

# Can Findings of Qualitative Research in Education be Generalized?

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**Abstract.** Most qualitative researchers do not recommend generalization from qualitative studies, as this research is not based on random samples and statistical controls. The objective of this study is to explore the degree to which in-service teachers understand the controversial aspects of generalization in both qualitative and quantitative educational research and as to how this can facilitate problems faced by the teachers in the classroom. The study is based on 83 participants who had registered for a 10-week course on ‘Methodology of Investigation in Education’ as part of their Master’s degree program. The course is based on 11 readings drawing on a philosophy of science perspective (positivism, constructivism, Popper, Kuhn, Lakatos). Course activities included written reports, class room discussions based on participants’ presentations, and written exams. Based on the results obtained it is concluded: (1) almost 91% of the teachers agreed that external generalization in a different social context is feasible; (2) almost 63% of the participants used a fairly inconsistent approach, that is in a theoretical context agreed that qualitative research cannot be generalized and still when asked with respect to the experience of two particular teachers, agreed that generalization was possible; (3) almost 28% of the participants used a consistent approach. Some of the reasons provided by the participants as to why generalization was feasible are discussed. An analogy is drawn with respect to Piaget’s methodology, viz., it was not based on random samples or statistical treatments and still his *oeuvre* has been generalized (criticisms notwithstanding) in both the psychology and educational literature.

**Key words:** Educational research, generalization, Philosophy of science, Qualitative and quantitative research methods.

## 1. Introduction

It is generally accepted by qualitative researchers that generalizability is neither desirable nor necessary; as such studies are not designed to allow systematic generalizations to some wider population. Freidson (1975) has expressed this dilemma in cogent terms: “There is more to truth or validity than statistical representativeness ... ” (p. 272). In a similar vein Guba and Lincoln (1989) have maintained, “Generalization, in the conventional paradigm, is absolute, at least when conditions for randomization and sampling are met” (p. 241). In spite of the difficulties of generalization

in qualitative research, Maxwell (1992) has clarified that, "This is not to argue that issues of sampling, representativeness, and generalizability are unimportant in qualitative research" (p. 293). Maxwell then goes on to differentiate between: (a) internal generalizability, viz., generalizing within the community, group, or institution studied to persons, events, and settings that were not directly observed or interviewed; and (b) external generalizability, viz., generalizing to other communities, groups or institutions. Nevertheless, Maxwell (1992) concedes that this differentiation of generalizability (internal/external) is not always helpful, "A researcher studying a school, for example, can rarely visit every classroom, or even gain information about these classrooms by other means, and the issue of whether to consider the generalizability of the account for those unstudied classrooms internal or external is moot" (p. 293). This, indeed, presents a dilemma for almost all researchers and teachers and has been the subject of considerable controversy in the literature (Eisner and Peshkin, 1990; Guba and Lincoln, 1994; Eisner, 1997, 1999; Husén, 1997; Niaz, 1997, 2004; Macbeth, 1998; Miller et al., 1998; Knapp, 1999; Denzin and Lincoln, 2000; Peshkin, 2000; Erickson and Gutierrez, 2002).

It appears that most qualitative researchers consider generalizability to be possible in quantitative research primarily due to the randomization of samples and the application of statistical techniques. In contrast, this study is based on the premise that reporting of data/results from both qualitative and quantitative research inevitably involves interpretation, which often leads to controversies, and hence the degree of generalizability cannot be predicted in advance but rather is determined by various complex variables. Philosophers of science have referred to this as the under determination of theory by evidence (cf. Duhem-Quine thesis; Quine, 1953; Kuhn, 1970; Lakatos, 1970). Progress in science has been witness to many such controversies, in which the same data has been interpreted differently by two scientists (cf. Holton, 1978; Niaz, 2000 for one episode in the history of science). Polanyi (1964) has expressed similar ideas eloquently:

Our vision of reality, to which our sense of scientific beauty responds, must suggest to us the kind of questions that it should be reasonable and interesting to explore. It should recommend the kind of conceptions and empirical relations that are intrinsically plausible and which should therefore be upheld, even when some evidence seems to contradict them, and tell us also, on the other hand, what empirical connections to reject as specious, even though there is evidence for them—evidence that we may as yet be unable to account for on any other assumptions (p. 135).

