Philosophy Rationale of Education

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Philosophy Background

Inspiration can be defined as the action or power of moving the intellect or emotions (Merriam-Webster Dictionary Online 2006). Inspiration can come in many forms and be delivered to others in various ways. As it pertains to my life, I believe that teachers are the lucky ones who possess the power to inspire the minds and emotions of those they teach. A teacher's job is never done, for what I teach today will last an eternity. I value my ability to positively influence a child's life by allowing them to engage in meaningful learning activities that they will remember forever.

For the past five years, teaching science has become a major component in my life. However, in truth, it is not the subject that I initially chose to teach. In fact, I was asked to loop with my very first class and move from a self-contained fifth grade class to a departmentalized sixth grade science position. I was reluctant to teach science at first because my scientific background knowledge was very limited. Initially, intimidation began to take over and I attempted to seek another position. Luckily, though, I did not find what I thought I was looking for at the time.

As my first official summer vacation as a teacher grew near, I began to think more positively about the opportunities the upcoming school year held. In fact, I utilized my time off to prepare for the journey upon which I was about to embark. I did what any other teacher would do. I read through some of the texts and researched different concepts to re-learn middle school level science concepts. When summer ended and the new school year began, I found myself excited and eager to teach science using a hands-on approach with many concrete activities planned for various times throughout the school year. Little did I know, five years ago, that I would be seeking a master's degree in science education and loving every minute that I teach and learn about science.

Importance of Science

Science is all around us! That statement alone expresses the importance of science education/ science literacy in our society. One of the very first concepts I teach my students is that everything we know in this universe is in some way, shape, or form related to science. Placing emphasis on the fact that science can be related to our daily lives inserts value on learning about specific scientific ideas and topics.

As I have become a more scientifically literate citizen over the past few years, I feel that I possess a deeper understanding of phenomena that occur within my daily life. Yet, many students are not afforded the same experiences with science as I have been fortunate enough in which to partake. I believe that science education is not valued highly enough in educational institutions, including K-12 schools and universities. It seemingly does not take precedence over other content areas such as mathematics or reading comprehension. The push for "high-stakes" testing in math, reading, and writing has put science on the back burner of the educational kitchen. In fact, one research report states that the general public and political legislators have minimized the priority of science education over recent years. This unfortunate fact has applied cost restraints to science education programs in many K-12 schools which have resulted in low achievement in standardized test scores in the content area of science (Jorgensen, MacDougall, and Llewellyn, 2003). As a result, a study conducted among our nation's high schools found that 82% of American 12th grade students performed below the

proficient level on the 2000 National Assessment of Educational Progress (NAEP) science test ("Facts About," 2004).

Although each content area is important in its own way, science education serves a purpose to explain and define natural, observable occurrences. Without the "why" there will be no "because" statements. In other words, when the general public and educational/ political leaders do not emphasize and value science education as equal to reading, writing, and math, then there will be a decline in scientifically literate citizens and student performance will be at an all time low. According to Lynn Arthur Steen, of St. Olaf University (1994), popular viewpoints both public and professional support an "elitist" idea of science education. There is a notion that scientific knowledge is presented as an "elitist pursuit requiring genius" (Scully, 2006, para.4). This means that mastery level achievement in science is attained by small groups of people who are proficient in difficult scientific concepts. Therefore, the notion some elitists believe is that those with the talent will succeed, which gives the impression that science is an exclusionary content area that should be directed to those who will benefit the most, whereas math, reading, and writing address a wider variety of learners. This theory of elitism contradicts points made that science is equally as important as reading and mathematics because it emphasizes the idea that talent prevails over effort as the necessary forecaster of success among students. It also detracts from the belief that everyone needs science in their daily lives.

Teaching Science Strategies

As research demonstrates, there are a variety of teaching strategies and methodologies to be used by educators. Some tactics for teaching science include the inquiry model, guided instruction, hands-on approaches, differentiated instruction, and project-based learning. Many recent studies indicate that some of the most effective and powerful ways that science is being taught in schools focuses on the inquiry-based approach.

The National Science Education Standards [NSES, retrieved January 16, 2007 p.23] defines scientific inquiry as:

> *the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Scientific inquiry also refers to the activities through which students develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world.* (National Science Teachers Association [NSTA], retrieved January 16, 2007, para.1).

The inquiry-based approach enhances the learning of science because it incorporates hands-on, project-based techniques, and differentiated instruction. The inquiry model allows students to learn through questioning, reasoning, and explanation of interactions within their own environments. When students engage in inquiry lessons, they gain a deeper understanding about the scientific concepts being presented and are able to recall and explain scientific phenomena based on investigative evidence. In addition, students who learn science through inquiry are more likely to apply concepts learned to real-life occurrences. In other words, utilizing an approach such as this will make learning science more applicable and meaningful to students in their daily lives.

