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## **Inquiry – Again!: Issues of Practitioner Interpretation and Implementation**

### **Vexation**

At last year's Crossroads, I presented a vexation regarding the divide between teachers and researchers in science education and its related disciplines. Since that time, I have struggled with a more fundamental question: What is the role of (educational) research for practitioners? I reflected on the question throughout my coursework, graduate assistantship and at various national conferences, thereby facing the complexity of my inquisition regarding this seemingly elemental principle. Also during this time, meetings with my cohort group and colleagues allowed for constructive development of these ideas. Ultimately, this has become a consideration of the values associated with different types of knowledge.

My graduate assistantship work with a multi-million dollar science center currently under construction has been a proving ground for the apparent existence of this “divide” and the role of research. Indeed, my GA has allowed me to continue as a practitioner while progressing as a doctoral student in that I have been able to join my coursework with the center’s maturing programs, specifically in its professional development program. I can quickly put into practice much of what I have learned from literature and class work, and these experiences have often provided important, yet anecdotal, evidence for or against my various explanatory theories under consideration regarding the “divide.”

As a result, at the end of a year of experience that has helped me understand my vexation better, I recognize that I am able to more fully acknowledge the depth and breadth of the vexation. Nevertheless, instead of narrowing the focus of the question, thereby productively zeroing in on a dissertation topic (e.g. perhaps identifying where teachers access information from research or if they do at all), I have been preoccupied with theorizing on matters such as the historical and cultural foundations for the existence of the problem of the research divide, and adjusting my own framework as I respond to new knowledge.

In the end, this contemplative exercise about the underpinnings of research in my field has been distracting and yet beneficial in three ways. First, considering highly significant ideas in education (within the safe confines of my mind, my cohort group and colleagues) has helped me identify deficiencies in my own knowledge base. Second, such theorizing has helped me to identify many variables, uncertainties and the stakeholders in a potential research project, which, incidentally, has the potential to develop into my dissertation. And third, my professional center of gravity has shifted from “my classroom” to “our research,” thereby allowing me to “think big” and believe that we might be able to find out, figure out, be part of and add momentum to something that will make a difference for society and the education of its people.

As it stands, some of educational research seems to be utilized by policymakers, and with the lack of advocacy on our part, they seem to have been granted full access to in-service teachers. It is a prime example of niche partitioning—policy can have an impact on the in-service teachers, whereas research can have unique access to those in preservice. The result is that science teachers predominate NSTA, science education researchers predominate NARST and policymakers generally stay home. Science teachers are subjected to standards alignment and NCLB, researchers have the ability to question standards alignment and NCLB, and policymakers have the ability to change standards and shape NCLB. I am beginning to wonder if the divide is really between policy and practice and if it is research that plays a key intermediary role between them.

### **Venture**

I believe the subject of “inquiry” is an area in which I can work to understand the alleged divide and its fundamental topography. At present, I see myself at a critical junction as I begin my second year of doctoral study, and this is the direction into which I would like to venture. For me, the expanse between research and practitioner is illustrated on a daily basis by this topic of inquiry.

It appears that at some point, science education laid claim to inquiry learning and attempted to define “inquiry” when it realized its predominance in science and the utility it might prove to have for content mastery in the post-Sputnik era. Formulas patterned after the use of inquiry by scientists resulted in formalized routines for preK-16 teachers to use in the classroom. Some of these methods allowed students to raise and investigate questions of “their own.” In the methods which more closely attend to ownership of a question which can be investigated, the students essentially learn about science content in a similar pattern to the way scientists suggested the content first. Therefore, I do not advocate for inquiry use in science class because scientists use inquiry (a rationale based on reflection). Rather, I advocate for use of inquiry in the context of science class because it is the predominant learning foundation which lent to scientific discovery (a rationale recognizing

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common heritage of the content). In essence, inquiry use in the classroom is not a way to mimic or produce scientists, but a way to contemplate their honed use of inquiry in order to evolve the learning mechanism in oneself.

By clarifying inquiry and identifying its role within the context of a science classroom, I believe we can move to the center a productive agenda for (science) education research and bring to the fore the actualities of students' educational situations and, thereby, the actual state of education. This research agenda would be more directly linked to the basic needs of policy, it would be better outfitted to hold policy accountable, and it would be responsive to the actualities in practice. In the multiple-decades-long process of embracing inquiry as a means to an end in student learning toward achievement and personification of science, a side effect may have been creation of our own "Nature of Science Education" that has marginalized these topics from science classrooms.

So in terms of my own personal venture:

1. I would like to refine my own understanding and theory about inquiry (referred to in my vexation and partially outlined above).
2. I would like to better incorporate the current research on inquiry into the teachers' curriculum in the science center's professional development program, which at present includes a version of The Exploratorium's Institute for Inquiry. Too often in that workshop, inquiry is interpreted as a teaching method that allows teachers to have students behave like scientists, rather than a learning mechanism of students that teachers can incorporate into lesson design. I also worry that teachers merely arrive at a procedural way of using inquiry in the classroom rather than a principled understanding themselves of what constitutes inquiry. I would also like to explore ideas on how to most effectively incorporate inquiry into an elementary science teaching methods course I will be instructing this fall.
3. Next, I would like to articulate how we can adapt or alter the inquiry prescription we offer in professional development and apply it in other aspects of the science center's educational program. There are several specific considerations here, best phrased in questions such as: How can we adapt or alter the inquiry prescription we offer in professional development and apply it in other aspects of the science center activities such as exhibit-based learning environments and programs such as field trips? Also, how can we transfer knowledge from consideration of inquiry in informal education settings (where such learning is not governed by standards or assessments) to inform its use in classrooms?
4. Finally, I would like to map out a circuitry of stakeholders who, as a group, have a collective intelligence about the realities of inquiry in the science classroom – first from the standpoint of research, and then to the level of the classroom, and taking into account the relationships with policy and science. Visualizing this network, and my role within it, will allow me to better understand the transmission of information that actually takes place between teachers and researchers specifically on the subject of inquiry.

### **Epilogue**

Having re-read my proposal in preparation for its printing, I don't think it makes much sense. In the spirit of Crossroads, I offer it up as is and hereby nominate myself for the "Paradox, Counterparadox, and Then Some" Award at the ceremonial luncheon in Ogden, where I hear they will not be serving baked chicken. Together, my venture and vexation are tidbits from a web of thought (which I sense has some structure I have yet to figure out) and representative of my enjoyment of the mental struggle as I navigate through the interesting, intertwining and overlapping strands of my graduate assistantship and doctoral studies.

In this past year, I have not entered any reading, writing, meeting, class or discussion with a finalized conceptualization of inquiry. Instead, I invite these encounters to weather, erode and construct my explanations. I have willingly allowed inquiry, as simple a thing as it can be, to sustain a status of multiplicity and ambiguity. With that status it has taken me on a tour through theory, research, practice and policy; a journey whose passage has laid a path for my history (as student, scientist, learner, thinker and teacher) to be very intimately connected to my present.