

QUANTITATIVE AND QUALITATIVE RESEARCH METHODS: SOME STRENGTHS AND WEAKNESSES

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Abstract *Rencana ini membincangkan kedua-dua kaedah penyelidikan iaitu kaedah kuantitatif dan kaedah kualitatif. Tumpuan perbincangan lebih kepada kekuatan yang dimiliki oleh kedua-dua kaedah dalam mencapai matlamat penyelidikan iaitu pengumpulan sebanyak mungkin data penyelidikan. Kaedah "triangulasi" yang merupakan gabungan kedua-dua kaedah penyelidikan di atas dan politik dalam penyelidikan pendidikan turut diberikan perhatian.*

INTRODUCTION

Educational research has made wide contributions to educational policies, principles of teaching and learning, curriculum, classroom instructions etc. Several methods have been used. It can be categorised broadly as quantitative and qualitative. The purpose of both methods is to gather data to achieve the purpose of the research. The two methods are not exclusive of each other. They can be used either separately or in co-operation. This article discusses both categories of research methods i.e. the quantitative and the qualitative, their historical background, a few examples of each method, and their relative strengths and weaknesses. Finally, the triangulation method are suggested. It concludes by looking at how these methods can be effectively used to give up a complete whole picture of issues raised in education.

QUANTITATIVE RESEARCH

The main purpose of quantitative research, according to Borg and Gall (1989), is the detection of causal relationships between variables. In quantitative research information of observed behaviours of samples is obtained through statistical data collecting of the observed behaviours of the samples. The data, which are collected, are analysed in numerical form (Borg and Gall, 1989; Gall et al., 1996). This type of research is more concerned with the objectivity and the validity of what has been observed. The sample size involved is usually large (Babbie, 1989; Bogdan and Biklen, 1989).

Certain techniques are employed to gather data. These include interviews, questionnaires or experimental research. Such data can be gathered either in a quantitative or qualitative way (Smith et al., 1994). In addition, the data, for example an interview transcript can be analysed in either way (Smith et al., 1994). One important feature of quantitative research is that the process of data collection can combine both descriptive and analytical summaries (Smith et al., 1994). The aim of most quantitative research is to test hypotheses and theory. Alternative explanations of results are offered and the need for further studies are often provoked and challenged (Borg and Gall, 1989).

Generally, quantitative research involves systematic measurement, experimental and quasi-experimental methods, statistical analysis and mathematical models (Linn, 1986, p.92). Quantitative research is structured, logical, measured and carried out on a wider scale than qualitative research which is more intuitive, subjective and carried out in a more intense manner on fewer subjects. Therefore, as Bouma and Atkinson (1995, p. 208) state: "Some subjects are best investigated using the quantitative approach whilst for others, qualitative approaches will give better results. However in some cases both methods can be used."

Survey Method

The survey method is the most frequently used type of self-research report (Gay, 1987). It provides an opportunity for the researcher to collect data from a population in order to determine the current status of that population with respect to one or more variables. It has been used in many fields such as in political science, education and economics.

The survey method is a constructive research methodology and can be considered as a systematic data collection tool used in large scale investigations (Borg and Gall, 1989; Smith et al., 1994). Survey instruments include questionnaires and the individual interview. Information collected by such methods are often quantifiable (Borg and Gall, 1989). In conducting a survey, several tools can be used either alone, in combination or triangulation. The most common tools used in survey research are the mailed questionnaire, face-to-face interview, and telephone interview (Gay, 1987). Other methods that can be used to collect survey information include the records of examinations.

Whatever tools are used, the main purpose of survey research is to obtain standard information from all subjects in the sample in order to generalise the findings (Gall et al., 1996).

type of survey and data analysis

There are two types of survey outlined by Borg and Gall (1989). They are the cross-sectional survey and the longitudinal survey. In the cross-sectional survey data are collected from a sample from a predetermined population (Borg and Gall, 1989). The information is collected at one point in time although the actual time required to complete may take more than a day or a month. Generally, it can be analysed in two ways, i.e. descriptions of single variables and exploration of relationships.

