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Responsibility in the Face of Accountability

A Success

Over the years science education researchers have generated an impressive corpus of literature on multiple aspects of science teaching and learning. By 'science education researchers' I mean people who work at universities and conduct educational research (e.g., the people I encounter when I attend NARST). Within the field of science education it seems that we have reached some degree of consensus about what constitutes meaningful science learning and how teachers ought to teach in order to foster meaningful learning. For example, we recognize the importance of teaching students not only the content of science, but also teaching them about the nature of scientific knowledge. We tout the benefits of inquiry-oriented science instruction for helping students learn both content and nature of science. We teach prospective teachers to teach via inquiry, and we spend a fair amount of time trying to understand how prospective and practicing teachers understand inquiry-based instruction, how they attempt to implement inquiry-based instruction in their own classrooms, and how they succeed at and struggle with this endeavor. Because many people have invested an extraordinary amount of time and energy into research, we have a wide range of resources upon which to draw for understanding and explaining the complexities associated with learning and teaching science. In sum, we know a great deal about science teaching and learning, and as a community we seem to have developed a coherent framework for teaching science, educating teachers about how to teach science, developing and evaluating curriculum and instruction, and evaluating the extent to which students have a meaningful understanding of science.

Using what we know about teaching and learning, many science education researchers have successfully demonstrated what is possible when teachers and students are given the right resources. In terms of science learning, several researchers have developed and implemented rich curriculum units. These researchers have shown that when students are provided with appropriate scaffolds (e.g., content resources, epistemological resources, metacognitive resources) and when they are prompted to think about science content, the nature of science, and the interconnections between the two, they are able to develop robust understandings of science. In terms of science teaching, several researchers have conducted design experiments and their findings have provided valuable information about what curriculum and/or instruction looks like in practice. The perspectives from practice have been useful for re-designing curriculum and instruction in ways that can facilitate the development of robust understandings of science. These are just a few examples of the ways in which science education researchers have made progress in terms of science teaching and learning.

My Vexation

My vexation is as follows: In what ways do / can / should science education researchers take responsibility for the factors that influence the ways in which teaching and learning practices are implemented in science classrooms? There are multiple factors associated with science teaching and learning practice including the teacher, the students, the climate of the classroom/school/district, the curriculum, the nature of assessment, the decisions about policy, and so forth. Within this nexus it may be impossible to discern which demands take priority at any given point in time, but certainly there are particular demands that cannot be ignored. At this time I am increasingly interested in policy and its role in shaping science teaching and learning practices. In this paper I will focus on federal (macro-level) policies and their role in classroom (micro-level) practices. I do not mean to imply that the macro determines the micro; my intention is to think about how these levels interact with one another.

We cannot ignore the fact that education – especially under NCLB – is becoming synonymous with accountability, nor can we ignore the fact that the NCLB system of accountability makes entities such as students, teachers, principals, districts, and states responsible for meeting the goals established by policy makers. Educators will incur penalties if they fail to meet these goals. Under the threat of penalty, educators are compelled to attend to the demands of accountability or face the consequences. The consequences that accompany accountability are not trivial. One issue is funding. Since education is notoriously under-funded in many states, it seems that it would be difficult for the majority of school districts and/or states to excuse themselves from participating in the required, federally approved

accountability measures. Utah is the first state to attempt to forego NCLB; Connecticut has filed a lawsuit over the cost of implementing NCLB. I imagine many people are curious to see how these situations get resolved and how they shape the future of federal involvement in public education. Funding is not the only issue at stake. School choice is another potentially vexing aspect of accountability. While school choice is often marketed as a way to prompt schools to improve their performance, we ought to attend to the reality of what will happen if--or when--school choice leads to the erosion of the public school system. Certainly the public school system is not perfect, but we ought to critically analyze the alternatives before we facilitate its dissolution.

My vexation deals with the responsibilities of science education researchers in the face of accountability. I realize my vexation is large in scope, but I think it is associated with the things I identified as the successes of the science education community. One of the things I wonder about is how the emphasis on accountability--and we will face this in science in the next few years--will shape science teaching and learning practices. In a worst-case scenario, it could be that measures of science learning will be based on overly simplistic representations of students' understandings of science. This is troubling given what we know about the complexities associated with science teaching and learning. We can hope that the emphasis on accountability will not force us to step away from what we believe to be our best practices. But if we fear that accountability measures threaten what we deem to be productive teaching and learning practices, what are we prepared to do about it? Or perhaps it is more appropriate to ask the question in the following way: If we think accountability measures threaten what we believe to be our best practices, what power do we have to influence these accountability measures? The first question emphasizes our willingness to engage in this debate; the second question emphasizes the extent to which we are able to influence educational policy. Unfortunately, I do not see many connections between the research I see in the science education community and many of the policies shaping public education (particularly policies about accountability).

The source of my vexation may come from my own limited understanding of educational policy. Admittedly, I think of policy as some kind of nebulous, yet omnipresent, force. It seems like something that science education researchers sometimes attend to, but not something in which they are engaged. This vexation also may be related to the ways in which I encounter science education research. I tend to read reports of research in journals and see research presentations at conferences. Both journals and conferences are venues that are used to showcase research. Part of doing research is trying to figure out how to make worthwhile contributions to the field. Sometimes this means trying to find something new to say to your colleagues, so some researchers look for unique niches to occupy in order to identify something novel in the field. The benefit of these niches is that they afford science education researchers a wide range of resources upon which to draw. However, in the quest to identify/develop unique niches have science education researchers lost sight of overarching responsibilities associated with science teaching and learning practices? Or have we missed opportunities to shape educational policy? We are dealing with some very critical issues in education today – gaps in achievement, inequities in funding, schools being labeled as failing, and so forth. The stakes are incredibly high. If we are willing to spend the time and energy to push the field towards understanding how to teach science for meaningful learning, how can we stand by and watch people make policy decisions that could potentially undermine what we believe to be productive teaching and learning practices? If we think that the field of science education ought to share in the responsibility of public education, it seems that we ought to attend to the ways in which policy decisions support or undermine our recommendations about science teaching and learning.

I will conclude my vexation with a few questions that arose as I was thinking through the issue of the connections (or lack thereof) between science education research and policy —

- What role do science education researchers play / want to play / think they ought to play in decisions about educational policy?
- Who is responsible for the policy decisions that potentially impact science teaching and learning practices? What does this mean for science education research?
- To whom are science education researchers responsible? Are we responsible only to ourselves?