

Review Article

The Basis of Distinction Between Qualitative and Quantitative Research in Social Science: *Reflection on Ontological, Epistemological and Methodological Perspectives*

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Abstract

This article examines methodological issues associated with qualitative and quantitative research. In doing this, I briefly begin by outlining the philosophical and conceptual framework that informed the two research methodologies and discusses how ontological and epistemological issues were translated in to specific methodological strategies and influence researchers methodological decision. My purpose in writing this article is not to promote one methodology over the other rather to describe and reflect on the differences between the two research methodologies from Ontological, Epistemological and Methodological Perspectives and how they will be selected for research.

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INTRODUCTION

This article explores and interprets the distinction between qualitative and quantitative research from Ontological, Epistemological and Methodological perspectives. As a starting point, it draws on my own personal experience of how teachers and students conceptualize the two research methodologies: qualitative and quantitative in my work place, Jimma University. My major observations were evaluating qualitative and quantitative research report by using positivist criteria, promoting one research methodology over the other, looking qualitative research as inferior compared to the quantitative research, emphasizing on quantitative research in dealing with social sciences in general and educational issues in particular. These various conceptions and practices motivate me to reflect on the basis of the distinction between the two research methodology by using current literature and my own experience of how research is conducted and constructed in social sciences. The goal of this review is to enable readers with little or no previous experience and having superficial understanding of different research methodologies to become a more informed consumer and producer of research.

Social scientists study diverse and complex phenomenon: from census data derived from hundreds of thousands of human beings, to the in-depth analysis of one individual social life; from monitoring what is happening on a street today, to the historical analysis of what was happening hundreds of years ago. In order to describe, explore and understand these social phenomena, researchers with in social science use different research methodologies, which can generally be subdivided into quantitative and qualitative research methodology. However, there are

compelling reasons as to the selection of each research methodology within the social science arena, and this was examined in the latter section of this paper.

Research methodology used in social science for much of the 20th century was largely quantitative methodology, which originated in the natural sciences such as Biology, Chemistry, Physics, Geology etc. and was concerned with investigating things which we could observe and measure in some way. Such observations and measurements can be made objectively and repeated by other researchers. Gradually, but certainly over the last decades some researchers within the social sciences (Sociology, Anthropology etc) have expressed dissatisfaction with the quantitative methodology as a means of both conducting research and generating knowledge. These researchers have argued that the aim of research practice should be to focus up on understanding the meaning that events have for the individual being studied. Having this argument in mind these researchers begun to explore alternative way of conducting research in social science and latter developed qualitative methodology, which attempts to increase understanding of why things are the way they are in social world and why people act the ways they do. As a result of this intellectual debate purists have emerged on both sides i.e. the quantitative purist and the qualitative purist.

The quantitative purists articulate assumptions that are consistent with what is commonly called positivist paradigm and believe that social observations should be treated as entities in much the same way that physical scientists treat physical phenomena. To the contrary, the qualitative purist also called interpretivist or constructivist by rejecting the positivist assumption contended that reality is

subjective, multiple and socially constructed by its participants (Krauss, 2005; Bryman, 1984; Lincoln & Guba 2000; Guba and Lincoln, 1994; Amare, 2004). Although these methodologies are acknowledged as a means to conduct research, scholars within the social science have argued that the relative preference of each research methodology depends on philosophical issues related to the question of ontology (the nature of reality) and epistemology (the nature of knowledge). As research methodology in social science are related in the sense that they are all means of soliciting information about the human nature from human participants, this article was aimed at clarifying the basis of methodological distinction grounded on a philosophical and theoretical view of research that guide the work of researchers in social science.

This article is not an exhaustive attempt to analyze and synthesize all aspect of the distinction between qualitative and quantitative research methodology. My goal is more modest. It is to make the reader aware of the two research methodologies and their basis of difference from ontological, epistemological and methodological perspectives. Furthermore, the goal is to deal with different research paradigms that are particularly appropriate for researchers who want to base their work on a positivist world view or an interpretivist-constructivist world view.

