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EDITORIAL

What Is A Theoretical Framework? A Practical Answer

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Other than the poor or non-existent validity and/or reliability of data collection measures, the lack of a theoretical framework is the most frequently cited reason for our editorial decision not to publish a manuscript in the *Journal of Science Teacher Education*. A poor or missing theoretical framework is similarly a critical problem for manuscripts submitted to other journals for which Norman or Judith have either served as Editor or been on the Editorial Board. Often the problem is that an author fails to justify his/her research effort with a theoretical framework. However, there is another level to the problem. Many individuals have a rather narrow conception of what constitutes a theoretical framework or that it is somehow distinct from a conceptual framework. The distinction on lack thereof is a story for another day. The following story may remind you of an experience you or one of your classmates have had.

Doctoral students live in fear of hearing these now famous words from their thesis advisor: "This sounds like a promising study, but what is your theoretical framework?" These words instantly send the harried doctoral student to the library (giving away our ages) in search of a theory to support the proposed research and to satisfy his/her advisor. The search is often unsuccessful because of the student's misconception of what constitutes a "theoretical framework." The framework may actually be a theory, but not necessarily. This is especially true for theory driven research (typically quantitative) that is attempting to test the validity of existing theory. However, this narrow definition of a theoretical framework is commonly not aligned with qualitative research paradigms that are attempting to develop theory, for example, grounded theory, or research falling into the categories of description

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and interpretation research (Peshkin, 1993). Additionally, a large proportion of doctoral theses do not fit the narrow definition described. The argument here is not that various research paradigms have no overarching philosophies or theories about knowing. Clearly quantitative research paradigms are couched in a realist perspective and qualitative research paradigms are couched in an idealist perspective (Bogdan & Biklen, 1982). The discussion here is focused on theoretical frameworks at a much more specific and localized perspective with respect to the justification and conceptualization of a single research investigation. So, what is a theoretical framework?

It is, perhaps, easier to understand the nature and function of a theoretical framework if it is viewed as the answer to two basic questions:

1. What is the problem or question?
2. Why is your approach to solving the problem or answering the question feasible?

Indeed, the answers to these questions are the substance and culmination of Chapters I and II of the proposal and completed dissertation, or the initial sections preceding the Methods section of a research article. The answers to these questions can come from only one source, a thorough review of the literature (i.e., a review that includes both the theoretical and empirical literature as well as apparent gaps in the literature). Perhaps, a hypothetical situation can best illustrate the development and role of the theoretical framework in the formalization of a dissertation topic or research investigation. Let us continue with the doctoral student example, keeping in mind that a parallel situation also presents itself to any researcher planning research that he/she intends to publish.

As an interested reader of educational literature, a doctoral student becomes intrigued by the importance of questioning in the secondary classroom. The student immediately begins a manual and computer search of the literature on questioning in the classroom. The student notices that the research findings on the effectiveness of questioning strategies are rather equivocal. In particular, much of the research focuses on the cognitive levels of the questions asked by the teacher and how these questions influence student achievement. It appears that the research findings exhibit no clear pattern. That is, in some studies, frequent questioning at higher cognitive levels has led to more achievement than frequent questioning at the lower cognitive levels. However, an equal number of investigations have shown no differences between the achievement of students who are exposed to questions at distinctly different cognitive levels, but rather the simple frequency of questions.

The doctoral student becomes intrigued by these equivocal findings and begins to speculate about some possible explanations. In a blinding flash of insight, the student remembers hearing somewhere that an eccentric Frenchman named Piaget said something about students being categorized into levels of cognitive development. Could it be that a student's cognitive level has something to do with how much and what he/she learns? The student heads back to the library and

methodically searches through the literature on cognitive development and its relationship to achievement.

At this point, the doctoral student has become quite familiar with two distinct lines of educational research. The research on the effectiveness of questioning has established that there is a problem. That is, does the cognitive level of questioning have any effect on student achievement? In effect, this answers the first question identified previously with respect to identification of a theoretical framework. The research on the cognitive development of students has provided an intriguing perspective. That is, could it be possible that students of different cognitive levels are affected differently by questions at different cognitive levels? If so, an answer to the problem concerning the effectiveness questioning may be at hand. This latter question, in effect, has addressed the second question previously posed about the identification of a theoretical framework. At this point, the student has narrowed his/her interests as a result of reviewing the literature. Note that the doctoral student is now ready to write down a specific research question and that this is only possible after having conducted a thorough review of the literature.

The student writes down the following research hypotheses:

1. Both high and low cognitive level pupils will benefit from both high and low cognitive levels of questions as opposed to no questions at all.
2. Pupils categorized at high cognitive levels will benefit more from high cognitive level questions than from low level questions.
3. Pupils categorized at lower cognitive levels will benefit more from low cognitive level questions than from high level questions.

