The third assignment for HPEN 7004 By Xiaoyan JIA (2006861)

A Critique of Empirical Research Methods

Qualitative and quantitative researches are two strands of research methods in empirical research, each with its uniqueness and applicability. Of the two research approaches, which is a better one? This paper argues that mixed methods research - the combination of the two - is the best choice, and the argument is supported both by detailed presentations of different qualitative and quantitative methods and by the benefits of mixed methods research. Finally, the choice of a mixed-method in future research is briefly justified.

Preliminary Ideas

An introduction of some key concepts underpinning research is essential to clear discrimination of qualitative and quantitative approaches, and the paragraphs followed briefly present ideas such as research, empirical research, research design, and research types for a better comprehension of these two approaches.

According to Punch (2014), researches within social science are ways human beings use to respond to questions, tackle problems, and create knowledge. Besides, researches can be grouped into different types such as theoretical, analytical and historical researches, etc. and one of the types is empirical researches, which resort to human senses to acquire experiential knowledge or observable information, and use these data as ways of tackling puzzles and problems as well as developing knowledge (Punch, 2014).

Accordingly, empirical research is seen as a well-planned, systematic, and logical inquiring process for answering questions as well as testing hypotheses by ways of collecting and analyzing empirical data (Punch, 2014). From this definition emerge four essential elements in empirical research and they are research questions, research design, data collection and analysis, answers to questions. Research design, as a blueprint for research, connects research questions with data and is embodied by four components: research strategy, conceptual framework, subjects, and how data are collected/analyzed (Punch, 2014). Research strategy means a logical rationale targeting research processes to answer research questions, and conceptual framework refers to conceptual positions of things to be studied and relationships between/among them (Punch, 2014). As to subjects and HOW, the former means sampling in research, and the latter refers to tools and procedures (Punch, 2014). Bear in mind that research design differs as a result of different research approaches in empirical research.

Empirical researches are comprised of two families of researches: qualitative research and quantitative research and a third approach, mixed methods, come out of the combination of the two. Qualitative research and quantitative research are effectively discriminated in terms of their data, and data collected in the former are mainly words but they are numbers in the latter (Punch, 2014). Furthermore,

they are different both in their research paradigm and in their designs and methods (Punch, 2014). The research paradigm is concerned with the world reality, the relationship between researchers and the world reality, and the methods for exploring the reality (Punch, 2014). Seen from the nature of world reality in paradigm positions, qualitative research tends to be related to interpretivism and constructivism, stressing meanings revealed from situations and people's behaviors, and stressing the power of humans in the construction of reality respectively, while quantitative research tends to be related to positivism, stressing the use of description and explanation for the development of "nomothetic" knowledge (Punch, 2014, pp. 42-43). In this paper, the difference between these two families of approaches are mainly examined in terms of research methods or strategies within research designs and other dimensions within research designs are briefly presented. All in all, the knowledge presented in the introductory part has laid the necessary bricks for a deeper exploration of both qualitative and quantitative types of research.

Qualitative Research Design

As is stated previously, research design differs due to different research types, and so does one of its core components - research strategy. Qualitative research is an umbrella term covering research methods or strategies such as grounded theory, ethnography, case study and action research, and narrative inquiry (Heigham and Croker, 2009, pp. 14-17), which are likely to be employed in future research and are expatiated on below.

Grounded theory is not a theory but a research strategy or a research method intending to generate theory, and the theory to be generated should be exclusively induced from the research data (Punch, 2014). Its development dates back to the 1960s and up to now, it has well developed and become a very important qualitative research method in social science (Punch, 2014).

As a unique strategy, grounded theory has three distinct features. Firstly, the relationship between data collection and data analysis is different from that of other approaches, in which data analysis starts after data collection ends. However, in grounded theory, data collection and data analysis alternate one after another, with budding directions yielded from data analysis triggering another round of data collection, and alternations persist until no new conceptual elements emerge (Punch, 2014). This practice is governed by "theoretical sampling", a principle that means that the second round of data collection should be directed by conceptual elements generated from the first round of data analysis and guarantees exhaustive research (Punch, 2014, p.192). Secondly, the grounded theory method attaches great importance to occasions when literature is sufficiently reviewed. The second principle is that literature should be integrated into research at the start of another round of data collection as new data after clear conceptual elements successfully emerged from a previous round of data analysis (Punch, 2014). This assures that all theories are yielded from data. Thirdly, the purpose of theory generation in grounded theory does not exclude theory verification, since verifying steps are parts of the generating process (Punch, 2014).

