A Review of Research Methods in EFL Education

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Abstract—**Ontological assumptions are dichotomous as realism and nominalism, which gives rise to dichotomous epistemological assumptions as positivism and interpretivism (or anti-positivism). This gives rise to methodological paradigms as quantitative and qualitative. As a blended paradigm of quantitative and qualitative, mixed methods rise as a third option. Each paradigm has its own characteristic research methods and strategies for data collection and analysis. The article elaborates these three research paradigms and relevant research methods in the field of English as a Foreign Language (EFL). Specific examples are given when each research method is illustrated.**

Index Terms—**EFL, ontology, epistemology, methodology, quantitative, qualitative, mixed methods**

In general English as a Foreign Language (EFL) education can be defined as the English language which is taught and learnt in a country where the official language is not English, like China, Japan, etc. This differs from English as a Second Language (ESL) education, which refers to English language that is taught and learnt in an English-speaking country, like USA, UK, etc. The language environment is the key factor in distinguishing the two terminologies. The primary concern for doing research in this field lies in making EFL education more effective. Good research contributes more effective EFL education by providing new insights into the teaching and learning process (Mackey & Gass, 2011). The research in EFL education covers a wide range of targets, e.g. students, teachers, textbooks, teaching models, learning strategies, education policies, etc. As a result the research methods adopted can vary greatly in light of the specific research purpose and a researcher's stance of paradigm. The research paradigm is closely related to ontology and epistemology.

I. ONTOLOGY, EPISTEMOLOGY AND METHODOLOGY

Ontological assumptions give rise to epistemological approaches; which, in turn, give rise to methodological considerations (Cohen, Manion, & Morrison, 2011). Ontology is the rationale for methodological option. Figure 1 reflects a flow of thought on research methods.

Ontology originates from Latin 'ontologia', which is a compound word of 'onto + logia'. The prefix 'onto-' means 'being, existence' while the suffix '-ology' means 'science, study, theory'. Therefore ontology refers to the study of the nature of being or reality. In people's endeavor to comprehend social reality, two strikingly different paradigms have been constructed. Their divergence centers on their ontological assumptions about the very nature of the social reality under investigation. Is the social reality external to individuals? Or is the social reality the product of individual consciousness? The different answers to the two questions have formed two contradictory paradigms to the research work of social science: *realism* and *nominalism*. The positive answer to the first question believes in realism. Realists hold that social reality has an independent existence and are not dependent on the knower for its existence. The real world has hard, intangible structures that exist irrespective of our labels. On the other hand the positive answer to the second question is a believer of nominalism. Nominalists however assume that the social world is chiefly concepts or labels that help individuals to structure reality. These concepts or labels are human being's artificial creation. As a result the social reality is relative. As far as nominalism is concerned, objects of thought are merely words and there are no independently accessible things constituting the meaning of the words (Burrell & Morgan, 1979; Cohen et al., 2011).
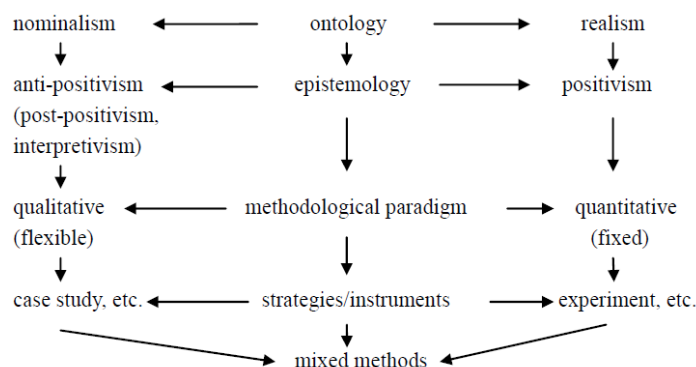

Figure 1 (Burrell & Morgan, 1979; Cohen et al., 2011)

Different ontological assumptions (realism or nominalism) give rise to different epistemology. *Epistemology* questions what knowledge is and how it can be acquired. Realists believe that reality exists independently of observers. They view knowledge as hard, objective and tangible. In their enquiry of knowledge realists tend to adopt the approach of *positivism*. Positivists hold that society, like the physical world, functions according to general laws. The law can be understood by way of objective research. When doing research, they claim that the information deriving from mathematical and logical treatments and the report of sensory experience is the exclusive source of authoritative knowledge (Macionis & Gerber, 2010). They assume that all authentic knowledge allows verification and that only valid knowledge is scientific. Hence the positivists take an objective approach to the social phenomena. They treat the social phenomena as being real and external to individuals, so the social phenomena could be researched in ways similar to natural science. Positivists hold that researchers can seek to explain what has happened and predict what will happen in the social world by searching for patterns and relationships among the relevant variables. They assume that researchers can develop and test hypotheses, and knowledge is a cumulative process (Burrell & Morgan, 1979). In their enquiry of knowledge, the traditional methods, such as experiment, survey, and the like are often adopted.