This shows how the plausibility of some conceptions (theory/generalization) can be upheld even if there is evidence to the contrary. In other

words, a community of researchers may decide to interpret empirical evidence in a particular way, even if there are alternative interpretations available. This suggests that even in qualitative research generalizability is possible, provided we are willing to grant that our conceptions/theories are not entirely grounded on evidence but rather on the degree to which the community can uphold such a consensus. Campbell (1988) has expressed this concern for objectivity on the one hand and the process of peer interaction on the other, in cogent terms:

The objectivity of physical science does not come from turning over the running of experiments to people who could not care less about the outcome, nor from having a separate staff to read the meters. It comes from a social process that can be called competitive cross-validation ... and from the fact that there are many independent decision makers capable of rerunning an experiment, at least in a theoretically essential form (p. 324).

This shows that in order to be scientific (in both social and the natural sciences) objectivity in the handling of data and statistical treatments do not necessarily provide a procedure (scientific method) that infallibly leads to research findings.

As an illustration of how qualitative research has been generalized extensively let us consider Piaget's work at the Center of Genetic Epistemology (Geneva). Most of the studies were based on very small samples with virtually no statistical treatments, and represent findings that were not repeated many times before being generalized. Vuyk (1981) has succinctly summarized Piaget's methodology, "... Piaget asks a very general epistemological question and then tries to translate it into an experimental situation" (p. 461). The degree to which Piaget's work has been generalized in science education bears witness to its acceptance (a critical appraisal notwithstanding) by the scientific community (cf. Shayer and Adey, 1981; Lawson, 1985; Eylon and Linn, 1988). Piaget's *oeuvre* has also been the subject of considerable controversy in the psychology literature. Nevertheless, a review of some of the most important critics shows that what was in discussion was not the lack of randomization of his samples nor adequate statistical techniques. According to Brainerd (1978), an important critic, Piaget's stages of cognitive development are perfectly acceptable as descriptions of behavior, but have no status as explanatory constructs (p. 180). Carey (1986) approves of most of Piaget's descriptive work and the argument seems to center on Piaget's (1985) interpretations, within his metatheory, "It is only when Piaget sought to further explain the differences between young children and adults in terms of domain-general limitations on the child's representational or computational abilities that

his interpretations have come under fire” (p. 1129). As to the difference between “descriptions” and “explanations” Pascual-Leone (1988) interprets the problem in an historical perspective by pointing out that what was a good explanation for a theory in the past, often becomes description for the theory superseding it. Niaz (1992) has demonstrated a “progressive problemshift” (Lakatos, 1970), that is increase in explanatory power in Pascual-Leone’s metasubject with respect to the epistemic subject in Piaget’s framework. This illustration from Piaget’s genetic epistemology shows how a researcher’s insight and acumen can facilitate generalizations that are later corroborated (even extended) by the research community.

The objective of this study is to explore the degree to which in-service teachers understand the controversial aspects of generalization in both qualitative and quantitative educational research and as to how this can facilitate problems faced by the teachers in the classroom.

## **2. Rationale and Design of the Study**

This study is based on 83 in-service teachers who had enrolled for the following required course: Methodology of Investigation in Education, as part of their Master’s degree program, at a major university in Venezuela. Of the 83 participants, 26 were Spanish teachers, 21 English as a second language, 17 chemistry, 9 mathematics, and 10 physics teachers. Age of the participants ranged from 25 to 45 years and the teaching experience ranged from 5 to 15 years (female = 54, male = 29, high-school teachers = 55, and university teachers = 28). Participants were divided into three groups (1–3), depending on their place of work and residence, and the same procedure was followed in all three. Almost all participants had seen a methodology course at the undergraduate level, based on texts, such as Kerlinger and Lee (2002). The main objective of the course was to go beyond and provide an opportunity to in-service teachers to familiarize with the controversial nature of progress in science (growth of knowledge) and its implications for research in education. Few participants had basic knowledge of the work of Popper, Kuhn, Lakatos, and other philosophers of science. Some participants had a basic understanding of constructivism but it was not grounded in any particular theoretical framework. Readings 6–8 led to considerable discussion with respect to social and other forms of constructivism.

