

Examination of Pre-Service Teachers' Learning Styles and Temperament Styles within an Elementary Science Methods Course

L. Octavia Tripp
Auburn University

Sheila D. Moore
Auburn University

Abstract

Pre-service teachers enrolled in an elementary science methods class were introduced to teaching strategies that enhanced how students learn in different ways. While their major content focus was science, they were instructed in the understanding and use of learning styles and temperament styles as it applied to teaching science. Elementary pre-service teachers in methods courses enter into their teacher education program with different levels of motivation, attitudes, and ideas about teaching and learning. Many times they are not prepared to deal with classroom environments and instructional practices. This study introduced pre-service teachers to learning styles and temperament styles models. Inventories of each were given to pre-service teachers for the assessment of their own learning style and temperament style. Pre-service teachers, once made aware of their learning and temperament styles, were better able to identify student differences, meet the needs of diverse learners, and enhance classroom instruction.

Introduction

When the No Child Left Behind Act was adopted in 2001, there was an increased focus on student achievement and how students learn and behave. Teachers were faced with the construct that every child can learn and adopted strategies for reaching that goal. As a result, teacher preparation programs in schools of education placed emphasis on training teachers in various methods of instruction. Teacher preparation programs accredited by the National Council for Accreditation of Teacher Education (NCATE) met national standards that emphasized the following:

- Knowledge of subject matter and a variety of ways of teaching all students to learn;
- Encouragement of students ability to think critically;
- Creation of a supportive environment to encourage active interest in learning;
- Classroom management of students who vary in learning styles.

Being accredited by NCATE symbolizes colleges of education's dedication to producing high quality teachers. As a result of the NCATE standards, the researchers of this study sought to implement these standards through the introduction of learning styles and temperament styles. NCATE standards are aligned with the research of understanding how children learn and children's preferences for learning.

Students bring to the classroom different attitudes, learning styles, and assumptions. (Cofffield & Moseley, 2004a; 2004b; Duff, 2002; Duff, 2004; Dunn & Griggs, 2000; Felder & Silverman, 1988; Kolb, 1984; Kolb & Kolb, 2005). Students tend to focus on facts, data, and algorithms. Some respond strongly to visual forms of information and many others prefer to learn actively and individually. Functioning effectively requires working well in a variety of learning styles models (Felder, 2005; Svinicki & Dixon, 1987).

Purpose of the Study

The purpose of this study was to introduce pre-service teachers in an elementary science class to learning styles and temperament styles as it relates to an additional teaching tool and strategy. This awareness and understanding of how students learn, helps pre-service teachers make better decisions in teaching strategies because students learn in different ways. The introduction of temperament styles and learning styles support pre-service teachers' awareness of their learning and temperament traits in relation to students' learning styles and temperament styles. In knowing their own styles and traits, they recognize that students may not process information in the same way as that of the teacher thus providing a barrier to student learning and achievement. This awareness and understanding of learning styles and temperament styles will be an added teaching tool to encourage confidence in the teaching of science in the classroom.

Learning Styles and Temperament Styles

Mismatches occur between students and teachers when the teacher is not aware of the student's learning styles and temperament styles. Keefe (1982) defined learning styles as characteristic cognitive affective and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with or respond to the learning environment.

Dunn and Dunn (1992) suggest that research on learning styles provides direction for either how to teach individuals through their styles, patterns or how to teach them by capitalizing on their personal strengths. Learning style can also be defined as the way in which each learner begins to concentrate on, process, and retain new and difficult information. (1992). Identifying learning styles and adapting lessons

can motivate, encourage students to succeed, and eliminate unfair labeling. Different individuals perceive and process experiences in different preferred ways (Brokaw & Merz, 2000; Dunn & Dunn, 1989; Dunn, Griggs, Olson, Beasley, & Gorman, 1995; Felder, 1993; McCarthy, 1981).