By contrast, nominalists see knowledge as personal, subjective and unique. In their course of understanding the social phenomena, they tend to adopt the approach of *anti-positivism* (or post-positivism, or interpretivism). Anti-positivists challenge the positivists' view of social reality being objective, independent, ordered, standardized, rational, impersonal, etc. As human societies have unique characteristics like rules, norms, symbols, meanings, and values, which is different from the world of nature (HLS, 2011), anti-positivists hold that social phenomena are multi-layered and deserve multiple interpretations. They believe people's knowledge of the world is conjectural, falsifiable, challengeable and changing, and the researcher could have multiple perspectives and multiple warrants (Popper, 1968). In enquiry of knowledge, anti-positivists favor the styles of ethnographic fieldwork, discourse analysis, etc.

Different epistemological assumptions give rise to different methodological paradigms. *Methodology* can be defined as a general research paradigm that outlines how a research project is to be undertaken and, among other things, identifies the specific methods to be used. These methods define the instruments or strategies for data collection or, sometimes, how the result is to be analyzed (Howell, 2013). In other words, methodology is a system of methods, principles, and rules for regulating a research project in a given discipline. In practice, positivism may be equated with quantitative (or fixed) research while anti-positivism is more qualitative (or flexible).

II. QUALITATIVE RESEARCH

Qualitative (or flexible) research is a paradigm of inquiry that allows researchers to examine human behavior in depth and the reasons that govern such behavior. Qualitative research is useful for exploring new topics or understanding complex issues, e.g. for explaining people's beliefs and behaviors or for identifying the social norms of a society. Thus qualitative research is most applicable for addressing 'why' questions to explain and understand issues or 'how' questions that describe process or behavior (Denzin & Lincoln, 2005; Hennink, Hutter, & Bailey, 2011). The qualitative data is generally termed 'soft', i.e., rich in description of people, places, and conversations, which is not easily handled by statistical procedures. The qualitative data is usually collected via sustained contact with the people being researched in the settings where they regularly spend their time. The researchers enter the world of the people they plan to study, get to know, be known, and be trusted by the researched, and systematically keep a detailed record of what is heard and observed (Bogdan & Biklen, 2006).

Participant observations and in-depth interviewing[1] are the two frequently adopted strategies to collect qualitative data. Qualitative data are the kinds of information gathered in a non-numeric form. The common examples of these data include: field notes, interview transcript, audio/video recordings, documents, etc. The data analysis of qualitative research is the process of moving from data collected into some form of explanation, understanding or interpretation of the people or situations being investigated. The purpose is to figure out the meaning and symbolization of the data. For example, by analyzing interview data the researcher might attempt to identify any or all of the followings:
  • What the respondents have been doing;
  • Their interpretation of a certain phenomena;
  • Why they have that point of view;
  • How they convey their viewpoint of their situation;
  • How they identify or classify themselves and others in their discourse. (Lewins, Taylor, & Gibbs, 2010)

Qualitative analysis is not adhering to any one 'correct' approach or set of rigid techniques; it is imaginative, artful, flexible, and reflective (Coffey & Atkinson, 1996). The process requires a lot of human efforts and it is very labor intensive. The good news is that computer assisted qualitative data analysis softwares (CAQDAS), NVivo for example, can help to reduce the manual work. Analyzing qualitative data is an inductive process, which often involves the process of:
  • Transcribing – transcribe recorded data into written form that is agreeable to analysts;
  • Coding – breaking the data down into small segments and labeling these;

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[1] Other data collecting methods may include open-ended questionnaires, diaries and verbal reports, discourse analysis, documents and records, audio/video recordings, etc.

• Looking for larger categories or themes;
• Interpreting meanings and present results.

The most commonly used qualitative research methods include case study, action research and ethnography research, etc.

Case study

A case study is an empirical inquiry that investigates a contemporary phenomenon in the real world context (Atkins & Wallace, 2012; Yin, 2003). It is a study of a single instance of a bounded system, such as a community, a school, a class, a clique, a child, etc. (Creswell, 1994). The data collection methods may include interviews, observations, open-ended questionnaires, diaries and verbal reports, documents and records, etc. For example, if we want to explore EFL teachers' perceptions towards Communicative Language Teaching (CLT) at a specific university. In-depth interview will be a good way to elicit data. The research process may roughly include: designing interview questions, deciding on subject size, selecting the subjects, conducting the interview, analyzing the data, and interpreting the data. Open-ended questionnaire might be another option. This can cover larger subject size, but this is more demanding in the aspect that the EFL teachers answer the questions willingly, carefully and honestly.

