists, science is seen as a way to find the truth and to dominate the world which is operated by cause and effect to be distinguished if scientific methods are applied in the research (2006). Trochim (2006) indicates that positivists believe that science is about testing the assumed theories by using deductive reasoning, and the results of the research reflects whether the theory supports or refutes the facts. If the theory does not fit the facts, then it will be revised for better predictions of reality. Positivists believe that the reality is "out there" and that it can be tested (Creswell 2003, p.7). Concerning the way of achieving the purpose of science, Trochim argues that positivists believe that it can be done through what can be observed and measured. As for human emotions or thoughts, which cannot be measured as this is beyond our knowledge, they are impossible to be tested (2006).

Post-positive claims can also be called "quantitative research", "empirical science", and "positivism/post-positivism" (Creswell 2003, p. 6). What post-positivism represents, as Philips & Burbules (2000) claim, is the thinking that is after positivism (as cited in Creswell 2003, p.7). Conversely, as Trochim (2006) points out, post-positivism is not just an adjustment to positivism; instead, its central tenets reject the views held by positivism. He further claims that the post-positivist, who can also be called a 'critical realist', believes that there is an external reality, which is in contrast to 'subjectivism', where no external reality exists in the world (2006).

### The Differences between Positivism and Post-positivism

Concerning the differences between positivism and post-positivism, Trochim argues that both positivists and post-positivists believe that reality exists, but the difference is that the post-positivist thinks that observations may contain errors, and so as all theory is revisable (2006). In discussing the views held by post-positivists and positivists with regard to finding reality, Trochim (2006) points out that, for what post-positivists argue is the 'ability' with 'certainty' to know reality, they have a critical view of the 'ability' that positivists claim about finding the reality. For the post-positivist, the goal of science is about "getting it right about reality" (Trochim, 2006), whereas the positivist believes that the goal of science is to find the truth of reality. Trochim further indicates that for the post-positivist, all measurements may contain errors. Post-positivists suggest using the 'triangulation' method, which is using multiple measurements across all the resources to achieve more reliable findings about reality from the research (2006).



### **Ontological perspective**

Positivists regard 'reality' as *single, tangible, and fragmentable* (Lincoln & Guba 1985, p.37). They see the world is a place where is in order and is governed by laws. In contrast to constructivism, the study of the world can be done objectively, and has no concern with how humans create meanings (Teddlie & Tashakkori, 2009).

### **Epistemological perspective**

For the positivist, the relationship between the known and the knower is perceived as 'objective' with the separateness (Teddlie & Tashakkori 2009, p.88). In other words, the knower and the known are independent (Lincoln & Guba 1985, p.37).

### **Methodological perspective**

For positivists, the methodology tends to be experimental. They prefer to have questions or a hypothesis stated beforehand in a study, and further to have it tested by empirical tests under a controlled set of conditions (Guba, 1990).

### **2.1.2 Constructivism**

Creswell (2003) indicates that the assumptions that are made by those favouring constructivism is to seek an understanding of the world where people live and work. Constructivism advocates the belief that the meanings developed can be different, encouraging the researcher to seek more nuanced views instead of narrowing down the meanings into only a few categories or ideas (2003, p.8). Creswell further points out that researchers from the constructive perspective obtain their information for study mainly from their participants' views regarding the target issues. More specifically, the information obtained is mostly through interaction or discussion with other people, and the questions for the participants are rather general and open-ended (2003). This is so that the participants can construct their opinions with more freedom, and as a result, they provide the researcher with more information for a better understanding about the target issues. Creswell (2003) emphasizes that the research process is rather important in constructive research. Researchers focus on the specific context where the participants work and live in order to understand their background with aspects of history and culture. The interpretation of the information obtained is influenced by the researcher's personal background as well as the position taken by the researchers. Crotty also states that "What constructivism claims is that meanings are constructed by human beings as they engage with the world they are interpreting" (1998, p.43).

### **Ontological perspective**

Ontology concerns the 'nature of reality' (Teddlie & Tashakkori, 2009). For constructivists, the world is internally constructed, therefore, humans create meanings



individually and collectively in the world from people's experiences. Constructivists believe that we can never be positive about 'what is real' (Teddlie & Tashakkori, 2009). The research of the world is done subjectively as it is from what people say about their experiences, and our interpretations of these words.