Students' unique learning styles are comprised of these preferences. McCarthy (1981) identified three basic types of learners; visual, auditory, and kinesthetic. Visual learners process information through sight (pictures, models, diagrams, demonstration, and other visual aids). Auditory learners use hearing as their main source of information. Their preference is lecture, discussions, and listening to others. Kinesthetic learners prefer hands on approaches to acquire knowledge. This type of learner likes to explore the physical world by touching and movement (McCarthy, 1981).

Temperament can be defined as a solid core of traits of one's personality that reflects the unique essence of a particular human being. Bryce (2002) suggests that temperaments are built on the interpretation of life, code of behavior and a mystery of understanding. Temperament points us each in a particular direction and makes us uncomfortable when we deviate from it.

At birth, individuals are equipped with fundamentally different temperaments or dispositions to act in certain ways. It was suggested that people's patterns of attitude and action are inborn as their body develops (Keirsey, 1998).

One may propose that people communicate in different ways, have different mating, parenting, and learning styles. They desire to learn different things at school and excel differently at work (Keirsey, 1998). There seems to be a lot to gain by appreciating these differences and a lot to be lost if we ignore them or condemn them. The first step to understanding differences is for one to understand one's own personal traits, whether it is learning styles or temperament styles.

Nelson (2002) discusses the learning nexus. This learning nexus is the point at which all learning styles incorporate elements of learning. It is a common ground, the connecting point that all learners share. When we can learn to focus our teaching in this area, the nexus, we can be confident that our teaching is going to reach the learning styles of each of our students. "If we stand firmly, where all learning preferences overlap, we have the best likelihood of meeting the learning needs of our students and the curricular needs established by our districts" (Nelson, 2002, p. 155). Nelson in his work *The Aristotle Effect* found that too often teachers who are determined to reach certain individuals in their classes forget about their need to meet the learning needs of all class members. There is a need for balance within the learning style as well as the temperament style when instructing students. No one lesson should focus on only one learning style or one temperament style. Teachers should strive for balance in their instructional methods. If balance is functioning in the classroom then students will be

instructed in ways that incorporate all of the learning styles preferences which could enhance increased comfort level, willingness to learn, and improved student achievement.

In college teacher preparation courses learning style models along with that of temperament models should be taught for the purpose of preparing new teachers to discover that students do have different learning styles and temperament styles. If pre-service teachers understand these differences and incorporate them into the classroom, teachers can be more effective educators and students can become better learners (Bryce, 2002).

Why did the researchers then look at introducing learning styles and temperament styles in the science classroom? Elementary pre-service teachers are typically not prepared to teach science content. They often fear not knowing the content sufficiently, not feeling confident enough to conduct science demonstrations, and not prepared to create or design science activities for the classroom (Prairie, 2005). The preference in science is to teach in an inquiry and discovery method which has attributes of hands on activities. However, there are students who prefer learning through, lecture, listening, and demonstrations. Understanding the use of temperament styles in the science classroom allows students to participate in cooperative learning groups, individual and independent learning, inquiry and discovery, and creative drama. Bryce (2002) indicated that when temperament styles are included in the classroom, magic transpires and every ones preferences are accommodated. This magic in the classroom encompasses the teacher meeting the learning and temperament styles of the students.

Learning Styles and Temperament Styles in the Science Classroom

The Felder-Silverman Learning Style Model was used effectively in engineering education and the sciences (Felder & Spurlin, 2005). Felder and Silverman's model is based on strategies that present information that appeals to a range of learning styles (Felder & Silverman, 1998). These strategies are:

- Teach theoretical material by first presenting phenomena and problems that relate to the theory;
- Balance conceptual information with concrete information;
- Make extensive use of sketches, plots, schematics, vector diagrams, computer graphics, and physical demonstration in addition to oral and written explanations and derivations in lectures and readings;
- Illustrate an abstract concept or problem solving algorithm, use at least one numerical example to supplement the usual algebraic example;
- Use physical analogies and demonstrations to illustrate the magnitudes of calculated quantities;

- Provide class time for students to think about the material being presented and for active student participation;
- Occasionally give some experimental observations before presenting the general principle, and have the students see how far they can get toward inferring the latter.