### **2.1. COURSE CONTENT (READING LIST)**

The course was based on 11 required readings and was subdivided in the following sections:

*Epistemology*: (1) Montero (1992–1993); (2) Martínez (1993);  
*Methodology*: (3) Erickson (1986); (4) Martínez (1998); (5) Maxwell (1992);  
*Qualitative research*: (6) Brown (1994); (7) Tobin and LaMaster (1995);  
*Integrating qualitative and quantitative research*: (8) Glasson and Lalik (1993); (9) Cortéz and Niaz (1999).  
*Methodological and philosophical reflections*: (10) Niaz (1997); (11) Lincoln and Guba (2000).

The reading list shows how the course was designed explicitly not only to incorporate epistemological, philosophical, and methodological issues, but also alternative teaching strategies, and issues such as different forms of constructivism and generalizability of research findings. This aspect of the course facilitated exploration of alternative approaches to methodology, referred to as a “hybrid” design by Shulman (1986, p. 4).

## 2.2. COURSE ORGANIZATION AND ACTIVITIES

On the first day of class (2 hours) all participants were provided copies of all the readings and the salient features of the course were discussed. It was emphasized that the course called for active participation. As all the teachers worked in nearby schools and universities, two types of course activities were programmed:

- (a) Class discussions were planned on Saturdays of the 3rd, 5th and 7th week of the course (3 hours in the morning and three in the afternoon). Readings 1–4 were discussed in the first meeting, readings 5–8 in the second meeting, and readings 9–11 in the third meeting. Participants were supposed to have studied each of the readings before the respective meetings. Each meeting started off with various questions and comments by the participants. The instructor intervened to facilitate understanding of the issues involved (total time devoted to class discussions = 18 hours).
- (b) Class presentations were programmed during the 10th and the final week of the course (Monday–Saturday, total time = 44 hours). On the first day of class participants had formed groups of three or four and selected one of the 11 readings for their presentation. Each of the groups was assigned 2 hours (1 for presentation and the other for interventions and discussions). The presenters were supposed to moderate the discussions. The instructor intervened when a deadlock was reached on an issue. It was expected that the participants would present the important aspects of the readings, with the objective of generating critical discussions. All groups prepared overheads/video beams for the presentations.

### 2.3. EVALUATION

All participants presented an Initial exam in the first session of the 10th week and a final exam during the last session of the 10th week. Both exams were “open-book” (about 3 hours each) and participants were allowed to consult any material that they felt could be helpful. This study is based on participants’ responses to item 1 of the final exam, which consisted of the following research questions:

Consider the following questions with respect to research in education and you are asked to respond by indicating: (i) In agreement; (ii) In partial agreement; and (iii) In disagreement:

- (a) Qualitative research as a method can help us to solve all the problems in education.
- (b) Quantitative data cannot be used and much less its statistical treatment.
- (c) It is not necessary to establish the validity of research but rather its “authenticity” or in other words interpretative validity.
- (d) It is neither desirable nor necessary to generalize from results obtained in qualitative studies.
- (e) If the phenomena are observed directly (participant observation) greater is the “authenticity” or validity of the research.
- (f) Formulation of hypotheses, manipulation of variables, and the quest for causal relations do not help to solve problems.

Note: Please justify your response in each case.

This study deals with participants’ responses to research question (d), which is considered as:

### 2.4. RESEARCH QUESTION 1

Consider the following question with respect to research in education and you are asked to respond by indicating: (i) In agreement; (ii) In partial agreement; (iii) In disagreement:

It is neither desirable nor necessary to generalize from results obtained in qualitative studies.

### 2.5. RESEARCH QUESTION 2

This research question was based on item 3 of the final exam and stated:

Do you think that Sarah’s (Reading 7) experience based on social constructivism can be applied in the context of Venezuelan education? If your response is in the affirmative, would this require some changes? If your response is in the negative, please explain.

*Note:* Group 1 participants responded with respect to Sarah's experience. Group 2 participants responded with respect to Sarah and Martha's experience, and Group 3 participants responded with respect to Martha's (Reading 8) experience.