The Basis of Methodological Distinction in Research

Generally speaking there are varieties of research methodologies with no single accepted research methodology applicable to all research problems. Each research methodology has its own relative weakness and strength. No single research methodology is necessarily ideal and that selection inevitably involves loss as well as

gain (Schulze, 2003). The selection of research methodology depends on the paradigm that guides the research activity, more specifically, beliefs about the nature of reality and humanity (ontology), the theory of knowledge that informs the research (epistemology), and how that knowledge may be gained (methodology). A consideration of epistemology, ontology and methodology must be a central feature of any discussion about the nature of social science research as these elements give shape and definition to the conduct of an inquiry (Popkewitz, Tabachnick & Zeichner, 1979).

Epistemological Issues/Considerations in Research

The traditional view regards the social sciences as largely similar to the natural sciences, and the researchers who adopt this approach are thus concerned with discovering laws concerning human behavior (Schulze, 2003; Krauss, 2005). The critical epistemological debate in terms of conducting social science research is whether or not the social world can be studied according to the same principles as the natural sciences (Bryman, 2001). There are two broad epistemological positions: positivism and interpretivism - constructivism.

Epistemology poses the following questions: What is the relationship between the knower and what is known? How do we know what we know? What counts as knowledge? For positivists, which are evolved largely from a nineteenth-century philosophical approach, the purpose of research is scientific explanation. According to Neuman (2003) positivism sees social science as an organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic causal laws that can be

used to predict general patterns of human activity. The nature of social reality for positivists is that: empirical facts exist apart from personal ideas or thoughts; they are governed by laws of cause and effect; patterns of social reality are stable and knowledge of them is additive (Crotty, 1998; Neuman, 2003; Marczyk, DeMatteo and Festinger, 2005). A basic assumption of this paradigm as Ulin, Robinson and Tolley (2004) remarked is that the goal of science is to develop the most objective methods possible to get the closest approximation of reality. Researchers who work from this perspective explains in quantitative terms how variables interact, shape events, and cause outcomes. They often develop and test these explanations in experimental studies. Multivariate analysis and techniques for statistical prediction are among the classic contributions of this type of research. This framework maintains that reliable knowledge is based on direct observation or manipulation of natural phenomena through empirical, often experimental, means (Lincoln & Guba 2000, 2005; Neuman, 2003).

On the other hand, an interpretivist-constructivist perspective, the theoretical framework for most qualitative research, sees the world as constructed, interpreted, and experienced by people in their interactions with each other and with wider social systems (Maxwell, 2006; Bogdan & Biklen, 1992; Guba and Lincoln, 1985; Merriam, 1988). According to this paradigm the nature of inquiry is interpretive and the purpose of inquiry is to understand a particular phenomenon, not to generalize to a population (Farzanfar, 2005). Researchers within the interpretivist paradigm are naturalistic since they apply to real-world situations as they unfold naturally, more specifically, they tend to be non-manipulative, unobtrusive, and non-controlling. According to Ulin, Robinson

and Tolley (2004) Qualitative research methodology often rely on personal contact over some period of time between the researcher and the group being studied. Building a partnership with study participants can lead to deeper insight into the context under study, adding richness and depth to the data. Thus, qualitative methodologies are inductive, that is, oriented toward discovery and process, have high validity, are less concerned with generalizability, and are more concerned with deeper understanding of the research problem in its unique context (Ulin, Robinson and Tolley, 2004).