Since grounded theory intends to generate theory, it is appropriate to underdeveloped research areas, and the theories generated will lay foundations for subsequent researches, either qualitative or quantitative. On the other hand, criticisms on its generality do not really matters, but what matters is the techniques and measures which guarantee that theories are generated exclusively from data collected.

Ethnography means giving an account of a culture and understanding its lifestyle from the perspective of cultural insiders (Punch, 2014). Ethnography originates from anthropology in the first half of the twentieth century and soon was adopted by researchers from other fields such as sociology, business, and education, etc. (Heigham and Croker, 2009). Ethnography is closely related to "naturalism", which is believed to supplement positivism and describes people and artifacts in their natural situations in the real world, thus disclosing meanings encoded in their behaviors and cultural products from a cultural participant's perspective (Punch, 2014, pp. 180-181). Ethnography is taken as a second pure form of research in the qualitative research category and it is different from experimental researches in terms of its non-experimental data collecting techniques, its overwhelming majority of qualitative data, and its interpretative analysis process (Nunan and Bailey, 2009, p.186).

Ethnography studies persons' flow of behaviors occurring in natural situations and then interprets cultural meanings of these behaviors and the research goal is to present, interpret and explain what is done by people in different situations, the results of their interactions, and the way they understand their behaviors and interactions (Watson-Gegeo, 1988, p. 576, quoted in Nunan and Bailey, 2009, p.186). Watson-Gegeo takes ethnography as a research product as well as a research method: "product" means ethnography is a detailed and analytical account of social settings and the interactions between people within these settings, and "method" means ethnography employs techniques such as (participant) observation, interviews, formal and informal, to collect information in forms of documents, materials, audio and video files, etc. (Watson-Gegeo,1988, pp. 582-553, quoted in Nunan and Bailey, 2009, pp.186-187).

Ethnography distinguishes itself from other natural inquiry forms in terms of its three features: being "longitudinal", thorough, and dependent on cultural frameworks (Nunan and Bailey, 2009, pp.189-190). Being longitudinal stresses enormous time and energy devoted to the research, and being thorough means everything occurring in real-life settings should be incorporated into the research, and lastly, the decoding of people and things is guided by cultural terms since the purpose of the research is to identify, to describe and to interpret the cultural rules governing people and their interactions. Besides the three features, Nunan and Bailey put forward four principles of ethnography: it spotlights "cultural patterns in groups", and is theories directed, and it is comprehensive and "comparative" (Nunan and Bailey, 2009, pp. 190-192).

As a research method, ethnography has both advantages and disadvantages. If research is concerned with a group of people and their cultures, ethnography is the appropriate method. Secondly, ethnography not only generates theory but also tests hypotheses, in that it adopts research procedures both from

grounded theory research and experimental research, which is confirmed in its "topic-oriented" stage and its "hypothesis-oriented" stage (Nunan and Bailey, 2009, pp. 192-194). On the other hand, researchers' roles in ethnography likely have bearing on the research. At the beginning of the research, as outsiders, researchers seem to collect unreliable information from participants in the group when they are not trusted by the participants (Nunan and Bailey, 2009). With researches going on, it is inevitable that researchers involve in lives of participants and then have an influence on them to some degree (Nunan and Bailey, 2009).

Case study. The history of case study research dates back to several decades preceding the 1960s and at that time it was employed in fields such as anthropology, history, and psychology; in the 1960s it was applied to the field of Education, which was then dominated by quantitative research (Heigham and Croker, 2009), and now it has been an influential research method in qualitative research in social science.

To define case study is not an easy thing but elaborations from different scholars have helpfully contributed to a whole understanding of it. Case study is taken as a research object with unclear contexts and boundaries by Stake (1995, p.14, quoted in Heigham and Croker, 2009, p.68). Merriam regards a case as a bounded system, an individual or an entity to be intensively and holistically explored by researchers (Merriam,1988, p.9, quoted in Heigham and Croker, 2009, p.68) and according to Merriam case studies are featured as particularity, and being descriptive and enlightening, and depend on inductive strategies to approach abundant data from multiple sources (Merriam,1988, p.16, quoted in Nunan and Bailey, 2009, p.161). Furthermore, Yin (1984, p.23, quoted in Nunan and Bailey, 2009, p.161) proposes that case study is empirical research that investigates a present phenomenon in its genuine contexts, the boundaries, and contexts of which are not identified at the start of the study, and in it, information from different sources are collected.