## 2.6. RATIONALE FOR RESEARCH QUESTIONS 1 AND 2

The objective of Research Question 1 was to make participants aware of the controversial nature of generalization in educational research. Erickson (Reading 3), Martínez (Reading 4), Maxwell (Reading 5), Lincoln and Guba (Reading 11) explicitly deal with this issue and provide reasons, arguments, and justifications for and against the use of generalization in educational research. On the other hand, the objective of Research Question 2 was to observe participants' responses to a contradictory/conflicting situation, based on actual classroom practice in which two teachers (Sarah & Martha, in USA) based on their social constructivist framework, adopt different teaching strategies. Sarah a teacher in Reading 7 (Tobin and LaMaster, 1995) facilitated the construction of a new metaphor, "a window into the mind of the student". This metaphor implies that the students be evaluated according to what they have learnt and not what they should have learnt. In contrast, Martha a teacher in Reading 8 (Glasson and Lalik, 1993) through her experience reached the conclusion that evaluation must include questions that only the very bright students could answer. During classroom discussions, it was observed that some teachers favored Sarah's strategy, whereas others favored Martha's. Based on this, Research Question 2 provided three alternatives: Group 1 was asked to consider generalization based on Sarah's experience, Group 2 based on both Sarah and Martha, and Group 3 based on Martha. The idea behind this was to see if a particular experience (Sarah/Martha) had an incidence on the degree to which participants supported generalization. It was expected that in order to be consistent, those participants who would agree to Research Question 1, would preferably disagree to Research Question 2, or vice versa.

## 3. Results and Discussion

Table I shows that 91% (Categories 1, 3, and 5) of the participants agreed to Research Question 2, which means that the experiences of Sarah and Martha based on social constructivism could be generalized in the context of Venezuelan education. Difference in the performance of Groups 1–3 was statistically (Chi-square) not significant, which means that all three groups accepted generalization to about the same extent. This finding is interesting as during class discussions participants became fully aware of the

*Table I.* Categorization of participants' responses to research questions in the study ( $n = 83$ )

Category no	Response to		Number of participants			
	Research question 1	Research question 2	Group 1 ( $n = 23$ )	Group 2 ( $n = 27$ )	Group 3 ( $n = 33$ )	Total (%)
1.	Agreed	Agreed	7	11	16	34 (41%)
2.	Agreed	Disagreed	2	—	—	2 ( 2%)
3.	Partially Agreed	Agreed	3	9	6	18 (22%)
4.	Partially Agreed	Disagreed	1	1	2	4 ( 5%)
5.	Disagreed	Agreed	8	6	9	23 (28%)
6.	Disagreed	Disagreed	2	—	—	2 ( 2%)

*Notes:*

Group 1 participants were asked to generalize based on Sarah's experience (Reading 7). Group 2 participants were asked to generalize based on Sarah and Martha's experiences. Group 3 participants were asked to generalize based on Martha's experience (Reading 8). Categories 1 and 6 were considered Inconsistent, 2 and 5 Consistent, 3 Partially Inconsistent, and 4 Partially Consistent.

**Research Question 1**

Consider the following question with respect to research in education and you are asked to respond by indicating: (i) In agreement; (ii) In partial agreement; (iii) In disagreement.

It is neither desirable nor necessary to generalize from results obtained in qualitative studies.

**Research Question 2**

Do you think that Sarah's (Reading 7) experience based on social constructivism can be applied in the context of Venezuelan education? If your response is in the affirmative, would this require some changes. If your response is in the negative, please explain.

fact that qualitative researchers (Erickson, 1986; Maxwell, 1992; Lincoln and Guba, 2000) do not recommend external generalization. Furthermore, 41% of the participants agreed to both Research Questions 1 and 2 (an inconsistent strategy) and 22% partially agreed to Research Question 1 and agreed to Research Question 2 (a partially inconsistent strategy). This shows that 63% of the participants used a fairly inconsistent approach, viz., agreed/partially agreed that research experience in qualitative studies cannot be generalized and still agreed that the research experience of Sarah and Martha (Research Question 2) can be generalized in the context of Venezuelan education. Interestingly, most participants were not cognizant that their approach was contradictory or at least inconsistent. On the other hand, only 28% (Category 5) of the participants were consistent, viz., disagreed to Research Question 1 and agreed to Research Question 2. How do we explain these findings? In this respect, it would be helpful to consult the written justifications/reasons provided by the participants for their selected responses.



