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PHILOSOPHY AND RATIONALE OF TEACHING SCIENCE

It is so ironic how life turns out for people, especially me. I never wanted to be a science or math teacher. These two subjects caused me so much consternation in my academic life, that I developed an intense dislike of anything concerning math and science. I always wanted to teach reading and writing. I was and still am an avid reader when time allows. I remember, when I was young, being in my bedroom lining up my diverse collection of stuffed animals and reading them stories, asking questions, and giving vocabulary tests. I fulfilled that dream; happily I might add, until six years ago when my principal informed me that I had to teach fifth grade science. The sweat began to form and the stomach began to churn and I felt so incompetent, inept and scared, yes actually scared. All I could think of was how I failed math and science in fifth grade and how could I possibly teach something that I actually failed. It was with much trepidation and angst that I began my career as a science teacher.

It has now been six years and I have to say it was the best experience that was ever forced upon me. Becoming a science teacher has not only changed me professionally but also personally. This move made me realize that I am quite intelligent and gave me confidence that I never had before. It also enlightened me on how failing a subject in school really permeates your life in such a negative way and often times in ways in which you are not even aware. If it were not for the fact of being forced to teach science, I would never have dealt with a lot of the issues caused by my fifth grade failure. Having had this experience I have learned two valuable lessons. The first lesson concerns my students and the struggles they may be encountering learning science and second that there is a better way to teach science than through the use of textbooks alone.

As with everyone, each student has their own learning style in which they feel comfortable and strong. Sometimes the methods/strategies, used by the teacher, do not quite fit the student's style of learning. When this occurs the student struggles to accommodate to the teacher's style and in the process compromises his/her own method

of learning. There are some students who can adjust to this due to previous experience with a variety of teachers. However, there are also a number of students who may not have the skills or practice to stretch their own style and as a result, fail. I think it is at this point that the teacher should employ differentiated instruction. Differentiated instruction is the one method that addresses this issue of individual learning styles of the students. Differentiated instruction "is a process through which teachers enhance learning by matching student characteristics to instruction and assessment," (Wortmann, 2007, pg.7). By determining the point at which the student is presently engaged in the learning process, then offering to the student different pathways to achieve success increases self-esteem and generates an enthusiasm for learning within the student's comfort zone. Differentiated instruction arms the teacher with not only one strategy of teaching but with a plethora of strategies to ensure that each student learns. These strategies include but are not limited to offering students different types of assessment, learning centers, portfolios, scaffolding, cooperative groups, flexible pacing, and an emphasis on higher order thinking skills (Szesze, 2001). This method of instruction does have its drawbacks in that it requires the teacher to identify the needs and learning styles of each of his/her students and then determine the best strategy to apply to help each student achieve the skill or the concept. If you have a class of 33 students this may be an overwhelming as well as an unrealistic task. It would be impossible to have 33 different teaching strategies for each of your students and still be able to teach each concept successfully. Generally, I try to incorporate two or three different types of strategies that would assist the students in learning a concept without feeling overwhelmed myself. This requires me to familiarize myself with the students through observation and perhaps a survey of the students to identify their learning style. Based upon these observations and surveys I am able to group them into their different learning styles. Although it may be very time consuming for the teacher on the one end, it is very beneficial for the student on the other end.

Science needs to be taught using a variety of methods. I would not totally eliminate textbooks because they offer a compilation of information in one source. However, I think that much of the science teaching today should be much more interactive, hands on and connected to the students' world. I firmly believe that children learn by doing, making discoveries and then connecting those discoveries to other ideas

or concepts. I believe that the constructivist view of teaching in conjunction with differentiated learning offers the most valuable method for instruction. Being a constructivist fits nicely in with the differentiated learning style because constructivism places a value on the child's experience and the learning he/she has already accumulated throughout his/her young life. Students build a model of their world through their experiences with the outside world (Berger et al., 2003). As a result, teachers are able to act as facilitators or guides for the students during the learning process. Students need to have the time and resources to explore the world around them, to ask questions and learn the skills needed to find the answer to those questions. When students interact with the real world, they are able to process new information, thereby modifying their original construct to fit the new information. In this way, students own their knowledge and are in full understanding of what they are learning. As with all theories, there are some drawbacks with constructivism. The term constructivism appears to permeate all areas of education. There are constructivist theories on everything related to education from teaching and learning to personal knowledge and ethics (Matthews, 2000). The danger of all of this is that we have students who may be constructing their own reality without any thought or connection to the one common underlying reality that exists. It is always necessary, for me at least, to connect what the student is learning to the knowledge of what really exists within the world. It is a matter of having the students construct meaning and knowledge from what really exists and occurs in the world today and to make sure that the reality which, they are building in their science experience is connected to the one underlying reality, which everyone holds to be the truth. The manner in which I assess this meaning is through performance assessment and observation. I like the students to show what they know either through a project or writing piece upon which they have decided. In this way, the student controls the demonstration of the acquired knowledge. One method used by both teachers and students to help in teaching or demonstrating a concept is technology.

Technology is one method I use to help students connect with science. Through the use of smart boards, web resources, simulations, visits from experts, and of course, trips, students can be exposed to the many facets of science that will stimulate thinking and problem solving. Students must learn how to use these resources in order to find the

information they need to make logical, informed decisions. We as teachers need to teach our students how to find the answers to their questions so that they will grow into scientific literate responsible adults.

One of the goals of science teaching should be to help create scientifically literate adults who will be able to make decisions that are based on fact. Adults need to be able to think critically about the information that they encounter everyday and from there they need to decipher fact from fiction. Never has science education been more important than today with the environmental issues (global warming, fresh water shortage) we face, as well as new strains of viruses (HIV, influenza) and the threat of biological warfare (anthrax). In the 21st century, we as global citizens need to be aware of and responsible for our actions as they either contribute to or are detrimental to the health and well-being of our environment. It is so important to have informed citizens who are able to make informed decisions and use that decision to initiate action either through the voting booth or through various organizations. It is important to realize that as a teacher, I can have a real impact on the future and hopefully that impact will be a positive one.

Being a teacher is very meaningful to me. I feel that I learn just as much from my students as I teach them. Their enthusiasm is contagious, and they are so curious about how things work, that their questions are endless. They are the ones who challenge me to continue my quest for learning. It is good to be in the learning process with students because we are learning together and we are sharing that knowledge with family and friends. I also value my colleagues who help me to solve problems, plan lessons, and deal with the little things in classroom life that can drive any teacher crazy. If it were not for their input and ideas, I know I would not be able to do my job as effectively as I can. As they say, two heads are better than one.

In conclusion, I have grown so much from taking the risk of teaching science and I am now forever grateful to Mrs. Bravo, the principal who told me that I had to teach science. I think that she saw in me something I didn't know and I only hope that I can pass this on to the students I teach. They are all worth the risk.

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