On the other hand, science is not always being taught using the most effective strategies. Rather, some school teachers still incorporate science through direct instruction such as lecture, rote memorization of vocabulary and note-taking. One Carnegie Mellon psychologist is conducting a study in Pittsburgh with elementary students and how they acquire "CVS" (Control of Variable Strategy), which is the skill that allows scientists to design experiments and draw valid conclusions based on evidence (Klahr, 1998). Klahr along with fellow associates states that children need to be directly taught the skill of "CVS" as they will not be able to develop it on their own through discovery learning activities (1998). In fact, 5% of Americans polled in the Bayer Facts of Education Survey voted that "traditional" methods to teaching science are the best and most effective in the classroom (Bayer, 2007). Although these strategies are valuable tools for learning facts and terminology, these techniques are not necessarily engaging and do not always elicit students to gain a deep understanding of how things work. These strategies are not likely to produce meaningful learning opportunities when utilized in isolation. However, if educators were to use these strategies in conjunction with other, more engaging and interactive tactics, then teaching science would be more effective and beneficial to students. Under the "No Child Left Behind Act" the government is starting to see the need to increase student understanding in science, but is mandating that America's teachers are to only utilize research-based teaching methods and require schools to discard "unproven fads" ("Facts About," 2004). While research-based teaching methods may be effective, it seems unreasonable to mandate that it be the only method for teaching science in the classroom.

Furthermore, research suggests that emphasis should be placed on teacher education/ training programs in the content areas of science, so that highly qualified educators are responsible for producing more scientifically literate citizens. The National Science Teachers Association (NSTA) recommends that science educators should partake in inquiry based lessons as part of their preparation. It suggests that programs include lessons on how to develop appropriate inquiry based questions, writing lesson plans that support various learning abilities in order to understand scientific inquiry, and examining instructional resource materials that will enhance inquiry based activities (NSTA, retrieved January 16, 2007).

Differentiating Instruction

"If a child can't learn the way we teach, then maybe we should teach the way they learn." -Ignacio Estrada

A very important fact one learns in life is that people everywhere are different and diversity can come in many forms. Physical, behavioral, and emotional characteristics are listed as a few of the differences among individuals. Many people act, talk, think, and believe differently from one another. Knowing this, teachers have an obligation to identify these variances among their students and accommodate them accordingly.

Students learn in a variety of ways. Some alternative learning abilities can include concrete, auditory, visual, and analytical learners. Students who are classified as concrete/ tactile learners exhibit bodily-kinesthetic intelligence and ultimately understand concepts by engaging in hands-on activities. These students need to apply abstract concepts to concrete evidence through hands-on tasks. Auditory learners demonstrate linguistic intelligences and process information by listening and hearing concepts being

taught aloud in a classroom. These typically are students who talk aloud to themselves to solve a problem or who will read aloud to themselves so that they may hear the information being taught. Another variation of linguistic intelligence learning comes in the form of visualization. Visual learners absorb concepts through seeing charts, graphs, pictures, etc. In order for them to process information, they may need to see a demonstration or written directions. In addition, the analytical learners are the "thinkers" and portray logical-mathematical intelligence. These students can conceptualize and think abstractly about concepts being taught. They will process information by reading in a text or through research on a topic. Based on research, the key to teaching a classroom full of different learners is knowing how to reach all of them by creating an environment that is conducive for each one of their learning styles and multiple intelligences.

To reach all of my learners, I differentiate my instruction and utilize a vast array of strategies in my classroom. Differentiating instruction enables all students to have the chance to learn core concepts by offering those learning opportunities and tasks that are appropriate for each student's needs ("Differentiated," retrieved January 16, 2007.). In my classroom, I incorporate learning communities devised of students from various ability/ readiness levels, motivational levels, and learning styles. I execute interactive tasks to keep students engaged in the learning process in addition to meeting individualized needs. Differentiating science lessons takes form by facilitating students in exploration of topics in which they are interested, utilizing inquiry based tasks, and strengthening their research skills on specified content areas ("Differentiated," retrieved January 16, 2007). I find that varying structure of my lessons elicits student response and motivates them to learn in my classroom while working toward individual academic goals.

Overall Philosophy

I believe that motivation is an important factor as a teacher. I feel that I can accommodate the learning styles and individual needs of my students by planning engaging, interactive lessons using an inquiry based approach. I am able to accomplish my professional goal as an educator to motivate my students to want to learn how to become scientifically literate citizens. Every day that I modify my teaching to accommodate their learning, I believe I am moving towards my goal of creating life-long learners.

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