### 3.1. EXAMPLES OF CATEGORY 1 RESPONSES

Participants in this category agreed to both Research Questions 1 and 2 (see Table I), and following are some of the examples:

#### 3.1.1. *First Example*

Response to Research Question 1: “I agree... What I want to express is illustrated by the following example: different sculptors can elaborate different sculptures from the same block of marble. This means that different researchers can obtain different results on studying the same problem ... and hence it is not necessary to generalize.”

Response to Research Question 2: “Yes, Martha’s experience can be applied in Venezuelan education ... Most of our teachers are authoritative and inhibit students, and this new experience will help to make the teachers: guides ... critical investigators ... facilitators of a reciprocal learning relationship ...”

#### 3.1.2. *Second Example*

Response to Research Question 1: “I agree, as there are no absolute truths ... and truths are relative and can change. What is a scientific revolution today will not be so tomorrow ... research findings depend on the moment ... in which the study is conducted ...”

Response to Research Question 2: “In my opinion, Martha’s experience can be applied in the Venezuelan context depending on certain changes that would help the teacher to implement new strategies in the classroom ... (Rest of the response describes the different phases of the learning cycle, from Reading 8).”

#### 3.1.3. *Third Example*

Response to Research Question 1: “I agree, in qualitative research the same situation can lead to different results ...”

Response to Research Question 2: “I think that Martha’s experience can be applied not only in Venezuela but in any part of the world ...”

#### 3.1.4. *Fourth Example*

Response to Research Question 1: “I agree. In qualitative research generalization (internal) is possible through the development of a theory that not only interprets persons and situations under study but also shows that the same process in different situations can lead to different results ...”

Response to Research Question 2: “Yes, I agree that Sarah and Martha’s experiences should be applied in the Venezuelan educational context. Both of them were more than willing to recognize their deficiencies and accept changes in their original metaphors related to educational practice ... (a succinct summary of the main features of Sarah and Martha’s teaching strategies is provided) ... If Venezuelan teachers could look into the mirror of Sarah and Martha and accept that we have deficiencies ... this could help to facilitate critical learning ...”

### 3.1.5. *Fifth Example*

Response to Research Question 1: “I agree ... qualitative studies are usually not designed to permit systematic generalizations to some other population ...”

Response to Research Question 2: “Yes these can be applied in the context of Venezuelan education. I admire the decisions of Sarah and Martha, who had well-defined ideologies and still decided to change their role in order to facilitate learning in their classrooms ... This was a valiant attitude that requires courage...”

### 3.1.6. *Sixth Example*

Response to Research Question 1: “I agree, and this is because we live in a changing world ... to generalize is risky as social situations and contexts may seem to be similar but are not the same ...”

Response to Research Question 2: “Sarah and Martha’s experiences can be applied in our context ... however, some changes are required, e.g., economic situation of the teachers will have to be improved so as to make working conditions more stimulating, teachers’ work load will have to be decreased so that they have more time for preparation of classes, etc...”

These examples show that participants in Category 1 while responding to Research Question 1, were quite convinced that findings from qualitative research cannot be generalized as research is a creative process (example about carving sculptures), there are no absolute truths, scientific revolutions [Kuhn] make transfer of knowledge difficult, qualitative research develops theoretical constructs for particular situations, and that generalization involves risks. Interestingly, however, in Research Question 2 these participants had no difficulty in recommending that findings from two qualitative studies (based on Sarah and Martha’s experience, in USA) can be applied to a different social context (Venezuela). Most of the participants had no reservations with respect to this generalizability and mentioned various advantages, such as facilitation of a reciprocal learning relationship, a critical appraisal by teachers of their own deficiencies, and the courage

to change ones convictions (frameworks) in the face of new contradictory evidence. Most teachers also suggested various changes in the present educational system in Venezuela in order to implement Sarah and Martha's teaching strategies, such as better working conditions.

### 3.2. EXAMPLES OF CATEGORY 3 RESPONSES

Participants in this category partially agreed to Research Question 1 and agreed to Research Question 2 (see Table I) and following are some of the examples:

#### 3.2.1. *First Example*

Response to Research Question 1: "Before deciding whether it is feasible to generalize or not it is important to know the degree to which the phenomenon of interest varies in the surrounding or new context ..."