These multiple definitions reflect four distinct features inherent in case study research. Firstly, a case is a bounded system, and "bounded" means defined or having boundaries (Nunan and Bailey, 2009, p.161). Heigham and Croker (2009, pp.68-69) put forward that a "bounded system" is comprised of a person, a site, and contextual features in that site, which shed light on the relations between the person and the contextual features there; with research going on holistically and intensively, the original site might be expanded to incorporate more contextual features. Secondly, individuals in case studies are positioned in their contexts or natural settings (Nunan and Bailey, 2009). Since contexts are very opaque, researchers need to delimit the case and decide its contexts. Thirdly, wholeness, unity, and integrity feature case study research (Punch, 2014). Lastly, case studies are dominantly qualitative without the exclusion of quantitative research since their abundant data are collected from multiple sources in natural contexts via multiple data collection methods (Punch, 2014). Additionally, case studies tend to be an in-depth exploration of a particular entity, and are likely to be longitudinal, and are with abundant detailed data collected from multiple perspectives and with multiple points of view brought into the data analysis process (Nunan and Bailey, 2009).

Diversity of case studies contributes to diverse categorization guided by different criteria. Two leading scholars are excelling in case study research who classified case studies in terms of their entities and their research purposes. Stake (1995, quoted in Nunan and Bailey, 2009, pp. 69-71) categorized case studies into three types, such as intrinsic case study, instrumental case study, and collective or multiple case study. Category one emphasizes one particular case and aims to understand it thoroughly, category two stresses the purpose to provide insights into both practical and theoretical problems and the approaches used in this type are more interpretative and evaluative than descriptive, and case studies in type three include more cases in research and their purposes are also problem-oriented (Stake,1995, quoted in Nunan and Bailey, 2009, pp.69-70). Furthermore, Yin (2003, quoted in Nunan and Bailey, 2009, pp.70-71) grouped case studies into exploratory, descriptive and explanatory case studies. Exploratory means little is known about a case, descriptive means to represent a case in detail and natural settings, and explanatory tries to explore causal relations between elements in the case (Yin 2003, quoted in Nunan and Bailey, 2009, pp.70-71).

Despite criticism on its generality and objectivity, case study research develops and has made great contributions. An in-depth study on an entity or phenomenon deepens people's comprehension of it and facilitates people to expand unknown research fields (Punch, 2014). Secondly, when combined with other research methods such as surveys, it will bring more understanding to the subject surveyed (Punch, 2014).

Action research was originated from social science in about the 1940s (Lewin, 1946, quoted in Nunan and Bailey, 2009, p.261) and was then adopted in the field of education by Carr and Kemmis (1986, quoted in Nunan and Bailey, 2009, p.261), and it has been an important research method in a qualitative tradition now.

Action research reveals its two key processes: action and research. Action means an exploration of an issue or a problem in a certain context to identify and improve that issue or problem, and research means an application of a "systemic" qualitative-dominated approach to generate data or information (Heigham and Croker, 2009, pp. 114-115). Action research is defined differently, and one of its influential definitions in educational field was put forward by Carr and Kemmis, who defined action research as "self-reflective" inquiry initiated by practitioners to justify and rationalize their practices and to understand their practices as well as the contexts these practices are implemented (Carr and Kemmis, 1986, p.162, quoted in Heigham and Croker, 2009, p.115).

Action research has four distinct features. Firstly, its researchers take on double roles - a practitioner as well as a researcher. Secondly, its purpose is to improve an issue or tackle practical problems, as well as bring about practical knowledge. Thirdly, it has continuous "cycles" or "spirals" (Punch, 2014, p. 195-196), comprising of repetitious stages such as planning, acting, observing, and reflecting (Kemmis and McTaggart, 2000, p. 595-596, quoted in Punch, 2014, p. 195-196). Lastly, it employs diverse data collecting techniques from both qualitative and quantitative types of research such as observations,

questionnaires, interviews, surveys, documents, diaries, and journals, etc. (Heigham and Croker, 2009, p. 117).

