

# An Evaluation of the Application of Mixed Research Methods in Educational Research

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**Abstract:** *For a long time, research methods can be roughly divided into two categories: qualitative research methods and quantitative research methods, because the two types have different research processes and methods, so there are different advantages. However, both research methods also have certain drawbacks. This article explains and demonstrates the effectiveness of applying mixed methods in educational research through a paper called "Combining Qualitative and Quantitative Methodologies in Research on Teachers' Lives, Work, and Effectiveness: From Integration to Synergy". It detailed analyzes the research design and methodology, sampling and other parts to give readers a clear understanding of applying mixed research methods in appropriate studies.*

**Keywords:** *Mixed methods, sampling, education, quantitative methods, qualitative methods*

## 1. Introduction

The quantitative research method is a method for a large number of research groups which is designed to reflect the response to some variables and their relationships. and to obtain the final result through the integration, combing and calculation of a large number of data , but it is undeniable that this method can not properly reflect the understanding of a single individual through the results embodied in the data. In contrast, the qualitative research method is an in-depth study for minorities, and this kind of method can be conducted to do in-depth exploration of the subjects in addition to big data through interviews and other ways, but such in-depth exploration also leads to the result that researchers are unable to study a large number of subjects, so that they cannot look at the overall situation. However, these two research methods can complement each other to achieve a more comprehensive research effect. To find answers to complex problems, quantitative numbers or qualitative words alone are not enough to completely answer them, and the proper combination of the two data can provide the most complete analysis of the research problems. Therefore, the mixed research method came into being, which can effectively avoid the conflict between quantitative and qualitative research, and study education issues from the macro and micro levels. In recent years, the mixed research method has continued to develop and become another important educational research method in addition to the qualitative and quantitative research methods[1]. But Caracelli, Greene points out that the use of hybrid research methods also faces great challenges, and one of the biggest challenges is to maximize the advantages of various types of single research and development, and then integrate.[2]

## 2. Introduction to the study

In the study of Day Sammons , whose research focused on the life, work and effectiveness of teachers, the researcher adopted a mixed research method combining qualitative and quantitative methods based on the VITALE study as the theoretical basis[3], and by reviewing the previous research, they found that the previous researchers had insufficient aspects in this area, and thus proposed the research problem based on efficacy. Through a three-year field research on 300 teachers from 100 schools, a detailed research was made on multiple factors such as teachers themselves, student achievements, etc., and finally it came to a conclusion. Next, a detailed analysis will be made of whether the mixed research method is appropriately used in the study, whether the sampling is appropriate, and whether there are any research restrictions.

### 3. Research design and methodology

Creswell & Clark think that mixed research methods are appropriate when there are several situations: the need for quantitative and qualitative research orientations, the need to strengthen the research with a second source, the need to interpret quantitative results and also the need for qualitative exploration first. [4] Moreover, in many studies, most analysis of "efficacy" are based on applying quantitative research methods, collecting and analyzing large amounts of data to reach final conclusions. However, many researchers have criticized that quantitative studies are too simple to reflect why and how some internal and external conditions affect the final output results and cannot explain what is relevant to these results. Therefore, the study chose a mixed research method, and it is appropriate to use a combination of the two research methods. Since teacher effectiveness is influenced by many other relevant factors in addition to some quantifiable indicators, and these factors may have an impact on the results of the study, the use of mixed research methods can obtain big data while starting from the details to draw clearer and more powerful conclusions. [3] They believe that the mixed research method can provide researchers with a more comprehensive, meticulous and coordinated perspective on the "effectiveness" level of research than previous research methods, so it is more reasonable to choose it as a research method to study faculty effectiveness.

The whole study is based on the previous VITALE research, and at the beginning of the article, a brief review of the VITALE study was made, and the concept of "teacher effectiveness" was constructed from the previous study, which is very reasonable and makes this study theoretically supported.