Response to Research Question 2: "I agree that it is feasible to apply the experiences of Martha and Sarah in our context... However, I do not share the contradiction with respect to evaluation ... Let me explain: if the constructivists state that all levels of formation [experience] are viable then Martha's considerations are irrelevant. This aspect is of concern to me as I agree with Martha that students must be evaluated based on what they should have learnt, in order to facilitate greater understanding."

#### 3.2.2. *Second Example*

Response to Research Question 1: "Generalization would be possible if the same conditions are reproduced in other contexts to be investigated."

Response to Research Question 2: "Yes I agree, if the changes are the product of reflection and paradigmatic controversies (Lakatos). Furthermore, these experiences would help us not only to understand our educational practice but also to construct our own metaphors."

#### 3.2.3. *Third Example*

Response to Research Question 1: "I agree partially, as in my opinion even in quantitative research a sample can never be truly representative ... in most studies the sample is 'intentional' to a certain extent and depends on the reality and the convenience of the researcher. Hence the criterion for representative samples is not satisfied in neither qualitative nor quantitative research."

Response to Research Question 2: "Yes I agree, provided appropriate changes are made and of these the most important is with respect to the formation of the teachers."

Responses in this category attempt to create new interpretations by not strictly following the framework of some of the leading qualitative researchers (Erickson, 1986; Lincoln and Guba, 2000). Participants were willing to look at the degree to which the surrounding context differed from the original before deciding with respect to generalization. Furthermore, it was pointed out that even in quantitative research it is very difficult to work with truly representative samples and most studies are generally based on “convenient” samples (Third example). In science education, it is frequently observed (cf. Lawson, 1985), that quantitative researchers generally conduct their studies at the institution where they work, and their findings can at best be generalized only in that particular region/country. However, a review of the literature shows that these very regional studies are then generalized in almost all parts of the world (cf. Eylon and Linn, 1988). More recently, Keeves and Adams (1997) have provided support for such sampling procedures: “... the practice has emerged, largely for administrative convenience in testing in order to avoid the splitting of class groups, of drawing a stratified random sample of schools with a probability proportional to size and *with the school as the primary sampling unit*” (p. 36, emphasis added).

Another important aspect in these responses (Second example) is that generalization of research experiences can lead to controversies (an important characteristic of progress in science, cf. Lakatos, 1970) and even facilitate the construction of ‘our own metaphors’ in the new context.

### 3.3. EXAMPLE OF CATEGORY 4 RESPONSE

Participants in this category partially agreed to Research Question 1 and disagreed to Research Question 2 (see Table 1) and the following is an example:

#### 3.3.1. *Example*

Response to Research Question 1: “If the original study clearly outlines the context in which a qualitative study was conducted and spells out the recommendations, then it is possible that some aspects could be applied in a different scenario—without, of course leading to a complete generalization.”

Response to Research Question 2: “Sarah’s experience left many ‘blind alleys’ and hence I do not think it can be applied in our context. Her fundamental problem was to maintain discipline in the class ... for this purpose she had to call on the presence of one of the school Directors ... this is very common in Venezuela. Based on social constructivism Sarah evaluated students based on what they had learnt and they improved their grades ... this is also quite frequent in Venezuela, so that both the students

and the parents are satisfied. This ignores the question of students' preparation for future studies. It seems that Sarah is doing what many teachers in Venezuela do anyway, that is lowering the quality of education."

Responses in this category partially agreed that some aspects of qualitative research can be generalized. However, on considering Research Question 2 these participants found some aspect unacceptable and thus disagreed (e.g., blind alleys in Sarah's experience with respect to discipline and evaluation).

### 3.4. EXAMPLES OF CATEGORY 5 RESPONSES

Participants in this category disagreed to Research Question 1 and agreed to Research Question 2 (see Table I), and following are some of the examples:

#### 3.4.1. *First Example*

Response to Research Question 1: "Once qualitative research has been conducted one must think about the transferability of particular aspects in order to be incorporated in a universal perception. Generalization, is thus, a necessity so as to understand that the universal is not that which repeats frequently (e.g., Piaget's methodology), but rather what belongs to the essence of what is being studied. This is difficult even in quantitative research as often the samples are not totally representative, due to the difficulties associated with the collection of large amounts of data."

Response to Research Question 2: "I agree with Sarah's experience in order to facilitate creative capacity for understanding new concepts."