Action research has advantages. As with experimental research, action research does include intervention sessions in form of action, aiming for improvement, but at the same time, it does not bother to control variables, as with naturalistic inquiry, thus demonstrating merits brought about by coupling two opposite research approaches (Nunan and Bailey, 2009). Secondly, no other research except action research targets teachers and practitioners, and the implementation of action research not only helps them solve practical problems but also empowers them professionally and academically (Nunan and Bailey, 2009). These two advantages are what I concern when deciding whether to integrate action research into the future research project.

Quantitative Research Design

The emergence of quantitative research in social science is inspired by two core concepts borrowed from natural science: experiment and measurement, which mean manipulating independent variables and measuring dependent variables (Punch, 2014). According to different research designs, quantitative research can be grouped into three types such as experiments, quasi-experiments, and correlational surveys (non-experiments) corresponding to two main strands such as "comparison-between-groups division" by means of experiments and "relationships-between-variables division" by way of non-experimental means to examine results and causes respectively (Punch, 2014, pp. 288-289).

The purpose of an experiment is to confirm that the dependent variable differences between two groups are significantly caused by the independent variable differences between them (Punch, 2014). To fulfill this purpose, an experiment in quantitative research can be seen as a series of steps. Step one is to establish two comparison groups - treatment group and control group, and step two is to implement a treatment to the former group, but no treatment is done to the latter group, and step three is to make a comparison between the two groups in terms of their results - the dependent variables (Punch, 2014, pp. 290-291). Besides, a valid experiment needs conditions to guarantee that "extraneous variables" in the two groups are nearly the same, which are realized by randomly assigning participants to experimental and control groups (Punch, 2014, pp. 291-292). Furthermore, two features define a true experiment - manipulating independent variables to an experimental group and randomly selecting participants for comparison groups (Punch, 2014, pp. 290-291). An experiment is a very effective way to examine causal relations between things in the world in terms of variables. If the research purpose is to detect the cause-effect relationship between variables, an experiment is a perfect choice.

Quasi-experiments fall in between experiment and correlation survey on a quantitative research "continuum" (Punch, 2014, p. 296). In quasi-experiments, there is no manipulation of independent variables to treatment groups and extraneous variables are controlled by statistical techniques, and so are they in correlation surveys (Punch, 2014). Besides, the former is to discover a causal relationship between

independent variables and independent variables, and the latter is to detect the correlation relations between variables (Punch, 2014).

The Benefits of Mixed Methods

The exploration of research methods within qualitative and quantitative researches has highlighted their uniqueness, differences, and applicability, but the differences between them do not mean one approach is superior to another, but rather they are both seen as appropriate powerful resources to be employed by human beings to tackle problems and expand their inquiry into the unknown world. From my perspective, it seems unreasonable to contradict the two approaches and make an either-or choice between the two. Rather, a combination of the two is definitely the best choice. The benefits of mixed methods are argued from the following five aspects.

As is shown in research design part, qualitative methods and quantitative methods each targeting special questions and problems have made unique contributions to a whole empirical research. There seems to be more or diverse research methods in qualitative research than those in quantitative design. If researchers take a purist viewpoint, supporting one by denying the other, then the research methods left to them are very limited, which disabled them to administer satisfactory researches. On the contrary, a combination of qualitative and quantitative methods is certain to produce more and devise research methods, which will empower researchers to tackle complex and mysterious research problems and questions.

Research routes, aims, and results. As scientific research methods, qualitative methods adopt bottom-up routes by generating or constructing theories or knowledge from collected data for exploration, and the findings are particularistic theories or knowledge drawn from particular cultural groups while quantitative methods employ top-down routes by collecting data to test or confirm theories or hypotheses and the findings are generalizable theories or knowledge drawn from objective observations collected from wider populations (Johnson and Christensen, 2020). Accordingly, mixed methods take advantage of both routes for purposes of both exploration and confirmation, and the findings are more integrative, multidimensional, and comprehensive.

In terms of data collection, data forms, and data analysis, qualitative researchers take themselves as instruments to collect data in the forms of interviews, observations, questions, and fields notes, and the data they collected are mainly words in nature (Johnson and Christensen, 2020). While quantitative researchers employ standardized instruments or tools such as questionnaires and tests to collect data, which are in the form of variables (Johnson and Christensen, 2020). Mixed methods take advantage of heterogeneous data collected through diverse instruments and tools employed in qualitative and quantitative researches, and are subsequently subjected to powerful analysis approaches, which will provide researchers abundant, complete, and multidimensional information in the forms of numbers and words for them to generate and generalize theories or knowledge.