Typically in engineering classes students are viewed as passive and not seen as active or reflective. Felder and Silverman suggest to improve test scores, reduce hostile classes, poor attendance and drop outs, it is necessary that a teaching style that is both effective for students and comfortable for the professor is implemented.

As a result, this model was chosen to be implemented in the science elementary methods course. Based on various applications of the model by other researchers, one being Susan Montgomery, assistant professor of chemical engineering at the University of Michigan this model has had documented results with achievement, and usefulness in preparing students to learn in engineering and the sciences. Felder and Silverman (1988) classified students as:

- Active and reflective learners (learn by trying things, learn by thinking things through);
- Sensing and intuitive learners (concrete, practical, oriented towards facts and procedures, conceptual, oriented towards theories and meanings);
- Visual and verbal learners (prefer visual representations, prefer written and spoken communications);
- Sequential and global learners (linear, orderly, learn in small incremental steps, holistic, systems thinkers, learn in large steps).

Nathan Bryce (2002) developed the Insight Temperament Instrument TM, a temperament inventory based on extensive research and experimentation of the Myers-Briggs Type Indicator (MBTI) and the Keirsey Temperament Sorter. Bryce (2002) suggests that this temperament inventory can be used in the classroom as a tool to increase respect and sensitivity to the needs, values, and attitudes of others. This tool identifies an individual's temperament profile as four archetypal temperaments from which all personality styles are derived (Bryce, 2002).

These temperaments are symbolized by color: blue, gold, green, and orange. Each color has clear preferences on how one likes to learn information as it relates to favorite subjects, idea classroom environment, motivation to learn, sources of esteem, testing, and individualized learning styles. The temperament spectrum includes:

- Blue characteristic learners (likes activities that emphasizes cooperation, values close relationships, thrive on interaction and dialog);
- Gold characteristic learners (dutiful and stable, value order and organization, are responsible and dedicated);

- Green characteristic learners (innovative and logical, require intellectual freedom, value concise communication);
- Orange characteristic learners (active and competitive, talented resourceful, skillful, and adaptable, value visual, verbal, and hands on activities).

Methods

This study involved 28 female elementary pre-service teachers enrolled in a science elementary methods course at a rural southeast university. The goal of the study was to introduce pre-service teachers to learning styles and temperament styles. A class assignment was given to the 28 pre-service teachers so that the pre-service teachers would be able to identify their learning/temperament style and to observe students learning/temperament styles. Pre-service teachers observed students during their field experiences who exhibited certain learning styles and temperament styles. From their observations, pre-service teachers chose teaching strategies that aligned with how students learned and their preferences for learning associated with their temperament styles. Pre-service teaching styles were modified based on observations of student's learning styles. Their class assignment included lesson plans with activities aligned with the teaching strategies of Felder's Learning Style Model and Bryce's Insight Learning Temperament Model.

After the pre-service teachers taught their classes, they participated in a class discussion of what they learned from their experiences. Pre-service teachers reflected in a final paper about how the introduction of learning styles and temperament styles made a significant impact on instruction and student learning.

The Felder-Silverman Learning Styles Questionnaire was administered to 28 pre-service teachers. The survey results indicated that, 14 were active, sensing, visual, and sequential; 5 were reflective, intuitive, verbal, and global; 6 were active, intuitive, visual, and sequential; and 3 were active, sequential, verbal, and global.

Bryce's Insight Temperament Instrument was administered to 28 pre-service teachers to determine their color spectrum. The color spectrum is defined as their primary temperament, secondary temperament, third and fourth temperament, all of which have characteristics that defines an individual's behavior. Out of the 28 pre-service teachers participants; 19 were determined to be cooperative, organized, logical, and active; 3 were determined to be organized, active, cooperative, and logical; 3 were determined to be active, organized, cooperative, and logical; 2 were determined to be cooperative, logical, organized, and active; and 1 was determined to be logical, cooperative, active, and organized. All of which falls within the characteristics of the color spectrum.