In the description of single variables, the data reflect the result of the total sample distributed which may include many alternative responses in a single questionnaire. In the second type, the survey is used to explore relationships between two or more variables (Borg and Gall, 1989). Questionnaire items may refer to past, present and future phenomena.

In the longitudinal survey, data are collected at different points in time (Borg and Gall, 1989). The purpose of this is to enable changes or time-ordered associations to be studied. While the cross-sectional study is limited by time factors, the longitudinal survey is not. As a result, the data are not distorted by faulty recollection of the respondents (Borg and Gall, 1989).

questionnaire

Most data in quantitative research can be obtained by the questionnaire (Smith et al., 1994). The questionnaire is often used large scale surveys as it requires less time and is less expensive (Gay, 1987). Although questionnaires are usually mailed, they can also be personally administered.

In designing a questionnaire the first step is to define the problem and list the specific objectives to be achieved or hypotheses to be tested by the questionnaire. It is important to bear in mind the methods of data analysis that will be used in analysing the returned questionnaires designing the questionnaire (Borg and Gall, 1989).

The second step is identifying the sample. It is important that appropriate subjects who have the information and who are willing to give the information be included (Borg and Gall, 1989). However, there are some cases where the questionnaires need to be sent to groups who do not have the desired information, but most questionnaire studies conducted in education are aimed at specific professional groups or authorities (Borg and Gall, 1989).

The advantages of the questionnaire especially the mailed questionnaire, is it's lower cost and the speed of dissemination and collection (Gay, 1987; Borg and Gall, 1989). It can also cover a very much wider geographic area compared to other tools such as the interview or experimental research. In fact, the personally administered questionnaire has the same advantages as the use of an interview. It enables the establishment of a good rapport with respondents, to explain the purpose of study and to clarify items (Gay, 1987). It allows a large number of subjects to be sampled. It only requires the subjects to be literate and understand the questions (Kathwohl, 1993). The questionnaire has been widely used in quantitative research because its standardised, highly structured design is compatible with the quantitative approach. They are simple to use and analyse but on the other hand, the design is by no means simple. The main decisions to be made when designing a questionnaire are the type of questions to be included and the overall format of the questionnaire.

The questionnaire, however, does not allow respondents' opinion and feelings to be expressed freely. Another disadvantage is that once the questionnaires have been distributed it is impossible to modify the items, even though they may be unclear to some respondents (Oppenheim, 1992; Borg and Gall, 1989). Any ambiguities cannot then be clarified. Therefore, items should be carefully paraphrased and partitioned so that the response is definite and no confusion as to meaning of response is possible.

A serious problem in questionnaire is non response (Kathwohl, 1993). Since it involves a large sample who are usually volunteers, the researcher has no power to force them to return the questionnaire even though self-addressed envelopes with stamps affixed are used. Sometimes the return may be delayed (Bryman, 1989).

QUALITATIVE RESEARCH

The qualitative research model was developed primarily in social science research. It involves a particular philosophy and a strategy to boot. This type of research embraces naturalistic, ethnographic, participant observational, case studies and, subjective or

postpositivist studies. Although each possesses a slightly different approach, they are similar in certain respects although varying from user to user and from time to time (Bogdan and Biklen, 1982; Borg and Gall, 1989). According to Denzin and Lincoln (1994) qualitative research is "multimethod in its focus involving an interpretative, naturalistic approach to its subject matter. This means that the qualitative researcher studies things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them." (Denzin and Lincoln, 1994, p. 2). Maanen (1983) in Borg and Gall (1989), defined the qualitative method as "an array of interpretative techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world" (Maanen, 1983, p. 9).