After starting the study, a large-scale survey was conducted in 7 school districts, followed by the selection of 300 teachers from 100 schools who did the case study, and the research question involved how to define effectiveness and how to measure the effectiveness of teachers with different backgrounds, the different factors that affect the effectiveness of teachers themselves and teachers, etc. The data are mainly derived from interviews with teachers, questionnaires and performance data for students, and interviews with school leaders. In the specific study, the researchers also selected some quantitative data from students, school leaders, mixed qualitative interviews and quantitative data of student achievements, which are closely related to teacher effectiveness, and process it to qualitative data. Then organically mixed these two kinds of data to varying degrees in the process of data collection, testing and final analysis. However, because the information comes from the subject, the questions are generally open-ended, so that the interviewee can answer the interviewed questions from their own perspective. But because the article does not list the interview questions in the main part or appendix, it cannot be evaluated. There are generally four models for mixed studies, namely triangulation design, embedded design, interpretive design, and exploratory design [4]. In the article studied in this paper, the study mainly used a triangular correction design, and at the same time, other designs were mixed in the specific research section:

(1) In general, the entire design belongs to the triangular correction design to carry out quantitative and qualitative studies, and the relevant results are obtained after the respective data collection, transformation and analysis, and then compared and correlated, and finally interpreted. [5] In the course of the study, two different research methods were integrated to obtain quantitative and qualitative data, such as student achievement and teacher interviews. However, in the specific process, some other designs were mixed. [4]

(2) In the initial study, a quantitative survey of large groups was conducted. And through the results, the participants were selected and a series of studies were conducted, which also applies the first step in using explanatory design: the principle of participant selection patterns. [4]

(3) In the post-questionnaire interview, the researchers used the Grounded Theory method [3], which is to conduct systematic collation and analysis of qualitative data to form a theory. That is, to collect multiple sources of information, and then from the propositions or hypotheses generated in them and discover the theory. In this study, the researchers scientifically designed the questionnaire by reading a large amount of literature, and then used the conclusions obtained from the questionnaire analysis to redesign further interview plans and specific interview content, so the research method was reasonable and prudent.

This interactive mix of re-data collection, data analysis, and result interpretation makes the researchers' analysis, interpretation, and comprehensive understanding of the final results more in depth and clear, and this method is more effective than any single method. [6]

On the whole, such a design is in line with the idea of mixed research methods, and the two types of research methods are necessarily combined and interpreted, and complement each other's strengths. The

research design and research methods are more reasonable.

#### **4. Sampling**

Whether the respondent of each study meets the needs of the study, the sample size of the respondent, and whether the sampling is reasonable are all crucial to the value of the entire study, so whether sampling is appropriate in this study? Is the explanation sufficient?

##### ***4.1. Whether the sampling is appropriate***

As mentioned in the previous part, the original sample of this study was conducted through a large-scale survey in 7 school districts, and then 300 primary and secondary school teachers from 100 schools were selected for further study. The sample size is sufficient for case studies. In the selection of the teacher sample, when selecting, their teaching experience, gender, subjects taught and teaching age, socio-economic status are taken into account. In addition, the geographical location of the school where the teachers are in is also taken into account, so the sample size is reasonable, the scope is also wide, and there is a great correlation with the topics focused on the study.

In addition to this, the study also take students' grades on a number of exams and interviews as one of the criteria for measuring teacher effectiveness. At in the student selection level, students in the second, sixth and ninth grades (1, 11, and 14 years old, respectively) were selected as respondents, because students in these three stages were considered by government agencies to be in a critical period of learning, and their test scores could better reflect the effectiveness of teachers.

Therefore, the number, relevance and richness of sampling as a whole are reasonable, but the selection of samples also has some limitations. First, since the 100 schools were all government schools and did not include teachers from other forms of schools, so some teachers were neglected, leading to the fact that the scope of application of the results was limited and there may be deviations. At the same time, the data from fieldwork of 300 teachers for 3 years was large for the qualitative study, but in the study of Creswell & Clark, it was pointed out that too many participants in the qualitative study may affect the depth of the entire study.[4]

##### ***4.2. Whether the sampling instruction is appropriate***

The research article introduces the main research objects - that is, the source of teachers, teaching experience and other aspects. For students, the article also specifically pointed out the grade and number of students distribution and the reason for selecting them, which was clear and reasonable.