### **Epistemological perspective**

As Teddlie and Tashakkori claim, "Epistemology concerns the relationship between the known and the knower (the researcher and the participant)" (2009, p.89). For the constructivist, this relationship is viewed as "subjective" (2009, p.90) as the researchers and their participants need to work together to construct the research. That is to say, the research is built upon the interaction and cooperation between the knower and the known (Teddlie & Tashakkori, 2009).

### **Methodological perspective**

For constructivists, the methodology is hermeneutic, constructed by individuals' "narrative" forms (Teddlie & Tashakkori 2009, p.6). Most constructivists use grounded theory, ethnography, biography, or case study in their research designs.

#### **2.1.3 Pragmatism**

Cherryholmes (1992) points out that pragmatic claims were originally derived from the work of Peirce, James, Mead, and Dewey (p. 13). As defined in Tashakkori and Teddlie's study, pragmatism refers to a paradigm that rejects the concept of "truth" or "reality", but rather, it goes to look for "what works" for truth in which the research questions are concerned (2003a, p. 713). Also, pragmatism is in support of the use of the mixed-method approach, and considers that the values of the researcher are important in interpreting research results (2003a, p. 713). Similarly, Creswell (2003) indicates that the pragmatic researcher looks for 'what' and 'how' to research, according to the intended consequence of the research (2003, p.12).

Pragmatism does not belong exclusively to any one system of reality. Mixed-methods researchers use both quantitative and qualitative assumptions for research. Also, the view that pragmatists hold of the world is that they do not think that there is only one absolute unity (Creswell 2003, p.12). As a result, pragmatists look at different approaches for their data collection and analysis, instead of using just one single method.

### **Ontological perspective**

Cherryholmes argues that pragmatists agree that there exists an external reality and that it is independent from the human mind (1992, p.14). On the other hand, they also argue that whether one explanation of reality is better than any other (1992, p.15).



### **Epistemological perspective**

From a pragmatic perspective, both objective and subjective views are included. As pragmatists challenge taking the position of either objectivity or subjectivity, so as for the epistemological concern, pragmatists think of it as on a “continuum”, instead of being either objective or subjective (Teddlie & Tashakkori 2009, p. 90).

### **Methodological perspective**

Pragmatists tend to have both quantitative and qualitative research methods in their research designs; in other words, the methodology involves the statement of both research questions and hypotheses and is in contrast to post-positivism which only has hypotheses and constructivism which only has research questions (Teddlie & Tashakkori, 2009).

## **III. Research Methods: Qualitative, Quantitative, and Mixed Methods Approaches**

Having discussed the different types of paradigms and the philosophical theory related to research methods, this section gives an overview of research methods, and types of data collection.

### **3.1 Qualitative Approach**

#### **3.1.1 Characteristics**

The qualitative approach is regarded as being related with constructivism. Unlike quantitative research, which uses experimental methods and quantitative measures to test hypothetical generalizations, the qualitative approach uses interviews, observations, documents and audiovisual materials to provide a full story from the participants in the research.

#### **Reasons to choose qualitative approach**

Creswell points out that one reason for choosing qualitative research is when the study concerns an issue or a problem, and a complex and detailed understanding of the issue needs to be explored (2007, p.39). Qualitative research is undertaken under circumstances when the research needs to collect more information from the participants' stories, thoughts, or experiences. The data is collected by using the means of interviews, observations or diaries, and in order to generate research results which are trustworthy, the researcher works directly with the participants, for example, by reviewing the interview questions and transcripts, or having them involved in the research process of data analysis and interpretation. In Creswell's study (2007), he states that one of the characteristics of qualitative research is that the context or setting in which the individual lives or works, or the participants' address their stories, is taken into account in the examining process. Creswell also claims that the stories and the context in which the participants tell their



stories cannot be separated, even though the context could be their home, family or work (2007, p.40).