#### 3.4.2. *Second Example*

Response to Research Question 1: "It is possible to generalize provided we are willing to recognize that there will always be a margin of error/discrepancy between the original situation and the one to which it is being applied."

Response to Research Question 2: "Martha's experience can be applied in our context provided the teacher is convinced that it will facilitate significant improvement in learning."

#### 3.4.3. *Third Example*

Response to Research Question 1: "Generalization is difficult in qualitative research. However, what is the alternative—should we dedicate all our lives to study the whole population on every problem of interest? Hence I disagree."

Response to Research Question 2: “Without suggesting that the learning cycle (used by Martha) is a panacea, as theories change, I think that it can be applied in our context.”

Participants in this category were consistent by disagreeing to Research Question 1 and agreeing to Research Question 2 (i.e., accepted generalization). In a sense these responses innovated by not following the strictures of most qualitative researchers. The main argument seems to be that although transferability of findings from one context to another is not automatic, it still remains a necessity. Many participants referred to Piaget’s methodology (which was discussed in class) as a prime example of how qualitative research can be generalized. Furthermore, it was recognized that there will always be discrepancies between the original and the applied contexts, and this precisely leads to controversies and not panaceas, and hence the progress in educational research.

#### 4. Conclusion

In-service teachers in this study participated in a “Methodology of Investigation in Education” course, in which various aspects of qualitative and quantitative research were discussed based on a philosophy of science perspective. This facilitated the understanding of the controversial nature of growth of knowledge and its implications for research in education. A major finding of this study is that after having studied and discussed the role of generalization in qualitative and quantitative research, almost 91% of the teachers agreed that generalization (external) in a different social context is feasible. Furthermore, almost 63% of the participants used a fairly inconsistent approach, viz., agreed/partially agreed to Research Question 1 (Categories 1 and 3), that is research experience in qualitative studies cannot be generalized (external) and still agreed that the research experience of Sarah and Martha in USA (Research Question 2) can be generalized in the context of Venezuelan education. Interestingly, almost 28% of the participants were consistent (Category 5) in first accepting the possibility of generalization in qualitative research and later its external application.

It is important to note that teachers were fully aware as to why qualitative researchers (Erickson, 1986; Lincoln and Guba, 2000) do not recommend generalization and still agreed to external generalization in a different social context based on the following reasons/justifications: (a) Facilitation of reciprocal learning relationship; (b) a critical appraisal by teachers of their own deficiencies; (c) courage to change ones convictions (frameworks) in the face of new contradictory evidence; (d) even in quantitative research “convenient” rather than random samples are used. Apparently, participants argued that if this was one of the major arguments of qualitative researchers for not generalizing then it could be

circumvented; (e) generalization can lead to controversies (an important characteristic of progress in science) and even facilitate construction of “our own metaphors” in the new context; (f) generalizability from one context to another is not automatic but still remains a necessity (Piaget’s methodology was used as a prime example); (f) there will always be discrepancies between the original and the applied contexts, and this precisely leads to controversies and not panaceas, and hence the progress in educational research.

A major argument of qualitative researchers for not generalizing from qualitative studies is that this research is not based on sufficiently representative samples and adequate statistical controls. In this context, it is pertinent to ask whether most of Piaget’s work was based on representative samples? A review of the literature shows that this was not the case. So how did Piaget’s work come to be generalized and accepted by the educational research community? A plausible reason is provided by Piaget’s differentiation between the epistemic and the psychological subjects and that his genetic epistemology primarily referred to the former. Epistemic subject refers to the underlying rationality (universal scientific reason) ideally present in all human beings (for details, see Kitchener, 1986, p. 81, 1993; Niaz, 1991, p. 570). In other words, Piaget was not studying the average of all human abilities (hence lack of statistical treatments and random samples), but rather the ideal conditions under which a psychological subject (a particular person) could perhaps attain the competence exemplified by the epistemic subject.

Finally, it is important to note that recent research has recognized the need for integrating research methodologies, that is utilize both quantitative and qualitative techniques when conducting educational research (Niaz, 1997; Johnson and Onwuegbuzie, 2004; Onwuegbuzie and Leech, 2005). This provides further warrant for generalization of findings of qualitative research in education.

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