A qualitative researcher is a 'first informer' (Bogdan and Binklen, 1982) who obtains information by collecting primarily verbal data by means of intensive case studies and then analyses the data. This is one reason why qualitative research is much more difficult to undertake because the researcher himself/herself is the main tool for collecting data (Borg and Gall, 1989).

Qualitative researchers also avoid going into a study to test specific questions or hypotheses (Bogdan and Binklen, 1982; Borg and Gall, 1989). Instead, they believe that finding the answers to questions should be one of the products of data collection rather than setting out to prove an assumption. The research can be structured through the study itself not through the presentation of any preconceived ideas or precise research design.

Because qualitative researchers are themselves a primary instrument in data collection, they rely partly or entirely on their feelings, impressions and judgement in data collecting (Borg and Gall, 1989; Bogdan and Binklen, 1982). They also rely heavily on their own interpretations in understanding the meaning of their data. Findings are often reported in the form of verbal descriptions rather than in the form of quantitative summaries as in statistical analysis.

This type of research, according to Borg and Gall (1989), promotes close interaction with the respondents. The data arising out of these interactions is in the form of what people reveal to the researcher and the researcher's impressions. Such "collaborative inquiry" labelled by Torbert (1981) can improve the validity and usefulness of the findings. This is because most of the phenomena that interest the researchers are internal events such as perceptions and feelings rather than overt behaviour.

Qualitative researchers based their research on the assumption that the social environment is transitory (Borg and Gall, 1989). They therefore develop knowledge by collecting primary verbal data through intensive cases studies and subjecting these data to analytical inductions.

Qualitative researchers use the natural setting as a direct source of data of which they are the key instruments (Bogdan and Binklen, 1982). They will go to the particular setting to assess the context, because they believe and assume that the setting influences human behaviour in which it occurs and has therefore to be observed.

Results are presented in a descriptive way (Bogdan and Biklen, 1982). These may be in the form of quotations to illustrate and support the presentation, for instance, interview transcripts, field notes, videotapes, personal document etc. All the findings will be analysed as close as possible to the form from which it was recorded or transcribed. Although everything is seen as a useful aid to a comprehensive assessment (Bogdan and Binklen, 1982) only a small amount of data will eventually be used. What is finally presented in the research report is "barely the tip of the iceberg in that field and transcript extracts are chosen as being representative and illustrative of action that was frequently observed" (Salisbury, 1986, p. 23).

In qualitative research emphasis is placed on the process (Bogdan and Binklen, 1982) and no hypothesis is made and tested. Strategies employed suggest how the expectations are translated into daily activities and are activated to discover why and how such situations occur.

Qualitative researchers are more likely to study the individual case (Borg and Gall, 1989) because each individual, class, culture or society is likely to have an idiosyncratic set of value, feelings and beliefs that can only be discovered through intensive study of that individual, school or class.

According to Bouma and Atkinson (1995) the essence of qualitative research is to view events through the perspective of the people who are being studied; the way they think, and their view of the world etc. Qualitative research requires the researcher to empathise with the people being studied.

Therefore qualitative research necessarily includes a longitudinal element as the subjects of the study are studied over a period of time and the emphasis is on the process of how things happen and change. Qualitative researchers typically provide detailed descriptions of the settings they investigate (Bogdan and Binklen, 1982).

This type of research is relatively unstructured. Because it is so open ended, the investigator often does not decide in advance precisely what is to be investigated. This open approach allows the researcher to investigate unexpected topic which may only become apparent after an investigation has begun. Qualitative researchers often reject the formulation of theories until after they have started the investigation.

In summary, qualitative research refers to any social science study that produces results that are not obtained by statistical procedures or other methods of quantification. Although some of the data may be quantified, the analysis is generally qualitative. It can refer to research regarding people's lives, their stories, and behaviour and it can also be used to examine organisations, relationships and social movements. Research done in this way produces descriptive data such as people's own spoken or written words or observable behaviour. The methods used by qualitative researchers include: participant observation, unstructured interviews, life histories.

