A Contrastive Study of Qualitative and Quantitative Research Methods and Mixed Research Method in Applied Linguistics.

Qualitative research and quantitative research are two main scientific research methods. This article compares qualitative research and quantitative research to help people understand the connections and differences between them. Both are widely used in natural as well as social sciences. Qualitative research uses an inductive logical structure, that is, a bottom-up structure. Through observation and analysis on certain phenomenon, researchers can finally summarize and propose their own opinions. Quantitative research is the opposite, it uses a deductive logic. Researchers propose their hypotheses, through a process of analyzing collected data, they finally verify whether these hypotheses are correct. Qualitative research and quantitative research complement and support each other rather than being isolated (Wang, 2014). They offer two different methods to answer a variety of questions. Because multifarious questions in our society are complex, diverse, and of different nature, it is impractical to answer them with only one method. Therefore, suitable research methods to solve and answer different questions are invented and approved.

Backgrounds

Qualitative research is exploratory and is used to define problems or discover approaches to deal with them, it has also been referred as 'market research' for gathering data with open questions. By discovering problems, understanding phenomena, and analyzing different behaviours and opinions from many perspectives,

qualitative research can obtain various views and observations (Aspers & Corte, 2019). Qualitative research method helps researchers to uncover, explain and deal with problems, and reveals the essence cause of them. Researchers can also obtain a lot of different information and inspiration by adopting this research method.

Quantitative research method is objective and specific. It focuses on revealing various facts under data analysis. Researchers apply quantitative research methods to gather, compare and analyze data for the conclusions. Quantitative research aims to discover rules and to provide universal explanations for various phenomena. Quantitative means to measure on the basis of numbers. Quantitative research and scientific experimental research are closely related. Usually, it is to verify whether the theory or hypothesis is correct. The final result is generally to support or oppose the research hypothesis (Daniel, 2016).

Differences

First, they treat their study subjects differently. In qualitative research, the researcher and the research object are very close. The research object is often highly subjective from the researcher's perspective and it is usually an impartible part of the whole research process. Also, the researcher is used as the main research tool. The researcher's participation is part of the data analysis and the research object. Without the researcher, the data lose their research meanings. However, in quantitative research, the research object is an independent existence for the researcher and is kept at a certain distance to the researcher. In the research process, researchers stay

objective and analyze the research objects without putting them in any background. Quantitative researchers also believe that their research objects can be divided into several parts, and by observing each component, an overall understanding of the whole research subject can be obtained (Hong, 2013).

Second, their research methods are dissimilar. Qualitative research method doesn't reduce the research complexity by decoding phenomena into variables, instead, it elevates the research complexity by adding contextual factors into the analysis (Savela, 2018). Therefore, qualitative research method actually pursuits complexity rather than simplicity in a way, that is, by putting the researched phenomena back into the realistic situations, or time dimensions, or social backgrounds to observe, to study, and to analyze for the purpose of a transparent understanding of these phenomena. This strategy of qualitative research means either turning a simple phenomenon into a relatively complex one or expanding a complex phenomenon into a more complex one. In qualitative research, no matter researchers' emphases are on the backgrounds of the phenomena, or the contexts where the real actions happen, or the deep understandings of various aspects of a phenomenon, or the pursuit of subjective cognition and understanding of the research object, they are all complementing phenomena which are associated with the research phenomena. It is exactly this complement that benefits the researcher to understand the research phenomena in a better and more accurate way (Fredericks & Miller, 2003). In the meantime, it is precisely because of the complexity and comprehensiveness of qualitative research methods that it can be used to explain the complex social phenomena (Sofaer, 2002).

And vice versa, to maintain this complexity, qualitative research has to reserve the openness and diversity in methods and procedures. However, due to the limitation of the researcher's ability to deal with the research object, qualitative research has to narrow the scope and width of the research and focus on a relatively small space in order to achieve an in-depth and connotative result. Data used in qualitative researches are often obtained by researchers themselves from first-hand personal observations, participant observations, questionnaires (with open questions), records, focus groups, and artifacts. One method often used in qualitative research is the participant observation method. Participant observation method draws certain conclusions by observing the causes of actions and behaviors, the participants' degree of effort, and their attitudes. Case study is also one of the most common qualitative research methods, it is a descriptive research method used to describe facts and explicate phenomena. It is widely used in law, medicine, sociology, and management. By contraries, since social phenomena are complex and interrelated, quantitative research method is to decode this complexity, that is, to simplify the original complicated and messy phenomena into several key variables through necessary trimming, editing, and simplification, offering fundamental conditions for the research. Quantitative research is used to describe or explain the connections between different phenomena, and to discover correlations between certain essential variables. It can also be applied for common large-scale surveys and rigorous experimental. But all these quantitative research methods are launched based on these simplified and very limited variables. Since it is a study focusing on fixed topic, quantitative research requires statistics and analysis of the overall results. The main methods are: telephone

survey, face-to-face survey, mail questionnaire , media survey, and lien questionnaire. Researchers mainly use deductive methods to analyze the causes and results (Salvador, 2016).