Both positivist and interpretive researchers hold that human behaviour may be patterned and regular. However, while positivists see this in terms of the laws of cause and effect, interpretivists view such patterns as being created out of evolving meaning systems that people generate as they socially interact (Neuman, 2003). Since interpretive researchers place strong emphasis on better understanding of the world through firsthand experience, truthful reporting and quotations of actual conversation form insiders perspectives (Merriam, 1998) than testing the laws of human behavior (Bryman, 2001; Farzanfar, 2005), they employ data gathering methods that are sensitive to context (Neuman, 2003), and which enable rich and detailed, or thick description of social phenomena by encouraging participants to speak freely and understand the investigator's quest for insight into a phenomenon that the participant has experienced. Owing to this, interview, focus group discussion and naturalistic observation are the most widely used data gathering methods for researchers using qualitative research methodology. To the contrary, the positivist researchers' emphasis on explaining behavior through measurable data by using highly standardized tools

such as questionnaire, psychological tests with precisely worded questions.

Issues of trustworthiness and credibility, as opposed to the positivist criteria of validity, reliability and objectivity, are key considerations in the interpretivist paradigm. According to Ulin, Robinson and Tolley (2004) positivists use validity, reliability, objectivity, precision, and generalizability to judge the rigor of quantitative studies as they intended to describe, predict, and verify empirical relationships in relatively controlled settings. On the other hand, qualitative research that aims to explore, discover, and understand cannot use the same criteria to judge research quality and outcomes. Lincoln and Guba (1985) suggest that the fundamental criterion for qualitative reports is trustworthiness. How, they ask, can a researcher be certain that “the findings of an inquiry are worth paying attention to, worth taking account of. For research to be considered credible and authentic investigations should be based on a sound rationale that justifies the use of chosen methodology and the processes involved in data collection and analysis.

Ontological Issues/Considerations in Research

Ontological questions in social science research are related to the nature of reality. There are two broad and contrasting positions: objectivism that holds that there is an independent reality and constructionism that assumes that reality is the product of social processes (Neuman, 2003).

A researcher with a positivist orientation regards reality as being ‘out there’ in the world and needing to be discovered using conventional scientific methodologies (Bassegy, 1995). People, through the use of their senses, can observe this reality and the

discoveries made about the realities of human actions are expressed as factual statements (Bassegy, 1995; Mutch, 2005). Positivist researchers do not regard themselves as important variables in their research and believe they remain detached from what they research. The philosophical basis is that the world exists and is knowable and researchers can use quantitative methodology to discover it (Cohen, Manion & Morrison, 2000). Through this orientation, knowledge is a given and must be studied using objective ways. Research findings are usually represented quantitatively in numbers which speak for themselves (Bassegy, 1995; Cohen, Manion & Morrison, 2000; Mutch, 2005).

On the other hand, interpretive researchers cannot accept the idea of there being a reality ‘out there’, which exists irrespective of people. They see reality as a human construct (Mutch, 2005). The interpretive research paradigm views reality and meaning making as socially constructed and it holds that people make their own sense of social realities. Interpretive researchers use qualitative research methodologies to investigate, interpret and describe social realities (Bassegy, 1995; Cohen, Manion & Morrison, 2000). The research findings in qualitative methodology are usually reported descriptively using words (Mutch, 2005).

The qualitative research methodology treats people as research participants and not as objects as in the positivist research approach. This emphasis can be an empowering process for participants in qualitative research, as the participants can be seen as the writers of their own history rather than objects of research (Casey, 1993). This methodology enables the participants to make meanings of their own realities and come to appreciate their own

construction of knowledge through practice. This process can be seen as enabling or empowering them to freely express their views, which they may not have a chance to do with someone outside of the school system (Cohen, Manion & Morrison, 2000).

Methodological Issues/ Considerations in Research

Methodology is a research strategy that translates ontological and epistemological principles into guidelines that show how research is to be conducted (Sarantakos, 2005), and principles, procedures, and practices that govern research (Kazdin, 1992, 2003a, cited in Marczyk, DeMatteo and Festinger, 2005).

The positivist research paradigm underpins quantitative methodology. The realist/objectivist ontology and empiricist epistemology contained in the positivist paradigm requires a research methodology that is objective or detached, where the emphasis is on measuring variables and testing hypotheses that are linked to general causal explanations (Sarantakos, 2005; Marczyk, DeMatteo and Festinger, 2005). Positivist research uses experimental designs to measure effects, especially through group changes. The data collection techniques focus on gathering hard data in the form of numbers to enable evidence to be presented in quantitative form (Neuman, 2003; Sarantakos, 2005).