Ethnographic Method

One research method, which has been classified as qualitative research, is ethnography. Ethnographic methods of research have been introduced and used extensively by

anthropologists for many years. Although it is a new method in the educational field, the importance of this method has attracted many educational researchers. It provides an in-depth and analytical description of an intact culture scene (Borg and Gall, 1989).

In this method the researcher tries to immerse one self in a setting and to become part of the group, in order to understand the meanings and significance that people put upon their behaviour and that of others (Smith et al., 1994). Everything that happens in the setting will be observed continuously and researchers will try their best to record it virtually as it exists. Data will be collected from many variables over an extended period of time. According to Gay (1987), the variables being investigated are studied where they naturally occur, and are not under any environmental control of the researcher.

In education, the setting is usually on a small scale such as in a classroom or even a school. The reason for this is that the educational organisation has a very large influence on the behaviour of the people in it such as pupils, teachers and headmasters/headmistresses. The ethnographer works by observing many aspects of the learning environment to identify factors associated with effective and/or ineffective environments (Fienberg, 1979). Ethnography is a method of research based on the belief that behaviour is significantly influenced by the environment in which it occurs. "...if we wish to generalise our findings to real-world settings, the findings should be derived from research conducted in a real-world setting" (Gay, 1987, p. 121).

To conduct the study, the ethnographer first plans the research studies, defines and refines the research problem, which interests them, and finds the most appropriate environment or setting of study and effective level of participant. Their purpose is not to test any hypothesis. Attempts will be made to derive specific, testable hypotheses that explain the observed behaviour (Gay, 1987; Borg and Gall, 1989; Gall et al., 1996).

Participant observation, and/or non-participant observation can be used in this type of research (Gay, 1987; Borg and Gall, 1989). According to Gay (1987), ethnographic studies are characterised by some kind of participant observation at an overt level. In collecting the data, the ethnographer uses a variety of strategies in conjunction with observation, both verbal and non-verbal (Pelto and Pelto, 1978). Verbal strategies include the interview, both structured and unstructured, in which there is interaction between researcher and subjects in order to get the necessary data. Non-verbal strategies, include for instance, tape recorders, field notes, and diaries which according to Gay (1987), are less obstructive and less likely to affect the behaviour being studied.

Participant Observation

This is one of the main techniques used in ethnographical research (Skager and Weirberg, 1971). In this type of research the researcher's investigations are flexible and the details of the approach are often modified as the research proceeds. According to Robson (1995) the reason for this is that the researcher who starts the investigation with a specific hypothesis may impart misconceptions into the setting. However, the participants define the setting and their view cannot be known until the investigation begins (Bogdan and Biklen, 1983; Walker, 1985; Gay, 1987). The observer becomes a part of the field in which the subjects are observed so that they can provide a view from the inside because the view from within

may be very different from the view from with out (Gay, 1987; Bouma and Atkinson, 1995).

The role of the observer is not easy. There are certain degrees of participant observation depending on the purpose of the study. Observation may be covert and overt (Gay, 1987; Smith et al., 1994). The overt situation, according to Gay (1987), is one where the observer is present and permission of the subject is sought. In contrast, the covert observation is where the subjects do not know the researcher's presence. In this situation, the degree of participant involvement is greater.

Researchers who want to use this kind of research have to be well prepared and well trained before starting the investigation (Gay, 1987). Much reading and knowledge is needed as a preparation in order to be able to perceive and respond to the events discovered in the investigations. In choosing the site of study, Bouma and Atkinson (1995) suggested that if there is a choice, researchers should choose a site where the subjects are strangers because knowing beforehand the people to be investigated can influence their behaviour and response. It is better to investigate a setting where the researcher has no particular expertise because then there is an unbiased intention to evaluate the individual, service or performance rather than to seek to understand and describe what is happening (Bouma and Atkinson, 1995).