Third, their research procedures are diverse. Qualitative research has the advantages of flexibility and openness. While quantitative research sternly follows a standard operation procesure, qualitative research method is not only different in specific operation, but inconsistent in practically the whole research procedure as well, because the entire research process will constantly be changed, revised, adjusted, and repeated as the research is carried out (Quick, 2015). Qualitative research generally starts with identifying research phenomena, stating research purposes, and raising research questions. Then, it goes to the stage of constructing conceptual frameworks, sampling, and collecting materials. It ends with analyzing materials, drawing conclusions, establishing theories, testing validity, and writing research reports, etc. In the actual operation, these steps are not independent on their own, but are carried out in sequence with the guidance of scientific rules. Since qualitative research itself is an evolving and gradual process, they overlap, penetrate each other, and repeat. In qualitative research methods, researchers may suddenly change or adjust research procedures, research directions, and research goals. What triggers the researcher to make adjustments may be a sudden change in the field research scene, or a special experience and feeling obtained from participant observation, or an inspiration in the process of collecting data, or even a conversation of depth between the researcher and the interviewee. This is a unique point in the qualitative research process. On the

contrary, quantitative research is very systematic, fixed, and structured. Although quantitative research methods will not be exactly the same in each research operation, they are basically accorded overall. Quantitative research method follows a model of standard procedures. It usually starts from deciding research questions, selecting research design, and proposing hypotheses. Then it goes to the stage of data collection and data analysis, and finally reaching the research findings and conclusions. Due to this research procedure naturally being systematic, fixed, and structural , quantitative research method is not only relatively easier to learn and test, but also easier to replicate in similar researches. The results of quantitative research are commonly showed in data, patterns, and graphs (Quick, 2015).

Fourth, they have disparate research foci. In general, qualitative research mainly focuses on and answers questions that are relatively micro and specific, often related to individuals and subjective meaning; its main goal is to reveal the way phenomena changes, the internal connections of each phenomenon, the subjective cognition, the meaning of behaviours, and to propose new theoretical hypotheses. It bases more on logic. It relies on materials like life experiences and facts for analysis and uses methods such as logical reasoning and comparison to get conclusion. However, quantitative research mainly focuses on and answers questions that are relatively macro and general, often related to the overall and unchangeable facts, especially the relationship between related variables. The goal of quantitative research is offering an overall description of a structure or a trend as well as the related characteristics, revealing the relationship between variables, and verifying existing hypotheses (Feng,

2017). Quantitative research is based on probability theory and statistics. To investigate the actual data obtained, quantitative research is conducted through empirical measurement, statistical analysis, and modeling methods. Overall, the goal of quantitative research is to be able to more accurately conduct qualitative research.

Pros and Cons

Qualitative research provides the fastest and easiest way for researchers to gain information. It is also money-saving and timesaving because qualitative research usually takes samples from small groups from which the researchers need accurate data. In the meantime, due to the openness of qualitative research method, researchers can grasp details and other personal information, which in turn offers more possibilities for the research to go deeper and to specific areas. Researchers usually go deep into specific situations to study a phenomenon, so their conclusions are also unique. Besides, the openness of qualitative research also encourages researchers to be more creative, data used in qualitative research are not fixed in formats, they can be edited and transformed as the researchers wish so that they could be used in any aspect of the research. Despite that qualitative research method offers so many merits, its fatal weakness lies in the fact that it can be very subjective to the researchers (Queiros et al. 2017). Because qualitative research presents so much data that could be linked to various phenomena, it is up to the researchers to decided which data is useful. Besides, the depth and uniqueness of a qualitative research largely depend on the knowledge levels of the researchers. Certain data might be misinterpreted or abandoned when they precisely meet the researchers' weak spot,

making the whole research data lose the statistical significance. Moreover, in data collecting, details may be missed for the repetition of same data because the whole uniqueness of qualitative research is based on its effort of finding the specials out of the ordinaries, and that makes any qualitative research nearly impossible to repeat by other researchers (Rahman, 2017).