Action research

Action research in applied linguistics is the research initiated to explore and solve a specific problem in the teaching or learning context by systematic data elicitation and analysis (Heigham & Croker, 2009). The purpose of action research is to solve a particular problem and to produce guidelines for better practice. In the field of EFL education, action research is usually associated with solving the teaching and learning problems within classrooms rather than addressing social problems concerning language teaching. The researchers are often the EFL teachers in that they themselves are important source of knowledge regarding their own classroom situations. As a result action can be implemented more credibly. For example, if an EFL teacher notices some of his students are not active in participating in class activities, e.g. role-plays, presentations, etc., he wants to solve this problem to improve his teaching. He can conduct an action research with the initial research question like: 'What barriers come between the students and class activities?' Observations and interviews might be the good approaches to find the reasons why the students are not active in class activities. Once the reasons are sought, the teacher can take actions accordingly to improve the class activities. With no doubt, the teacher has to continue observing his class to see if the measures taken are effective.

Ethnographic research

Ethnographic research focuses on describing and interpreting the common patterns of a culture-sharing group through prolonged participant observation and interview (Heigham & Croker, 2009). The 'culture-sharing group' here is not limited to ethnic groups but can be related to any bounded units such as communities, institutions, and programs. Thus we can talk about the ethnography of a language classroom, or a specific school, or other language learning context (Dö rnyei & Taguchi, 2012; Harklau, 2005). There is an ethnographic study conducted by a teacher-ethnographer in his own school (Pollard, 1985). The study aims at giving a thorough description of what it means to be a participant-observer, and what opportunities and difficulties a teacher-ethnographer has when trying to fulfill the duties of the teacher and of the researcher. The data collection method applied in this study is participant observation and interview. Another example is an ethnographic study of students' writing development conducted by Starfield (2010) at a South African University. The purpose of the study is to better understand why it is that black students who speak English as an additional language are much less successful than their white peers. Eleven students participated in the year-long study. A combination of data collection methods were applied, i.e. observation, in-depth interview and documentation.

III.   QUANTITATIVE RESEARCH

Quantitative (or fixed) research denotes the systematic empirical investigation of social phenomena by means of mathematical and statistical techniques (Given, 2008). It involves collecting data in numerical form and analyzing by statistical methods (Mackey & Gass, 2011). Its research objective is to develop mathematical models, theories or hypotheses about certain social phenomena and in an aim to make use of them.

A key step of quantitative research is to collect data which is mainly in the form of numbers, percentages, scores, etc. (Given, 2008). The strategies and instruments for data collection can include experiments, questionnaires, tests and the like. The researchers analyze such data with the help of statistical knowledge and tools, hoping the data will yield an unbiased result which can be generalized to a larger population. SPSS is one of the most popular statistical analysis softwares. It offers easy ways to explore relationships among variables and to compare groups, which are the frequently researched questions in EFL education.

Qualitative research is often an inductive process, fit for in-depth exploration of small samples with a less generalizable result, however quantitative research is usually deductive, fit for more breadth of information across a large number of samples with more generalizable result. The frequently used research methods include survey, experiment and correlational study, etc.

Survey

Survey gathers data at a particular point in time with the intention of describing the nature of existing conditions, or determining the relationships that exist between specific events (Cohen et al., 2011). Surveys are question-and-answer

formats that are conducted in person, on the phone, by internet, or through other interactive points with people. Questionnaire is a widely used and useful instrument for collecting survey information. It can provide structured, often numerical data, which are comparatively straightforward to analyse. Survey is typical with large sample size. For example, Kelsen (2009) did a survey on using YouTube as supplementary material with college EFL students in Taiwan. The purpose of the survey is to explore students' attitudes towards using YouTube to study English. Pre-intervention questionnaire and follow-up questionnaire were conducted separately on the first and last days of class of the fall semester, 2007, in two sophomore classes (n=69). The statistical results were calculated using the descriptive statistics function of SPSS.

Quasi-experiment

Experiment involves manipulating one or more independent variables and observing the effect on a dependent variable. There is a big difference between true experiment and quasi-experiment. True experiment is commonly used in the natural sciences, such as chemistry, geology and physics, in order to prove or disprove a hypothesis, or theory; however it is difficult to apply to social science, such as psychology or education. This is because the subjects under study in social science are usually human-related, which are difficult to control. Quasi-experiment, also known as natural or in-situ experiment, is the experiment in which subjects are beyond the control of the experimenter and are not randomly assigned (Dunning, 2014). It is an empirical inquiry used to estimate the causal impact of an intervention on the subjects. Therefore quasi-experiment is more suitable for social science. Specifically, it is frequently used in EFL education research. For example, a quasi-experiment research was ever conducted on investigating the effect of note-taking on EFL listening comprehension (Zohrabi & Esfandyari, 2014). The subjects include 30 English learners in the intermediate level of language proficiency. The experiment is conducted through pre-test and post-test on two subject groups. Two classes are selected randomly, one as the control group and the other as the experimental group. These two groups were involved in six sessions of listening task where the experimental group took notes and the control group did not. The procedure of data collection was completed by obtaining the subjects' scores in the listening part of PET test.