Participant observation especially covert observation may provide valid findings and useful data (Gay, 1987) as it provides an accurate measurement and assessment of immediate experience in terms of settings and events happening or occurring.

According to Robson (1995) participant observation is the most appropriate technique for gaining access to real life situations. Furthermore, it has a lack of artificiality compared to other techniques and a high potential for providing insight (Gay, 1987). The possibility of obtaining good reliability and validity is higher especially in formal observations (Robson 1995).

The length of time spends in the observations helps to establish a more intimate and informal relationship between the observer and the informant (Cohen and Manion, 1989). The more the time spent, the more data can be gathered and more information gained. The behaviour of the participant will be its usual normal self.

Some researchers have questioned the validity of information and data obtained in this way (Skager and Weinberg, 1971; Gay, 1987). Participant observation has often been criticised as being subjective, biased, impressionistic, idiosyncratic and lacking quantifiable measurement (Cohen and Manion, 1989). Observing people, especially without their knowledge requires ethical standard of behaviour especially when recording their words and behaviour (Gay, 1987; Borg and Gall, 1989; Robson, 1995). The setting and behaviour of the participant may also affect by the presence of the observer (Borg and Gall, 1989). The greater the observer's participation the greater the observation may be biased (Gay, 1987; Robson, 1995).

The observation method is also more time consuming when compared to other methods of data collecting (Borg and Gall, 1989; Gall et al., 1996). More time has to spent in the field to get the information from informants and all the activities and behaviour occurring have

to be recorded. Time also has to be spent in analysing the data (Borgdan and Binklen, 1982).

When people are used as an instrument, allowance must be made for some bias (Cohen and Manion, 1989; Robson, 1995). Attention may be given to some aspects of the surroundings rather than others. Personal factors such as interest, experiences, expectations, knowledge etc. may influence the observation. The possibility of becoming emotionally involved with the study and the group members is higher in participant observation (Skager and Weinberg, 1971). This can detract from the objectivity of the study.

Non Participant Observation

In this kind of observation the researcher is not directly involved in the situation to be observed (Gay, 1987; Borg and Gall, 1989). The observer looks in from the outside and does not interact with the subjects. Gay (1987) divided this kind of observation into: naturalistic observation and simulation observation. One example of naturalistic observation, is that used by Piaget in his study of cognitive development in children. In his study, certain kinds of behaviour development regarding cognitive theory were observed without any control or interference with the subjects. Normal behaviour, which occurred during the observation, was studied and recorded. Other examples of natural observation included pupils' behaviour at the canteen during recess time and teachers' behaviour during meetings, etc.

Cohen and Manion (1989) suggested that the best way to be a non-participant observer was to sit at the back of the classroom and record things as they occur. But the presence of the observer often changes the situation being observed (Gall et al., 1996). Furthermore, observational data might only be partly observed due to absence or distraction on the part of the observer (Gall et al., 1996). Although reliability and validity are high it might lose its complexity and completeness because it is hard for the informants to give accurate information and act in the same manner all the time (Robson, 1995).

In some cases it is hard to be objective especially if the observer already has pre knowledge of the informants' way of life (Robson, 1995). Although trust can be easily developed with the informants, there may be difficulties in gaining respect from other members of the group when confronted with an observer's role. Consequently behaviours and actions may become artificial and hesitant. In the educational setting such as schools where the hierarchical structure is vital, a more senior member of staff may resent being observed or questioned by a more junior member (Robson, 1995).

Interview

The interview is a commonly used technique in quantitative and qualitative research. It is used to gather data and to develop hypotheses through communication (Cohen and Manion, 1989). Cannell and Khan (1968) defined the research interview as 'a two-person conversation initiated by the interviewer for the specific purpose of gaining relevant information. It focuses on the content specified by the research objectives and a direct verbal interaction between the researcher and the informant. It is an oral exchange between individuals and a response may be limited in a single word or it may require a lengthy oral discussion.