Mixed methods provide researchers panorama deep lens to examine the world. Johnson and Christensen (2020) note that the focalized in quantitative researches are cause-effect relations between variables under man-made conditions, and its research angle is narrow, while the focalized in qualitative researches are human behaviors taking place in real-life situations, and its research perspective is wide and deep. The combination of the two angels will provide researchers with wide and deep views to approach complex questions or problems arising from a real-life world with multi-dimensions and multi-layers.

Mixed methods take advantage of subjective perspective from qualitative researchers and objective perspective from quantitative researchers. Qualitative researchers are likely to engage with cultural groups under exploration by participant observation and do their best to discover cultural values or meanings governing going-ons there from the perspectives of people in those cultural groups since they take the view that reality is constructed socially (Johnson and Christensen, 2020). While quantitative researchers tend to distance themselves from the reality under study and use standardized and quantitative measuring tools to measure the observed world, and this is because that they adopt the view that reality is objective and observable, and if it is examined from similar rationales, then what examined looks similar (Johnson and Christensen, 2020). Accordingly when adopting both perspectives, what mixed methods researchers acquire is a full world comprising of subjective, inter-subjective, and objective realities (Johnson and Christensen, 2020).

Mixed Method Research Design

Mixed Methods involve collecting and analyzing both qualitative data and quantitative data in empirical research (Punch, 2014). Mixed research dates back to the 1990s and in about three decades it has been developed to be a separate research design. Two important factors are contributing to the development of mixed methods research. The first is a conviction that a combination of qualitative and quantitative methods will multiply their advantages by complementing their disadvantages instead of overlapping their disadvantages (Creswell and Creswell, 2018). The second is the influence of pragmatism, which notes that research methods are dictated by research questions and research questions take priority over research paradigm and research methods (Creswell and Creswell, 2018).

In mixed methods, the ways to integrate the two methods matter. Punch put forward three dimensions to be taken into consideration for blending the two methods: the timing, the weighting, and the mixing dimensions (Creswell and Plano Clark, 2007, quoted in Punch, 2014). The three dimensions concern when to combine the two approaches, which approach weigh heavier, and how to integrate their data sets.

Based on some seminal researches, Creswell and Creswell (2018) proposed three central and one complex mixed methods research designs. Convergent design is the first core mixed-method design, in which qualitative and quantitative methods are equally coupled in a single-phase method, and qualitative and quantitative data are collected and analyzed respectively, and then the results are compared (Creswell and Creswell, 2018). Explanatory sequential design is the second core mixed-method design, where

quantitative data are collected and analyzed in stage one, and the results are used to direct the collection of qualitative data in stage two, and the purpose is that qualitative data are made good use to explain quantitative results (Creswell and Creswell, 2018). Exploratory sequential design is the third core mixed-method design, in which qualitative data are collected and analyzed in stage one, and a variable drawn from qualitative results is singled out to be tested in stage two, and then a quantitative method is employed to test this variable in stage three (Creswell and Creswell, 2018). Complex mixed-methods means more steps or procedures from the three core designs, such as integrating exploratory sequential design, convergent design, and explanatory sequential design into the three stages of an experiment, or integrating one or all of the core design into a case study (Creswell and Creswell, 2018).

Mixed methods are beneficial to researchers, in that it has strengths from qualitative and quantitative approaches, and it provides researchers with sophisticated and complex research methods, it provides researchers with both qualitative and quantitative data, and it helps researchers to better comprehend the research questions confronting them (Creswell and Creswell, 2018). Instead of being dizzied by these advantages and benefits brought about by mixed methods, future new researchers need to keep calm when choosing appropriate mixed methods. Besides, they'd take into consideration their intents, ways to integrate data, when to collect data, the emphasized data in different stages, and the matching of research design with the research field (Creswell and Creswell, 2018).

The Research Method for Future Research

The purpose of my future research is to test the efficacy of a teaching method on students'writing performance, so the first choice is a quasi-experiment method from quantitative research, in that variables, are tested and differences between comparison groups are calculated statistically in pre-experiment stage. Since a purely quantitative method excludes the personal experience of research participants, the qualitative method should be integrated into the experiment. After a careful examination of mixed methods research designs, a mixed-methods experiment meet the two requirements.

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