For instance, a focus group allows a researcher to obtain massive data. With a record and concentrate topics, a researcher could achieve an incredible amount of data in just an hour. These data reflect human nature rather than mechanical figures. Some data are predictable because human beings are same creatures walking on each; while data for everyone may have differences because each individual is unique. Thus, this uniqueness offers a lot for the researchers to work with. However, each individual may interpretate differently to the same question in the research , and that challenges the researcher to interpretate their responds equally or in a fixed method. At the same time, there is a possibility that after the data is sorted, no unique and valuable data is obtained for research. Because people's ideas are not fixed, the participants may also change, and the experimental environment is also shifting, to use the focus group to collect data again may get a completely different set of data，and adding more difficulty to the research.

Unlike qualitative research, quantitative research does not require researchers to collect data in person (such as scales, questionnaires, experiments, etc.). The data used in it is measurable and statistical. Therefore, quantitative research experiments can be

easily replicated and normally no difference will occur in the same experiments. Data collecting in quantitative research uses more random samples and is more straightforward and transparent. By using scientific analyzing methods like SPSS, every step of the quantitative research follows the standard to reduce bias. Therefore, the result is convincing and reliable. Its conclusions are characterized by generality, universal applicability, and are usually free from background constraints. At the same time, quantitative research methods make full use of mathematical knowledge, and its research results can be quantified with high accuracy, and is less subjective influence by researchers (Feng, 2017). While quantitative research method has been so popular over decades, it has several flaws. To ensure the persuasiveness of the data, the data collection process of quantitative research requires a lot of time and money. Because of this, and the reason that quantitative research uses exact numbers for analysis and research, it is easy for researchers to forge numbers in data collection, which is the first step of the research. Meanwhile, quantitative research studies the interrelationships between variables in a phenomenon. It cannot specifically and clearly explain the connotation of a specific phenomenon, and it cannot conduct a deep and concentrated study. The final result of quantitative research is usually a report containing a large amount of data. If these data are not properly used and analyzed, the result of quantitative research can only be a pile of data, which has no practical guiding significance (Savela, 2018).

Launching questionnaires with fixed options is a popular method in quantitative research. It allows researchers to immediately obtain a large amount of valid data, and

these data do not need to be compiled and can be directly used for analysis. Soon after obtaining the data, the researcher can test whether the previous hypothesis holds. Participants of the questionnaires do not need to spend too much time. The biggest advantage of the questionnaire is that it can be distributed in a expanding scope for data collection. However, the questionnaire survey has many problems. First of all, the distribution of the questionnaire must have all representative research objects taken into account, otherwise the final research results will not have universal applicability. Therefore, as simple as distributing the questionnaires is, it is a complicated and time-consuming process to whom the questionnaires are distributed to. Secondly, every researcher should consider whether the option setting (scale setting)of the questionnaire is effective and can be closely related to the research hypothesis. Finally, the validity of the returned questionnaire directly affects the final research results.

Mixed Research Method

Mixed research method is a new research method that promotes the mixing or integration of quantitative and qualitative data in the same research or continuous researches (Johnson et al. 2007). Different from quantitative and qualitative data collection and analysis and measurement, mixed research method integrates the merits of both qualitative and quantitative research, and it can use data in a more scientific and collaborative way (Shorten & Smith 2017).

Mixed data allows researchers to have a clearer understanding of research issues,

whether in research depth or breadth. Mixing data through research topics can avoid excessive reliance on quantitative research data, and at the same time obtain some details and experience in the qualitative research process and subjective factors that occur in various phenomena (Jogulu & Pansiri, 2011). When both qualitative and quantitative data can be obtained, qualitative and quantitative research methods are compatible and without any overlap. They explain the research objects from different perspectives. If using the two methods have the same conclusion, then this conclusion is supported by both qualitative and quantitative data, so the reliability is naturally higher (Zhang, H. 2012). By using mixed methods, researchers can use numbers to further illustrate graphs, tables, and narratives, which can complement each other . To conclude, the mix research method is an evolution of words and numbers and has become growing popular in social science study.

Research Methods in Applied Linguistics.