These research questions still need to be transformed into testable statistical hypotheses, but they are ready to be presented to the dissertation advisor. The advisor looks at the questions and says: "This looks like a promising study, but what is your theoretical framework?" There is no need, however for a sprint to the library. The doctoral student has a theoretical framework. The literature on questioning has established that there is a problem and the literature on cognitive development has provided the rationale for performing the specific investigation that is being proposed. **ALL IS WELL!**

If some of the initial research completed by Norman concerning what classroom variables contributed to students' understandings of nature of science (Lederman, 1986a, 1986b; Lederman & Druger, 1985) had to align with the overly restricted definition of a theoretical framework, which necessitates the presence of theory, it never would have been published. In these initial studies, various classroom variables were identified that were related to students' improved understandings of nature of science. The studies were descriptive and correlational and were not driven by any theory about how students learn nature of science. Indeed, the design of the studies was derived from the fact that there were no existing theories, general or specific, to explain how students might learn nature of science more effectively. Similarly, the seminal study of effective teaching, the Beginning Teacher Evaluation Study (Tikunoff, Berliner, & Rist, 1975), was an ethnographic study

that was not guided by the findings of previous research on effective teaching. Rather, their inductive study simply compared 40 teachers "known" to be effective and ineffective of mathematics and reading to derive differences in classroom practice. Their study had no theoretical framework if one were to use the restrictive conception that a theory needed to provide a guiding framework for the investigation. There are plenty of other examples that have guided lines of research that could be provided, but there is no need to beat a dead horse by detailing more examples. The simple, but important, point is that research following qualitative research paradigms or traditions (Jacob, 1987; Smith, 1987) are particularly vulnerable to how 'theoretical framework' is defined. Indeed, it could be argued that the necessity of a theory is a remnant from the times in which qualitative research was not as well accepted as it is today. In general, any research design that is inductive in nature and attempts to develop theory would be at a loss. We certainly would not want to eliminate multiple traditions of research from the *Journal of Science Teacher Education*.

Harry Wolcott's discussion about validity in qualitative research (Wolcott, 1990) is quite explicit about the lack of theory or necessity of theory in driving qualitative ethnography. Interestingly, he even rejects the idea of validity as being a necessary criterion in qualitative research. Additionally, Bogdan and Biklen (1982) emphasize the importance of qualitative researchers "bracketing" (i.e., masking or trying to forget) their a priori theories so that it does not influence the collection of data or any meanings assigned to data during an investigation. Similar discussions about how qualitative research differs from quantitative research with respect to the necessity of theory guiding the research have been advanced by many others (e.g., Becker, 1970; Bogdan & Biklen, 1982; Erickson, 1986; Krathwohl, 2009; Rist, 1977; among others). Perhaps, Peshkin (1993, p. 23) put it best when he expressed his concern that "Research that is not theory driven, hypothesis testing, or generalization producing may be dismissed as deficient or worse." Again, the key point is that qualitative research is as valuable and can contribute as much to our knowledge of teaching and learning as quantitative research.

There is little doubt that qualitative researchers often invoke theory when analyzing the data they have collected or try to place their findings within the context of the existing literature. And, as stated at the beginning of this editorial, different research paradigms have large overarching theories about how one comes to know about the world. However, this is not the same thing has using a theory as a framework for the design of an investigation from the stating of research questions to developing a design to answer the research questions.

It is quite possible that you may be thinking that this editorial about the meaning of a theoretical framework is too theoretical. Trust us in believing that there is a very practical reason for us addressing this issue. At the beginning of the editorial we talked about the lack of a theoretical framework being the second most common reason for manuscripts being rejected for publication in the *Journal of Science Teacher Education*. Additionally, we mentioned that this is a common reason for manuscripts being rejected by other prominent journals in science education, and education in general. Consequently, it is of critical importance that we, as a community, are clear about the meaning of a theoretical framework and its use. It is

especially important that our authors, reviewers, associate editors, and we as Editors of the journal are clear on this matter. Let us not fail to mention that most of us are advising Ph.D. students in the conceptualization of their dissertations. This issue is not new. In 1992, the editorial board of the *Journal of Research in Science Teaching* was considering the claim, by some, that qualitative research was not being evaluated fairly for publication relative to quantitative research. In their analysis of the relative success of publication for quantitative and qualitative research, Wandersee and Demastes (1992, p. 1005) noted that reviewers often noted, "The manuscript had a weak theoretical basis" when reviewing qualitative research.

Theoretical frameworks are critically important to all of our work, quantitative, qualitative, or mixed methods. All research articles should have a valid theoretical framework to justify the importance and significance of the work. However, we should not live in fear, as the doctoral student, of not having a theoretical framework, when we actually have such, because an Editor, reviewer, or Major Professor is using any unduly restrictive and outdated meaning for what constitutes a theoretical framework.

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