In contrast, qualitative methodology is underpinned by interpretivist epistemology and constructionalist ontology. This assumes that meaning is embedded in the participants' experiences and that this meaning is mediated through the researcher's own perceptions (Merriman, 1998). Researchers using qualitative methodology immerse themselves in a culture or group by observing its people and their interactions, often participating in

activities, interviewing key people, taking life histories, constructing case studies, and analyzing existing documents or other cultural artifacts. The qualitative researcher's goal is to attain an insider's view of the group under study.

Selecting a Research Paradigm in social science

Encyclopedia of qualitative research (2008) defines a paradigm as a set of assumptions and perceptual orientations shared by members of a research community. Paradigms determine how members of research communities view both the phenomena their particular community studies and the research methodology that should be employed to study those phenomena. According to Denzin and Lincoln (2005) paradigm is the net that contains the researcher's epistemological, ontological, and methodological premises.

Whether consciously or not, every researcher works from some theoretical orientation or paradigm. According to Cohen, Manion & Morrison (2000) Researchers have their own different worldviews about the nature of knowledge and reality that helps them clarify their theoretical frameworks. Perspectives can vary a great deal among researchers who see the world through different cultural, philosophical, or professional lenses. One researcher might seek evidence of the regularity of patterned behavior in trends, rates, and associations while others might focus on how people understand or interpret what they experience. These two predominant research worldviews are the positivist paradigm and interpretive paradigm which are the focus of the study. It has become very common in methodological literature that a quantitative methodology is described as belonging to the positivist paradigm and a qualitative methodology as belonging to the

interpretive paradigm. An interpretivist or constructivist paradigm portrays the world as socially constructed, complex, and ever changing in contrast to the positivist assumption of a fixed, measurable reality external to people.

Positivism is based on the assumption that there are universal laws that govern social events, and uncovering these laws enables researchers to describe, predict, and control social phenomena. Interpretive research, in contrast, seeks to understand values, beliefs, and meanings of social phenomena, thereby obtaining a deep and sympathetic understanding of human cultural activities and experiences. Rubin and Rubin (1995) and Cohen, Manion & Morrison (2000) pointed out that quantitative research methodologies are a search for both law-like regularities and principles which are true all the time and in all given situations. On the other hand, qualitative researchers attempt to understand the complexities of the world through participants' experiences. Knowledge through this lens is constructed through social interactions

within cultural settings. Meanings are "found in the symbols people invent to communicate meanings or an interpretation for the events of daily life" (Popkewitz, 1984).

Description of these different paradigms demonstrates that there are competing Methodologies to social research based on different philosophical assumptions about the purpose of science and the nature of social reality (Neuman, 2003; Ulin, Robinson and Tolley, 2004). The research paradigm chosen by individual researchers appears to be dependent on their perceptions of "what real world truth is" (ontology) and "how they know it to be real truth" (epistemology). A researcher's choice of research paradigm can also be determined by the kinds of questions that help them to investigate problems or issues they find intriguing. Figure 1 presents how philosophical framework influence research practice at all and summarize the relationships between different philosophical schools of thought and methodological traditions with focus on constructivism and interpretive.

