Critical Incident Reflection #1

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"Texas budget might test if students need materials to study for new exams," was the headline seen in the Austin American Statesman on Sept 22, 2010 (Alexander, 2010). The article told the story of the relationship between the financial support for new testing materials and a possible lack of future funding for all materials, particularly science education materials, slated to be adopted in 2012. In addition to the possible lack of resource materials for science teachers, the current testing schema in the state of Texas will be moving to the State of Texas Assessments of Academic Readiness (STAAR) and End of Course (EOC) exams beginning in the 2011-2012 school year, ramping up rigor levels for all coursework.

Intertwined with concerns about funding for new materials, are concerns about budgetary cuts at the district level. "Last year was not a good year for anyone's wallet. But the recession is taking an extraordinary toll on school systems, as sweeping budget cuts are enacted in cities and states nationwide. Experts say the budget crisis will be felt acutely this year and that it might only be the beginning." (Chivvis, 2010). The trickle-down effect of budget cuts leads to cutbacks in the number of classroom teachers leading to increases in class size. In several classrooms in one Texas district, teachers are reporting numbers as high as thirty-five to thirty-seven students. This is number is far above the recommended number of students, twenty-four for a high school classroom, that can safely conduct a lab in a science classroom as reported in a study by Sandra West cited in the National Science Teacher's Association's position statement, "Liability of Science Educators for Laboratory Safety (National Science Teachers Associatoin, 2010). Furthermore, the reduction in budgets at district levels contributes to the reduction of budgets for materials at the campus level, including reduction in science equipment and consumable materials.

Given the new challenges facing science education in Texas today, in conjunction with previous challenges such as equity for all classrooms, lack of appropriate technology, implementation of new standards, and the new testing environment are there necessary changes in classroom pedagogy and structure on the horizon? Does the new construct of lack of resources, overcrowded classrooms, and limited finances allow us to move away from what we understand as some of the best practices for science education including hands-on, student centered learning as outlined in the National Science Education Standards (National Science Education Standards, 1996 p.31-32) to a place that is safe and will get students through the system? Certainly science teachers in Texas have cause for moving away from the hands-on, experiential learning style used during labs to more of a lecture based design when faced with the overwhelming challenges previously noted.

How can we expect teachers are able to facilitate a safe learning environment with nearly thirty-seven students in a class when it is so clearly an unsafe environment? Even if other, smaller classes could participate in lab activities with safety and ease, would this then remove the equity for all students by providing them with opportunities their peers would not have? Without textbooks and the ancillary materials that are included with textbooks such as labs and diagrams will teachers have the time to cull through the endless resources that are available on the internet and choose what is appropriate and speaks to the needs of the students and the standards with clarity and fidelity? Furthermore, provided that teachers are able to access activities that are true to the needs of the students and standards, how then will they fund the materials necessary to implement the learning?

Truly, it would seem, that science education in Texas is at a low-point. Teachers have cause to move back to older and arguably safer ways of teaching students including lecture and

worksheet driven learning. It is imperative that students pass the new, more rigorous exams in order graduate and to move on to the post-secondary option of their choice. Teachers and schools as a whole must do what is right to ensure that each student is able to walk across the stage and receive his or her diploma, even if it means moving to a structure that is facilitated with more ease such as the "teacher-student" form of learning (Friere, 2007 p.68-69) due to the lack of resources that have led to the current classroom situation in science education, then this is an allowable circumstance.

However, new questions would be raised by reverting to "teacher-student" styles of teaching. For example, how does this reversion, this figurative "KT boundary" impact students in the future? How long will this need to revert to the teacher-student form of learning be? If there is an end, then how do we support teacher capacity to move back to a system that incorporates best practices for students?

If we move away from students working in labs and conducting hands-on investigations of science back to a lecture-style approach due to the constraints of the current climate in science education in Texas, then do we truly serve the community needs of the future? According to Jim Garrison ad Alven Nieman in Pragmatism and Education embedded in their discussion about John Dewey and Social-Darwinism, "The community needs individuals to perform a large array of vital functions if it is to thrive. That a given community elects to reward only a small number of those vital functions…is a condemnation of that society." (Garrsion & Nieman, 2003 p. 27). If the science education community in Texas moves away from the use of hands-on, experiential learning that supports the advancing of vital functions for both students and the greater community of the future, the future and viability of our students and our community becomes underserved.

Even faced with many challenges and constraints in our current climate, it is not acceptable that science educators in Texas do not continue to move forward with capacity building targeted toward supporting student needs through the use of best practices. “Moreover, there are always survivals from the past; there are always pressures; there is always a certain *weight* in a lived situation…We achieve freedom confrontation with and partial surpassing of such weight or determinacy.” (Greene, 1995 p. 52). We are in a time that carries a great “weight,” however it is up to each teacher individually. “We have somehow to understand this world and provoke others to understand it if we are in some fashion going to transform it.” (1995, p. 44). It is within these challenges to science education, this “noxious cloud” (1995, p. 45) of the current climate of science education that teachers need to find the knowledge and skill to make sense out of it in order to rise above rather than succumb. When each teacher individually addresses the collective challenges facing science education by creating their own awareness, then they will be able to overcome these challenges and continue a pedagogical structure that is aimed at supporting student needs regardless of circumstance.

It is through our individual reflective efforts that we can begin to come to some understanding in the science education community about how to manage the challenges of our current climate while at the same time supporting the best practices and learning needs of our students. It is essential that “our transformative pedagogies must relate both to existing conditions and to something we are trying to bring into being, something that goes beyond the present situation” (1995, p. 51) which can be attained not through return to outdated ways in the face of adversity, but through continued growth both in the individual and in the scientific community as we move into the future.

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