Methodological Critique of Quantitative and Qualitative Educational Research Studies

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Introduction

Quantitative and qualitative research both fulfill important roles in educational research; therefore, it is useful for educators and researchers to have a good understanding of both methodologies. By knowing how various aspects of each can be used for developing 1) a clearer, more accurate understanding of any given problem and 2) the best possible approach for advancing pedagogical practices and delivering learning outcomes that best prepare students for the future.

This critique will analyze two examples of these basic methodologies. The quantitative study, described by Hamre and Pianta (2005), was primarily concerned with the possible effects that certain first grade classroom characteristics (specifically instructional and emotional support) might have on children who were considered to be at risk of academic and social difficulties in school. The qualitative study, conducted by a teacher educator, was primarily concerned with 1) how new teachers' thinking becomes more complex while they undergo challenging professional development and 2) how this might inform teacher training pedagogy.

A. Description of the Research Problems

In their research problem, Hamre and Pianta presented clearly defined variables. The tested variables of academic achievement and levels of conflict were measured against the dependent variables of levels of instructional and emotional support offered by teachers in the classroom. Sleeter's research problem is a case study that assumes the perspective of one teacher educator and considers how the evolution of a novice teacher's thinking processes and skills might help to develop teacher education pedagogy. Sleeter's aims are defined as correcting "common novice assumptions" (Gay, p. 51, 2011) and to help novice teachers to

become more epistemologically sophisticated about designing and teaching multicultural curriculum.

B. Selection and Assignment of Participants

The most apparent difference in the participants of the two studies is the size, scope and age. Hamre and Pianta's study involved 910 children from 827 classrooms, 747 schools, 295 public school districts and 32 states. Sleeter's study involved a single participant. The first graders were chosen after extensive testing in a random stratified sampling (non-proportional). Validity was maximized by grouping children according to low, moderate, and high groups in both instructional and emotional support, and also according kindergarten functional risk and demographic risk (Gay, p. 41, 2011). Rather than testing, in Sleeter's qualitative study, there were three specifically defined sample selection criteria for the study: "relatively new to multicultural education, open to learning, and teaching in a diverse classroom (Gay, p. 52, 2011)." Although it may appear that a form of qualitative criterion sampling was used because Ann was most closely matched to those criteria--and was selected from a larger study of teachers—it would be more accurate to regard this as non-random purposive sampling because Ann was the only participant. Qualitative criterion sampling should include at least five participants (Gay, p. 141-143, 2011).

C. Data Collection and Analysis

The quantitative study conducted by Hamre and Pianta involved a great degree of data collection from the selection of participants to testing of the dependent variables at the end of the study – following children from birth to first grade. Data collected included functional and demographic risk indicators such as maternal and child ethnicity, and risk assessments at 54 months. In addition, child outcomes were measured using well-accepted instruments: the Woodcock-Johnson Psycho-educational Battery Revised (WJ-R), the Student-Teacher Relationship Scale, and the Classroom Observation System (COS-1). Analysis involved

ANCOVA models and looking at moderation of risks. Sleeter adopted a longitudinal survey approach, with several data collections made over a period of 5 months, including student course work, student papers, reflective journals kept by both subject and researcher; classroom observation of the subject; and a tape recorded interview. The criterion-referenced data analysis was aided by a heuristic tool for reflection and analysis: a rubric that describes three incrementally increasing levels of complex thinking about multicultural curriculum (novice, developing, and accomplished) and four aspects of epistemological beliefs (task definition, perspective taking, self-reflexivity, and locus of decision making).

D. Procedures and Instruments

Procedures and instruments differed greatly between the two studies. Because Sleeter's subject was an adult professional, there was no consideration of the risk indicators that were central to the Hamre experiment. Although Hamre's view of demographics was in the context of "risk" (mothers' education level), Sleeter's primary demographic concern was to select a subject who met the three basic criteria given in Section B of this critique. The quantitative study relied extensively on psychometric instruments such as the Woodcock-Johnson composite test battery (Woodcock & Johnson, 1989), the Student-Teacher Relationship Scale (Pianta, 2001), and the Classroom Observation System for First Grade (NICHD ECCRN, 2002b). In contrast, the qualitative instrumentation consisted mainly of various forms of collected data (see Section C above) that were assessed using a heuristic tool that differentiated novice, developing, and accomplished teachers' thinking in four dimensions (Section C).

E. Reporting of Literature

The literature review at the beginning of the Hamre-Pinata article is extensive—over 3000 words—and it provides the reader with a perspective and sense of scope for related research that had been done previously to lay the groundwork for their own study. Ostensibly,

this may have been done to provide a justifiable rationale for a study that, without such careful documentation, may raise ethical concerns that could detract from the value and generalizability of the study. In contrast, there are significantly fewer references to literature in the qualitative study. This is most likely attributable to the fact that the generalizability of Sleeter's study is very limited because it relied on nonrandom purposive sampling (Gay, p. 141, 2011) and is limited to a relatively narrow field (training teachers about multicultural curriculum).

F. Reporting of Conclusions

According to Hamre and Pianta, the effects of the experiment's treatments are small but notable, and their findings are consistent with their hypothesis that schools do, indeed, have the potential to moderate children's risk of academic and social difficulties. One unexpected finding may have been that functionally at-risk children appear to positively respond to only emotional support—and not instructional support. The Sleeter study suggests, from a teacher educator's perspective, that there is significant evidence to support the hypothesis that novice teachers' thinking processes can evolve to more complex levels if the teachers are encouraged to reflectively discuss and write about some of their most basic assumptions, grapple with uncertainty, and learn from one another.

Personal Reflections – Gary Bartanus

Although Hamre and Pianta provide extensive literature and documentation, I question some aspects their study. For example, I am deeply skeptical of their definition of *demographic risk*. Indeed, they cite an impressive number of studies that support the premise that low *maternal* education is a key factor, but I wonder if they considered the possible existence of studies that indicate a similar risk with low *paternal* education? Don't fathers play a role in stimulating learning? It may have helped if this aspect had been discussed more extensively in the article.

Regarding Sleeter's qualitative study, I found that, although not generalizable to any great extent, Sleeter's active participant ethnographic approach helped her to learn what could be done to vastly improve teacher education pedagogy. It also helped me to gain important insight on how much "getting inside the head" of a unique, purposively selected individual can help one to develop a clearer perspective and fuller understanding of that individual's peer group.

While reading the Hamre article, I often felt uncomfortable with children being categorized as dependent variables, etc. Although I know this is necessary for scientific methodology, it is not a mindset with which I am comfortable. Therefore, I definitely find qualitative methodology to be more appealing than quantitative and, in my current BAE course conversion project (as described in gbartanus_AC2.doc), I will lean heavily on such qualitative methods as survey questions and interviews with the pilot teachers who meet our team's criteria. However, I expect to also make use of quantitative data (such as students' online attendance records, interface interactivity, and formative quiz results) to provide pilot teachers with as much information as possible for them to assess the overall effectiveness of the online course.

In conclusion, I see value in both methodologies and, although I favor qualitative as the primary approach for my own personal practice, I can certainly justify supplementing it with quantitative approaches whenever possible.

References

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