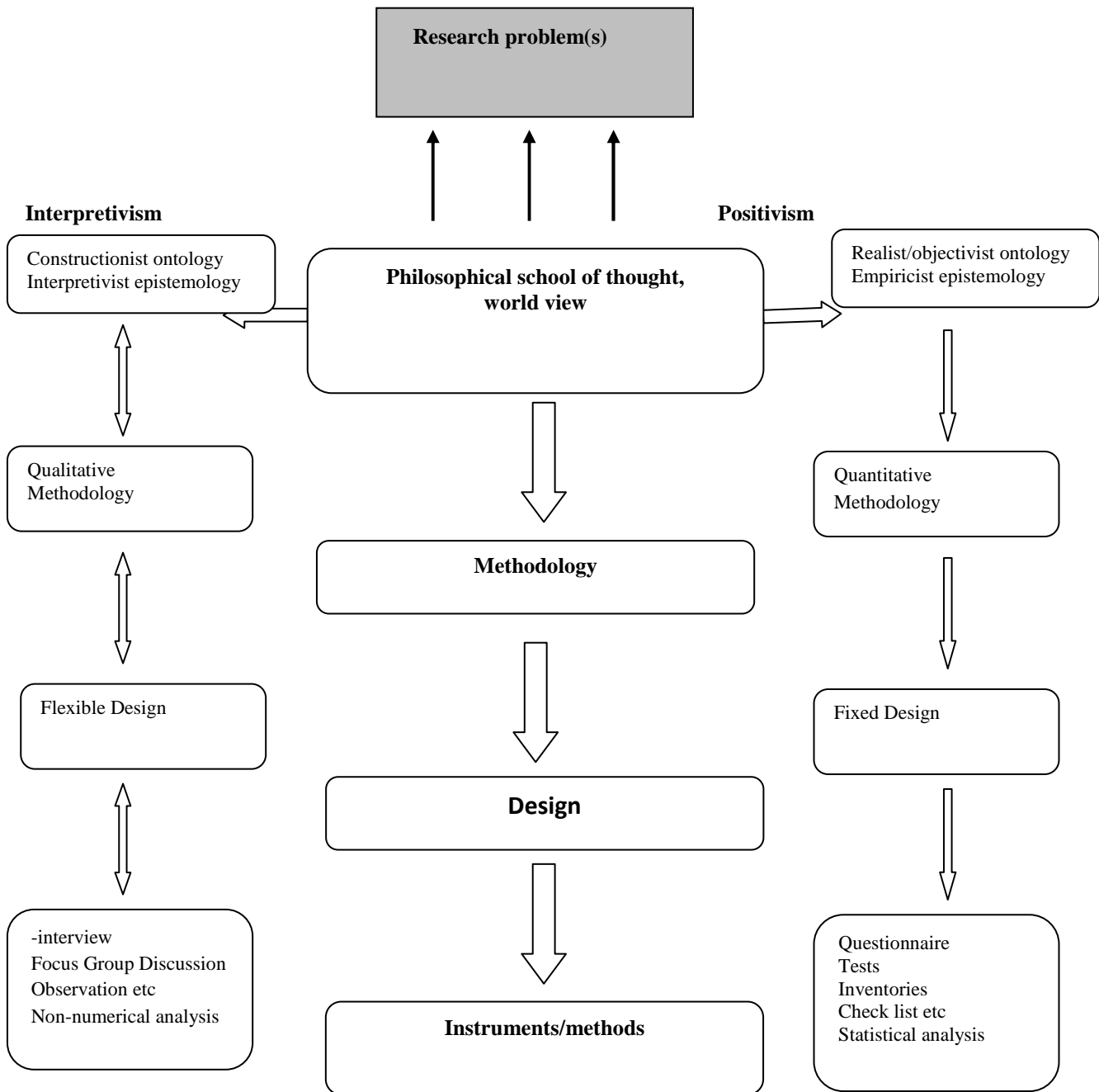


Figure: Foundation of Research

As depicted in figure 1 above ontology and epistemology influence the type of research methodology chosen, and this in turn guides the choice of research design and instruments. The ontology informs the methodology about the nature of reality and what social science is supposed to study where as the epistemology informs the methodology about the nature of knowledge or where knowledge is to be sought? About how we know what we know? Having the instruction from the ontology and epistemology the methodology prepares a package of research design that is to be employed by the researcher. Methodology is a research strategy that translates the ontological and epistemological principles in the process of research activity. How research is conducted and constructed?