Correlational study

A correlational study investigates relationships between variables, namely, it explores whether or not two variables are correlated and how strong their correlation is. Sometimes more than two variables are involved. Kalla (2011) summarizes three kinds of correlations between two variables.

• *Positive correlation* refers to when an increase in one variable gives rise to an increase in the other, and a decrease in one gives rise to a decrease in the other.

• *Negative correlation* refers to when an increase in one variable gives rise to a decrease in the other, and a decrease in one gives rise to an increase in the other.

• *No correlation* exists when a change in one variable doesn't give rise to a change in the other and vice versa.

SPSS is very capable of doing this kind of data analysis.

Wu (2012) did a correlational study of Chinese non-English majors' learning strategies and CET-4 achievements. The subjects are sophomores of non-English major from a university in Zhengzhou, China. Eighty subjects responded to the questionnaires. Pearson correlational analysis and multiple regressions were conducted to explore the relationships between learning strategies and CET-4 achievements. Independent samples t-test was also carried out to identify the significant differences in the use of leaning strategies between high-achievers and low-achievers.

IV. MIXED METHODS

It is highly possible that there are both singular and multiple versions of truth and reality in human society. The truth and reality is sometimes subjective and sometimes objective, sometimes scientific and sometimes humanistic (Cohen et al., 2011). A single quantitative or qualitative paradigm will only yield a partial understanding of the phenomenon being investigated (Greene, 2008). Polarization obscures the fact that quantitative and qualitative data are closely related to each other. The qualitative data can be described and manipulated numerically, and the quantitative data is based on qualitative judgments (RMKB, 2006). The social world is not an either/or world, but a mixed world. The paradigm *of mixed methods* recognizes and works with the fact that the social reality is not exclusively qualitative or quantitative. The paradigm of mixed methods involves collecting, analyzing, and interpreting both quantitative and qualitative data in a single research or in a series of research that investigates the same underlying phenomenon (Leech & Onwuegbuzie, 2009). The research of mixed methods addresses both the 'what' (quantitative and qualitative) questions and 'how' or 'why' (qualitative) questions. This is particular useful if the researchers intend to understand the different interpretations of a certain phenomenon.

A mixed method recognizes and accepts that many variables are operating in a single case, and, hence, to catch the implications of these variables, it usually allows more than one instrument for data collection and plenty of evidence sources. It has the potential to blend quantitative and qualitative data (Cohen et al., 2011).

For example, if a researcher wants to do a study on perceptions and attitudes of teachers and students towards a combined 'EGP-ESP' model for College English education in a specific university, a structured and closed questionnaire can be used to explore the attitudes of students since a questionnaire is very efficient in collecting survey information from large samples, moreover it is easy to be administered and comparatively straightforward to be

analyzed. The questionnaire can conveniently generate frequencies of response amenable to statistical processing and analysis. This is quantitative data that can be analyzed by SPSS.

Meanwhile a semi-structured interview can be used to explore the perceptions and attitudes of EFL teachers since interview is fit for collecting in-depth information with small samples. In a semi-structured interview, the researcher usually designs in advance a list of questions or some specific topics closely related to the phenomenon under investigation. These questions or topics are often referred to as an interview guide. During the interview, both the interviewer and interviewee have some leeway in asking and answering. That is to say, the questions asked may not follow on exactly in the way outlined in the interview guide. Questions that are not included in the guide may also be asked while the interviewer picks up some things said by interviewee and wanted to explore deeper. The interview process is flexible and the emphasis is put on the interviewee' viewpoint and understanding of the phenomenon (Bryman, 2008). The data collected is typically qualitative.

To sum up, a qualitative researcher elicits detailed descriptions and narratives in an aim to give the phenomenon an in-depth understanding. A quantitative researcher elicits data coded in numeric form in an aim to analyze them statistically. Mixed methods incorporate descriptives and unstructured inquiry into a framework of numeric measurements, or integrate numeric elements into the subjective and detailed descriptions (Healey, 2012). As for the criteria to choose the right research methods, two considerations may play into this decision: the research questions and the researcher's experience. Certain types of research questions call for specific methods. A researcher must analyze what research methods best fit for his research questions. In addition, a researcher's personal experience and training received might considerably decide what research methods he/she adopts. A researcher is very likely to choose the research methods he/she is most familiar with. In one word, the best policy is to adopt a pragmatic and fit-for-purpose approach.

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