Creswell further points out that qualitative research develops theories, when the existing theories are inadequate to examine the complexity or the whole picture of the issue that is being examined. He also indicates that qualitative research requires a commitment to studying a problem, and it requires time and resources (2007, p.40).

In the following list, several characteristics of qualitative research are presented, as summarised from Creswell's discussion (2007, p.37-39):

- (1) **Natural setting:** Unlike quantitative researchers, qualitative researchers collect data at a place where the participants address their thoughts or experiences, instead of in a lab.
- (2) **Researcher as key instrument:** Qualitative researchers are the ones who collect the data personally. In particular, they tend to collect their data through interviews or observations, instead of using questionnaires or other instruments developed by other people.
- (3) **Multiple sources of data:** Qualitative research collects its data from different resources, such as interviews, observations, documents, and audiovisual materials.
- (4) **Inductive data analysis:** Qualitative researchers build up different categories according to the content of the data they have collected, and further they organize the data and put it into the small units of these categories. During the analysing process, the researcher and the participant would work collaboratively to organize the themes or categories that emerge from the analysing process more specifically.
- (5) **Participants' meanings:** The focus of the research process on which qualitative researchers work is learning the meaning about the examining issue from the participants.
- (6) **Emergent design:** The plan, which was prescribed in the qualitative research process, may be changed, particularly during the stage of data collection. The interview questions, interview settings, or the format of data collection may be different from the original plan due to the emergent situation happened to the participants.
- (7) **Interpretive inquiry:** Qualitative researchers use their own interpretations, as well as the participants', to explain the results of the study from the data collection. Along with the readers' own interpretations of the study, multiple views of the research issue arise.
- (8) **Holistic account:** Qualitative researchers look into an issue from multiple perspectives. They identify the different elements involved in the issue, and employ many research resources with which to examine it. Unlike the cause and effect relationship, qualitative researchers try to identify the complex factors existing in the interaction. (Creswell 2007, p.37-39)



### 3.1.2 Types of Data Collection

Four basic types of data collection in qualitative research are illustrated in the following:

- (1) **Observation:** it provides direct and first-hand evidence about what actually happens in a situation (Denscombe, 2003). Cohen (2000) indicates that observation offers researchers a way to gather 'live' information from a 'live' setting (p.305). Some advantages of having an observation in data collection are that it can be an alternative to collecting the participants' information when they find the topic uncomfortable to discuss, and that the information can be recorded when it occurs (Creswell, 2003).
- (2) **Interview:** it can use open-ended or closed questions to elicit information from the participant, and the materials gained from interviews provide more of an in-depth insight into the topic (Denscombe, 2003). Interviews can be done face-to-face, one-on-one, or groups of people in person, as well as by telephone or emails. Creswell points out that the advantages of interviews are that they are another option when observation cannot be done directly by the participant. Also, as the interview is conducted along with an interview schedule designated by the researcher/interviewer, he/she can have 'control' over the process of questioning (2003, p.186)
- (3) **Documents:** the documents can be obtained from two sources; one is public documents, such as newspapers or minutes of meetings; another is private documents, such as diaries or letters. Creswell claims that documents allow researchers to acquire the words or language of the participants, and the data from documents are organized as they were given attention by the participant (2003, p. 187).
- (4) **Audiovisual materials:** these materials include photographs, films, videotapes, and computer software. It can be a less obtrusive way to collect information from the participants, and they provide the researcher with an opportunity to directly view the participants' 'reality' (Creswell 2003, p. 187).

### 3.2 Quantitative Approach

The essential methods employed in the quantitative research process include survey and experiments to collect data through the use of a predetermined instrument, and the results are presented in a statistical form.

#### 3.2.1 Characteristics

- (1) The researchers of quantitative studies tend to use post-positive claims to develop knowledge assumptions. They study the cause and effect, test a theory or experiment, and reduce the specific variables or hypotheses.
- (2) Quantitative researchers use predetermined instruments, such as surveys and experiments, to collect data, and the results are presented in statistical form.
- (3) The quantitative approach is best used to identify the factors that affect the problem, to





find out the best predictors of the outcome, or to test a theory. (Summarised from Creswell, 2003; Teddlie & Tashakkori, 2009).