The constructivist ontology claiming multiple, individual or socially constructed reality (both the researcher and the participant construct their own reality and knowledge) that will be studied contextually and holistically and the constructivist epistemology rejecting the traditional image between the researcher and things to be studied guide the qualitative methodology which in turn prescribe flexible design in which the researcher has got unlimited freedom of movement between the steps of research.

On the other hand the positivist ontology claiming objective, single, reality that will be studied without any perspective of the researcher and the positivist epistemology advocating the detachment or dualism of the knower and things to be known/studied guide the quantitative methodology which prescribe fixed design which favors the more restrictive option.

Researcher(s) with in interpretivist paradigm is/are guided to employ observation, in-depth interview, and group

discussion in the course of data collection and non-numerical data analysis technique, while, researcher(s) with in the positivist paradigm is/are guided to employ questionnaire, tests, inventories, and checklist in the course of data collection and numerical/statistical data analysis technique.

CONCLUSION

Social science research is complex, diverse and pluralistic. Owing to this, the way research is conducted, its goals and its basic assumptions vary significantly. The two major and most popular forms of research are qualitative methodology, which is grounded on interpretivist paradigm and quantitative methodology, which is grounded on positivist paradigm. These methodologies guide the works of the vast majority of researchers in the social science. Hence, researchers should have a clear understanding of the philosophical argument guiding their research study.

Researchers have their own different worldviews about the nature of knowledge and reality based on their own philosophical orientation (Cohen, et al. 2000). In any research endeavor, linking research and philosophical traditions or schools of thought helps clarify a researcher's theoretical frameworks (Cohen, et al. 2000). In the social sciences there are a number of general frameworks for doing research. They involve assumptions and beliefs on several different levels, from philosophical positions about the nature of the world and how humans can better understand the world they live in to assumptions about the proper relationships between social science research and professional practice. The framework for any research includes beliefs about the nature of reality and humanity (ontology), the theory of

knowledge that informs the research (epistemology), and how that knowledge may be gained (methodology) that brought about differences in the type of research methodologies used in social science research.

Quantitative methodology is concerned with attempts to quantify social phenomena and collect and analyze numerical data, and focus on the links among a smaller number of attributes across many cases. Qualitative methodology, on the other hand, is more concerned with understanding the meaning of social phenomena and focus on links among a larger number of attributes across relatively few cases.

The main intention of this paper is not to extend the current and long-lasting debate regarding qualitative versus quantitative research in social science research, rather to describe and reflect on the philosophical stance guiding the two research methodologies from Ontological, Epistemological and Methodological Perspective so that the audiences (teachers, students etc) can have a full range of understanding surrounding the topic of research methodology and the theory of how inquiry should proceed. My sense is to enable, professionals with little or no previous experience of the various research methodologies in social science arena and falling in to the trap that one research is better than the other, gain a basic understanding of qualitative and quantitative research. As has been stated in the body of this paper neither is better than the other research methodology. Rather they are just different and both have their relative strengths and weaknesses.

It is argued that no one research methodology is better or worse than the other as both are proven to be useful in most research endeavors (Cohen, Manion

& Morrison, 2000; Silverman, 1997) , what is critical is the selection of the appropriate research methodology for an inquiry at hand. In the same vein Neuman (2003) argues that there is no single, absolutely correct methodology to social science research” but rather the methodologies represent different ways of looking at the world – ways to observe, measure and understand social reality. Correspondingly, Merriman (1998) argues that getting started on a research project begins with examining your own orientation to basic tenets about the nature of reality, the purpose of doing research, and the type of knowledge that can be produced. Given these description, it can be summed up that the selection of research methodologies depends on *fitness for purpose*. According to Creswell (2003) the selection of an appropriate research methodology requires several considerations - firstly, the research problem will often indicate a specific research methodology to be used in the inquiry; secondly the researcher’s own experiences, training, and worldview; and thirdly the audience to whom the research is to be reported.

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