The research of applied linguistics can be divided into two categories, theoretical research and data-based research. Every testimony used to support the theory is considered to be a kind of data research. The data here refers to corpus in linguistics. Theoretical research usually discusses the origin of language, historical language, and language philosophy. These studies are logically scientific, while the arguments and premises they are based on are mostly hypotheses, which cannot be testifies or studied by observation or experience. Therefore, qualitative research is not popular in this field. However, data-based research focuses more on data obtained and the way analyzing it, and has more principles and approaches in data collection. In these two

main researches of applied linguistics, different research methods are required because their emphases are different (Yan, 2001). Naturally, mixed research method is necessary in applied linguistics research. How should qualitative and quantitative research be combined, and who should lead and assist, are questions worth exploring. Questionnaire is taken as an example to explain here.

The first is to use qualitative research in quantitative research . For example, before distributing questionnaires into the public, a series of participant observations and interviews can be conducted to explore the research preliminarily. Through interviews without fixed answers, researchers are able to make scientific and reasonable settings for the questionnaire options. Here, the participation of qualitative research provides preparation and foundation for quantitative research (Feng, 2017). This mixed research method can only be regarded as a partial or phased combination of qualitative and quantitative research. Because from the perspective of following scientific research methods, interviews ought to have been conducted before designing the questionnaire, which is part of quantitative research. Only here, the results of qualitative research provide some guidance and ideas for the following quantitative research.

The second is to use qualitative research methods in quantitative research methods to explain the results of quantitative research. In this mixed research method, quantitative research method plays the main role, and qualitative research method provides auxiliary functions. After conducting a quantitative questionnaire survey on

large-scale subjects, the researcher can launch interviews on a few cases, and the results of the interviews can be very supportive to help understand and explain the meaning of the quantitative statistical analysis results, or to further explain the former. Interestingly, a mixed research method of using quantitative research to support and explain qualitative research, that is, to use qualitative research as a supplement, is extremely rare because it violates the scientific nature of the research method (Feng, 2017). Data quantization (that is, cutting and editing data from qualitative research into data that can be used for qualitative research) will inevitably cause the loss of details. Therefore, the data coverage of qualitative research is always scientifically broader than quantitative research data.

The third is to use different research methods for different aspects of the research problem, or to use qualitative research and quantitative research methods for different topics among a same research project. This mixed research method is more specific to the various aspects of the research question, and can better answer the main research question and more comprehensively explain the research phenomenon. The data and results obtained by the two research methods can not only be used to supplement each other, but also can be connected by using certain scientific method to testify new hypotheses raised during the research process. When studying the nowadays overall situation of university students learning L2, different questionnaires can be issued for different research questions. Qualitative research method is necessary for making open questionnaires, collect data, and answer related research questions such as the motivation of studying L2, approaches of L2 learning, and how L2 learning will benefit

future career and life. Under this research question, for which L2 subject is the most popular, at which grade university students start L2 learning , and which major students in which major are most inclined to learn L2, quantitative research methods can be used to issue questionnaires with fixed options to answer these sub-research questions. After obtaining the above results, researchers can also use data integration and comparison to further analyze whether there is a correlation between university students' L2 learning expectations (benefits for career and future life) and the grade that they start learning L2, or the types of L2 they choose to learn. By distributing different questionnaires for different research questions, a researcher could use the data obtained to answer various research questions concerning the topic.

Based on the data of *Applied Linguistics* and *TESOL Quarterly* between 2003 and 2012, among 314 research articles on language teaching, there were 74 articles that used mixed methods, accounting for about 23.6%. In these studies, the use of mixed methods were mainly integrated them into the traditional research methods. However, there were only 13 cases that regarded mixed method as a research method, and only 6 cases had specifically mentioned the concept of mixed method . This shows that in applied linguistics, although the combination of qualitative and quantitative research methods is common, the concept of mixed method and the establishment of it are obviously not enough (Zhang, 2014). However, big data brings new opportunities for language research especially applied linguistics that is based on data analysis. Language is the main carrier of information. Applied linguistics research in the 'Big Data' age must take into account the needs of both humans and computers.

Traditional linguistic research mostly uses quantitative research methods. However, data offers us a clearer, more precise, and more detailed view of the research object, like observing a same article from different distances and angles, from the macro to the micro. These comprehensive, microscopic details are relatively more useful for researchers to conduct qualitative researches on the basis of traditional quantitative researches (Liu & Lin, 2018). Therefore, in the context of the 'Big Data' age, it is a inevitable trend that mixed research method becomes the main research method of applied linguistics.

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