Cohen and Manion (1987) outlined three purposes of the interview. First, the interview enables the respondents to express themselves their feelings, likes and dislikes, and their belief. The second purpose of the research interview is to test the hypotheses of new ideas put forward by the researcher and to identify variables and relationships between them. Finally, the interview may be used together with other research methods as a follow-up to unexpected results, to test the validity of other methods or to go deeper into the motivation of respondents and their reasons for acting as they do (Kerlinger, 1970).

According to Cohen and Manion (1987) the four kinds of interview used specifically as research tools are: the structured interview, the unstructured interview; the non-directive interview and the focused interview. For the purpose of educational research usually only the first two are used. The structured interview is one in which the content and procedures are already organised, and the sequence planned. The wordings of the questions are determined by means of schedule, and the interviewer has little freedom to make modifications (Cohen and Manion, 1987). The **structured interview** involves a series of closed-form questions and there are no follow-ups to the answers to obtain greater depth.

In contrast, the unstructured interview is more open allowing both researcher and subject greater flexibility and freedom although the researcher has control over the research purpose, the question, content sequence and wording (Kerlinger, 1970). This type of interview is more casual but planned. The purpose is to establish a good rapport between the informant and the interviewer following a structured format. In the **semi-structured** interview, the researcher as an interviewer asks carefully worded questions and probes more deeply using open- form questions. The purpose is to obtain more in-depth information. Finally, unstructured interview does not involve any detailed guideline. Questions are asked which lead the respondents to give the desired information. It is highly subjective and time-consuming (Borg and Gall, 1989).

Different types of interviews are used depending on the purpose and interest of the researcher. Three major types of interview that have been developed for a particular purpose and context of research are: key informant interviews, survey interviews and group interviews (Borg et al., 1996).

Survey interviews are used to supplement data that have been collected by other methods of research. Goetz and LeCoupte (1984) described three methods of survey interview: the confirmation survey interview, participant construct interview and project technique. The confirmation survey interview is a structured interview, which confirms the earlier findings. It may be useful in large-scale questionnaire studies in which in-depth interviews cannot be carried out because of the large number of respondents or geographical barriers. The participant construct interview is used to gain information regarding the physical structure and social world of the participant. The project technique uses ambiguous stimuli to elicit subconscious perceptions that cannot be observed in a natural setting (Borg and Gall, 1989).

Group interviews involve a group of individuals who have been assembled for the specific purpose of research, and questions are addressed to them at the same time and place.

The major advantage of the interviews is their adaptability. A skilled interviewer can follow up a respondent's answer to obtain more information and clarify vague statements (Borg et al., 1996). Because subjects can establish rapport and trust with the interviewer, all questions can be more clearly explained to promote interest and encourage response. This makes it possible to obtain information that the individual probably would not otherwise have provided (Borg et al., 1996).

However, these advantages are offset by certain limitations. It is difficult to standardise the interview situation so that the interviewer does not influence the respondents to answer questions in a certain way (Borg et al., 1996). Interviews cannot provide anonymity for the respondents. The respondents must reveal their identity to the interviewer, although the interviewer can analyse and report the interview data so that the identity of the participants is not revealed (Borg et al., 1996).

Each method discussed above has its own strength and weakness and are not necessarily exclusive of each other. Each can be used either separately or in conjunction with others. According to Robson (1995), in almost all cases answers to research questions can be sought out by using more than one method. Meanwhile, Babbie (1989) referring to a study by McRay (1981) stated that the best research is that which uses both quantitative and qualitative methods.

TRIANGULATION

Triangulation is the process of using more than one source to confirm information and data from different sources and different methods of data collections, and to confirm observations from different observers (Krathwohl, 1993, p. 329). Triangulation has the advantage of giving the study higher validity, accuracy and reliability (Abrahamson, 1983; Borg and Gall, 1989; Cohen and Manion, 1989; Smith et al., 1994; Gall et al., 1996) and affirms the credibility of the data collected (Babbie, 1989).