And because in the qualitative interview section, an interview with the school leader was added, but the sample of the school leader was not explained in the article. At the same time, the article does not explain the specific situation of sampling in detail, it only points out the scope of teacher sampling, but does not explain the specific composition of the last 300 studied teachers. Finally, due to the fact that in terms of sample size, the number of respondents in the quantitative and qualitative stages are not the same. And this is not mentioned that the comparison of the two sets of data is limited due to the difference in sample size, but in practice, this problem is common.

#### **5. Theoretical and policy contributions**

Day, Sammons focuses on the study of teachers' work, life, and effectiveness. Most contributions therefore focus on the theoretical aspect.[3]

First, this study adds value to this type of research on teachers' effectiveness. In their study on teacher effectiveness, the selection of teacher samples was very extensive, involving 100 schools in 7 school districts, while the previous study was mostly limited to performances of teachers within schools in terms of effectiveness, while ignoring the differences between teachers at the school level. This study fully complemented the shortcomings of this, and the results obtained were more applicable and extensive.

At the same time, because the previous research mostly used quantitative research methods, or used qualitative research methods to study one or several aspects of minorities, ignoring the in-depth study of the qualitative research of many other factors and variables which greatly deepened its limitations. However, in this study, under the combination of quantitative data analysis and qualitative in-depth

research, it is more comprehensive, supplementing the theoretical research on teacher effectiveness research, and was comprehensively recorded.

In addition, there are few records in the literature of theoretical and practical discoveries made in the course of research through mixed research methods. However, this study found that the use of the mixed research method has promoted the development and integration of research methods. The findings suggest that the use of the mixed research approach can contribute to the further development of the field of study, while also giving scholars a deeper understanding of the nature, impact, and variables of teachers' work, life, and effectiveness.

## **6. Ethical issues and research constraints**

Although this study has contributed many things to the study of faculty effectiveness, there are still ethical and research limitations.

### **6.1. Ethics and Morality**

Whatever the kind of research is, it should be carried out without violating ethics. At the ethical level, the study did not specifically mention, but it is mentioned in the article that in order to protect the confidentiality and autonomy of teachers and schools, some test results will not be fed back to the school under investigation, and the students' research results and data will be used by teachers to make wrong judgments about students' performance, thus affecting teachers' teaching practices and students' learning.

### **6.2. Research Limitations**

As mentioned earlier, the limitations of this study are mainly related to the following two aspects:

#### **6.2.1. Limitations in the teacher sample**

The sample of teachers only involved government schools, not teachers in private and other forms of school. However, the environment, students, and teachers' own experiences in different types of schools are different, so there are differences in teacher effectiveness. This makes the study somewhat limited, and the results of the study are only used in specific categories of schools.

#### **6.2.2. Taking the improvement of student achievement rather than the overall quality of students as a criterion for measuring teacher effectiveness is not in line with the trend of educational development in today's world**

At the student level, the student's grade is only a paper-and-pencil test result, which simply reflects the student's test ability, and other qualities such as students' hands-on ability and research ability are not involved, but today, all countries in the world emphasize quality education. So in such academic research, it is easier for teachers to take students' academic performance rather than students' comprehensive development and lifelong learning as their work goals. So there are certain limitations.

#### **6.2.3. Time lag**

In the study of value-added methods, because students' academic performance is measured one year after the interview, not in real time. So there are certain limitations to relate teachers' effectiveness to students' past performance.

In summary, in this study on teacher effectiveness, on the whole, its theoretical basis is effective. And since the mixed research method is adopted, the research design and research method are better coordinated. In terms of sampling, the sample size is large, and the main source of the sample is explained, so it has made a certain contribution at the level of theory and research method, but there are still some defects in the teacher source and the measurement standard level, which needs further improvement.

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