Findings

Based upon the discussion in the science methods class and exposure to the learning/temperament styles instruments, pre-service teachers found that their observations of students' learning styles and temperament styles and their own teaching methods and learning/temperament styles were useful in teaching science. The students reported their findings in a five page paper, using a rubric which identified theory, instruments, and the color spectrum. The following comments suggest how pre-service teachers bring into being the knowledge and exposure to learning/temperaments styles and the usefulness in the elementary science classroom:

"After learning about learning styles and temperament styles I feel more sensitive to people who are different to me and understanding learning styles help me prepare better lessons for my students."

"I am now better able to provide lessons in more colorful and more visual instead of relying on the text to guide me."

"During my lab experience there was a time during a science lesson when I think I taught all four models of learning."

"Teachers need to be aware of their student's individual learning style to better suit the needs of their students."

"Sometimes as a teacher I have to go against my own learning style to accommodate the diverse learning styles in my classroom. I feel that I am better able to provide learning experiences for students if I am aware of their learning styles."

"I feel that it is necessary for an effective teacher to know students temperaments. By knowing their strengths, weaknesses, and motivators, teacher can plan activities that meet the needs of each student."

"By learning my own temperament and learning style helps me to better understand what areas in my teaching profession I need to improve upon as well as to help me learn how my students in the classroom learn."

"I think that balance is important in a classroom. I think I understand how to balance learning and temperament better. At least knowing this I will be able to not only achieve more but to achieve it more effectively to the benefit each and every one of my students."

Based upon information gathered from the pre-service teacher's comments, it appears that they are knowledgeable about adapting their teaching techniques to student's preferred learning and temperament styles.

Implications

According to Bryce (2002), there has been no relationship between temperament and learning styles. For the purpose of this study, pre-service teachers have seen the importance of teaching students in a science class the way they learn and how they want to learn. They have implemented more inquiry and discovery which is one of the National Education Science Standards- Content Standard A- Science as Inquiry. Most of all they have seen how teaching strategies that include learning styles and temperament styles have been effective in preparing students to learn. Additional research is needed to examine the relationship of learning styles and temperament styles. The researchers suggest the following:

- Methods courses in teacher education should encourage pre-service teachers to make use of learning styles and temperament styles;
- Staff development encompassing learning styles and temperament styles should be ongoing;
- With the recent introduction of the No Child Left Behind Act of 2002 the endorsement of the National Council of Teachers of Mathematics, 1989, and the National Science Teachers Association, 1992, science instruction is mandated on the national and state levels; thereby new and different strategies should focus on how teachers teach and students learn;
- Equip new teachers with further training on learning styles and temperament styles;
- More research conducted as to the correlation of learning styles and temperament styles;
- Conduct more formal research among teacher temperament styles and learning styles to see if temperament styles and learning styles correlate to increase student achievement.

Conclusion

In the future, teacher preparation programs would be best served by assessing their methods courses to include learning styles and temperament styles as part of the curriculum. Attitudes and assumptions that future teachers will understand how diverse student populations learn and behave cannot be automatically assumed. Unlike students in the past, students are exposed to greater information and content knowledge requirements that previously found, and with legislation such as the No Child Left Behind Act (2002), teachers are expected to meet or exceed the established goals.

Pre-service teachers, as well as new teachers need to acquire classroom skills that encompass the knowledge of learning styles and temperament styles. Teaching methods must be adaptable to student's different learning styles, and be able to differentiate their temperament styles. Pre-service teachers as they enter into the classroom must be determined to meet the needs of every child.

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Author's Note

Dr. L. Octavia Tripp is an Assistant Professor in Elementary Education within the Department of Curriculum and Teaching, 5040 Haley Center, Auburn University, AL 36849

Sheila D. Moore is a doctoral student within the Department of Educational Foundations, Leadership, and Technology and works with the Truman Pierce Institute, 2195 Haley Center, Auburn University, AL 36849