As Babbie (1989) has pointed out that there is no one foolproof method. In fact, there has been a trend in educational research recently to use both methods in data collection and analysis. Robson (1995) in fact supported this by saying that using more than one method can contribute substantial advantages. Triangulation is not an end itself; it is an imaginative way of maximising the amount of data collected (Todd, 1979).

Which Methods for Educational Research?

The scientific paradigm has very successfully dominated social inquiry of the last half century. This early dominance in the social sciences was established by the quantitative approach using large-scale survey techniques and the term measurement became central to the survey and experimental traditions. This sort of tradition, reflected in the quantitative indices such as intelligence tests, attitude measurements and systematic interaction observation schedules, celebrated the scientific paradigm of inquiry. It is concerned with generalising to a wider population.

Quantitative methods of inquiry emphasise the use of the following strategies: survey questionnaires, structured interviews and statistical procedures of analysis as their forte. It followed the general ground rules for the validity of scientific propositions: adoption of research design, hypotheses, controlled comparison and collecting data, process of the data,

statistical analysis for significance and testing the hypotheses. These kinds of research methods were in much demand by the policy makers who believed in the power of the quantitative data for policy-making decisions (MacDonald and Walker, in Hamilton et. al., 1977: 81).

Stake (1967) labelled this methodology as formal evaluation lending itself to checklists, structured visitation by peers, controlled comparison and standardised testing. In their zeal to establish the superiority and virtues of the methodology, the proponents had termed it as a hard, objective and rigorous approach with a high level of generalisability at the analysis level. Essentially the kind of scientific inquiry is for the collection of particular kinds of data with particular specification and with specific aims in mind, in most cases anchored firmly on the pre-test post-test, product oriented design.

Qualitative methods on the other hand, emphasise a wide range of strategies that involve fieldwork, field research, ethnography, case study, participant observation, semi-structured and unstructured open-ended interviews and interpretive procedures.

The qualitative evaluators were quick to point out to the inadequencies of the hypothetico-deductive methodology that characterised the experimental traditions of the quantitative methods. This group of educational researchers, for example, Lacey and Gluckman, rooted in the social anthropology traditions say that the educational problems and processes are more complex that can be catered for through the confines of the agricultural-botany paradigm. Here, the researcher is more concerned with reactions, theories, assumptions and events instead of thinking in terms of parameters, factors and variables.

The versatility of the qualitative approach as exemplified in the participant observation, semi-structured interview techniques allows for the observation of an event, the events that precede and follow it and the explanations of its meaning by participants and spectators before, during and after its occurrence (Sieber, 1977). This approach is interested in providing a deeper understanding of the characteristics of the totality of a single situation (Vulliamy et. al., 1990:12).

In opting for a strong qualitative tradition, J. Finch asserts the "Quantitative work can only document correlations but itself cannot account for them" (Finch, 1985:114). Barry MacDonald and Rob Walker too agree, "Experimental methods and numerical analysis cannot adequately answer some of the questions raised" (in Hamilton et. al.(ed), 1977). "Such questions are directed at the experience of participants and at the nature and variety of transactions which characterise the learning milieu of the programme" (ibid, 181).

In spite of these positive statements, the qualitative approach has often been referred to as soft, non-rigorous and subjective (Burgees, 1985:3). As state earlier, the qualitative approach entails a combination of methods mostly interacting with subjects of the study using any or a combination of these techniques: observation; formal and informal interviewing; some systematic counting; some collection of documents and artefacts and open-endedness in the direction the study takes (McCall and Simons, 1969:1).

Stake (1967:523) designates the term 'informal evaluation' to the qualitative tradition. He attributes the following characteristics to this type of evaluation. It is dependent upon

casual observation, implicit goals, initiative norms and subjective judgment; often of valuable quality-sometimes penetrating and insightful, sometimes superficial and distorted.