### **3.2.2 Two Core Types of Data Collection**

#### **Surveys**

A survey design measures variables in a large number of individual subjects as a sample in order to examine their opinions, attitudes, behaviours or characteristics (Creswell 2003, p.153). The results from the sample of the population can be generalized. The purpose of using a survey, as Creswell indicates, is to generalize from the sample to the population, and inferences can then be made from the survey (2003). Another purpose, which highlights the use of surveys, is for simple economic reasons. Conducting a survey for research purposes requires less work in terms of the time taken and the level of design required, when compared with interviews or observations. Another advantage is that it indicates the characteristics of a large number of people rather than only a small group of individuals (Creswell, 2003).

#### **Experiments**

Experiments are used to test the impact factors of intervention on the results, and further to control other factors that might influence the outcome. Cohen et al (2000) indicate that one characteristic of experimental research is that researchers intend to control the conditions that determine the events in which the researchers are interested (p.211). For experiments, variables play an important role in research. The variable that the experimenter controls in order to see the change in the outcomes is called the independent variable. Another variable, known as the dependent variable, is influenced by independent variables. They both are interrelated to each other. Dependent variables rely on the change of the outcome that is caused by the independent variable (Creswell, 2003). In an experiment, there should be only one independent variable, but there could be more than one dependent variable emerging from the results (Creswell, 2003).

### **3.3 Mixed-Method Approach**

Mixed-methods research is a relatively new research approach in the social science research field. It gathers both qualitative and quantitative data and integrates them in a single study. It develops its knowledge claims based on a pragmatic paradigm. As with the discussion in the paradigms section in this paper, pragmatism does not view the world as a single unit; thus, the mixed-methods researcher tends to employ multiple types of data collection to answer the research question, rather than relying on only one specific method. The strategy of inquiry can be divided into three general types, and a more detailed description of each is outlined below.



- (1) **Sequential procedures:** researchers seek to expand the findings of one method with another. This may begin with the qualitative method, which involves exploratory aims, followed with the quantitative method, which uses a large sample so that the findings resulting from such a design can serve the purpose of generalisability. This type of design, however, can proceed in the opposite way; i.e. it can begin with a quantitative method where the assumptions are tested, and are then followed by a qualitative method that involves in-depth information with individual interviews or case studies.
- (2) **Concurrent procedures:** researchers seek to gather together data, both of a qualitative and a quantitative nature, at the same time to provide a better understanding of the research question. Researchers have the data gathered at the same time with both qualitative and quantitative methods. Then, researchers tend to integrate the data in the interpretation of the results.
- (3) **Transformative procedures:** essentially, the structure involves having the research issues presented in the beginning, and then using either sequential or concurrent methods as the methods to construct the content.

(Summarised from Creswell 2003, p.222)

## V. Conclusion

This review paper reports on the framework of a research design concerning the themes of paradigms, research approaches and specific research methods for data collection and interpretation. A paradigm, as Mertens points out, is a “conceptual model of a person’s worldview, complete with the assumptions that are associated with that view” (2003, p.139). Each of the research approaches (i.e. qualitative, quantitative and mixed-method approaches) can be worked with one or more paradigms (Teddlie & Tashakkori, 2009). Scientists with a quantitative orientation are primarily associated with post-positivism, because they focus on numerical data and analysis. Scientists with a qualitative orientation are primarily related to constructivism, and their focus is on narrative data and analysis. Scientists with a mixed-methods orientation are associated with pragmatism, which focuses on both numeric and narrative data and analysis.

The three research approaches discussed in this paper include qualitative, quantitative, and mixed methods. These approaches contain the paradigms that lie behind the inquiries, and the specific research skills for data collection and analysis. Creswell indicates that the choice for deciding which research approach is appropriate is dependent on three factors: the research problem, personal experience, and the audiences for whom the study is written (2003, p.23). The characteristics of each approach and the types of data collection for each are reported in order to identify the specific function for a research study, and to achieve the best understanding of the research problem(s).



From the discussion of the whole process of a research design, this paper has offered an opportunity to gain a better understanding of different paradigms, research approaches and methods, all of which play a crucial part in a research design.

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