Sieber (1973) argues that the historical antagonism between these two methods prevented the recognition of the strengths in either of these two groups and capitalising on them for the benefit and richness of the research results. But authorities like Trow and Zelditch (McCall and Simmons, 1969:5-19; 332-337) set the mood for a reconciliation and mediation. Trow, in particular, pointed out that no single technique can claim monopoly on the plausibility of inference. Some methods are appropriate for a particular research problem; he asserts the problem under investigation properly dictates the method of investigation. Zelditch, in particular, says that the researchers must ask themselves some pertinent questions. What kinds of methods are relevant for the particular topic under investigations? What kinds of information are relevant? How can the methods be evaluated? The suitability of the methods can be determined by the criteria of 'efficiency' and 'informational adequacy' of the particular methods used in gathering data (see also Vulliamy et.al., 1990: 10).

Sieber (1973) not only says that methods should be used alongside each other but should be integrated in the course of a research project. Depending on the informational needs of the research, we can employ the different techniques to a great advantage. Where methods are non-interchangeable, each method can be greatly strengthened by appealing to the unique qualities of the other method. This is so because each method has its inherent strength unmatched by other techniques. So the integration of the research techniques within a single project opens up enormous opportunities for mutual advantages in the three major phases of a research i.e. design, data collection and analysis. According to Sieber (1973), the researcher should ask which sets of methods will be best for the research problem instead of looking for the "best" method.

With the mediation between advocates of survey research and field methods, a new school researchers was spawned using both the techniques and seeing that there is a little bit of both in any study.

Observation, interviews, questionnaires, documentary analysis and so on are "neither inherently qualitative nor quantitative. All quantification involves judgements as qualities and all qualitative statements invoke hierarchy, number and amount to give shape to meaning" (Burgees, 1985: 290).

The whole question of appeasement between the two methodologies is best summarised by Lacey in a working paper examining the relationship between the case studies and theory. He says: "The traditional enemy 'quantitative research' is no longer a polarised opposition. In some areas of research, its false claims are vanquished and in others it is seen to be complementary: an ally not an enemy."

Parlett and Dearden (1977) sum up succinctly the resolution of the quantitative-qualitative conflict. They say, "the myth of an entirely neutral researcher has probably seen its day." Illuminative evaluation, which uses both quantitative and qualitative methods and data, can contribute towards advancing the understanding of educational affairs in a more realistic way. Each approach has something to offer to the understanding of the school system and a

combination of strategies could well put an end to the false claims of superiority of either of the modes of data collection and interpretation.

CONCLUSION

Thus, no one-research method can offer an objective, clear understanding an insight to a problem. A judicious use of strategies from both the methodologies can provide the most insight to the research questions. Researchers at the same time should be mindful of the limitations of each methodology and use strategies to minimise the contamination.

In the final analysis, it is possible to mix methods without being limited or inhibited by the researcher's allegiance to either the positivist or the interpretivist stance. An eclectic approach of combining both types of reporting the findings could provide an acceptable answer. Qualitative data is presented in the form of measurement and prediction. The qualitative data is used to describe various situations. In a sense it is a fusion of the styles and techniques from both the quantitative and qualitative methods of inquiry and reporting. The main determinants of the methods should be the logical relationship between the chosen field of study and the formulation of the research questions and the choice of appropriate research techniques to explore the questions.

An important element in any research is the selection of research methods that best provide an answer the problem that is examined. We need not always use the pure forms of any of the research methods. The constraints of time and resources would not, in some circumstances, permit the researcher to adopt a research methodology in its pure form. Rather, the strategies that are found to be useful, efficient and informative have to be adopted to provide the information and perspectives for the issues and concerns at hand. The method and strategies should in effect complement and supplement one another to inform and clarify issues. It must provide an opportunity to integrate the methods and information to present a composite picture.

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