Differentiated Instruction and Technology

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INTRODUCTION

Differentiated Instruction

The variety of students' needs and backgrounds in classrooms include students with special needs, gifted, and typical students who have grown up in differing socio-economic levels and diverse cultures. Differentiated instruction is based on the premise that instructional approaches should vary and should be adapted in relation to individual and diverse students in classrooms (Tomlinson, 2001). When teachers engage in differentiated instruction, they address every student's interests, ability levels, and learning profiles. The instructor plans both curriculum and instruction that honor the individual student's strengths and needs in order to benefit the learning of all the students (Tomlinson, 1999; Tomlinson & Eidson, 2003). Teachers adapt their content (what will be taught), process (how it will be taught), and product (the assessment of the content through culminating projects) in order to differentiate instruction (Hipsky, 2006a). The reality of why instructors should be differentiating instruction goes beyond theory into the reality of today's classrooms. Teacher Patricia Holliday expressed,

"Even though it takes a lot of time upfront to plan for a differentiated classroom, the benefits have been proven. Each year that I get better at planning for differentiation, I can see an improvement in the outcomes of my students" (Lewis & Batts, 2005, p. 32).

Ability Levels

Many of the concepts that are utilized in differentiated instruction are used in special education to meet the needs of those students that are on the ends of the ability spectrum. Differentiated instruction extends the concept of individualizing to meet the needs of all students in the class whether they are below average, average, or above average ability.

Curriculum Compacting

"Curriculum compacting" is a technique that has been used for gifted students that focuses on the most important learning skills and utilizes the child's talents and strengths to delve deeper into knowledge. The instructor identifies the goals and standards for each student who will engage in the compacting. A discussion takes place regarding what needs to be learned, what the potential enrichment activities are, and how the student will be assessed. Collaboratively, the student and teacher determine enrichment materials and guidelines for projects. Seminars conducted over the Web or in person, apprenticeships, and virtual mentoring can add to the compacting experience for the student.

Tiered Instruction

When planning tiered instruction, the teacher gears the lesson and activities toward the average student. Then that lesson is either leveled up or down to meet the ability level of each student. Often the students find activities that have been tiered to their needs in folders, at stations, or on computers.

Learning Profiles

A student's learning profile is determined predominantly by learning style. The teacher and student need to decide how the student learns best. Some look to the theorists in intelligence, Gardner and Sternberg, to support their decisions about students' learning styles. By establishing a student's learning profile, the teachers can garner insight into how to prepare instruction that will enhance the student's strengths and work on individual needs.

According to Gardner, students can have one or many ways of learning that dictate their strongest mode of learning. Gardner's Theory of Multiple Intelligences includes: verbal/linguistic, spatial, bodily/kinesthetic, logical/mathematical, musical, interpersonal, intra-

personal, naturalist, and existential (Gardner, 1983, 1999).

Sternberg's Triarchic Theory of Successful Intelligence includes creative intelligence (ability to go beyond what is given to generate unique and interesting ideas), analytical intelligence (ability to analyze and evaluate ideas), and practical intelligence (the ability that individuals use to find the best fit between themselves and the demands of the environment). According to Sternberg, students need to make the finest use of these strengths. Not everyone is naturally disposed to excel in all three. Therefore, the students need to utilize coping skills to compensate for weaknesses in any of these areas. This balance of intelligences can lead to student success (Sternberg, 1985, 1996). There are some teaching techniques that specifically tap into the student's learning profiles including using software such as Kid Pix®, Kidspiration®, and Inspiration® for students who need to learn visually, hear, or interact with information.

Learning Contracts

Learning contracts are a way to guide the students toward meeting the needs of learning profiles. Often the students recognize their own learning style. A contract allows the student to take responsibility for determining not only the way the information will be garnered, but also how the findings will be presented. Gregory and Kuzmich (2005) created a list of questions for the planning of a learning contract for differentiated instruction:

- How will the student demonstrate what was learned (i.e., record work, use a computer, or work with a partner)?
- What type of time and work would help the student to finish the assignment (i.e., extra time, fewer items, and/or new work)?
- What type of resources and materials does the student need (i.e., extra help from my teacher, use the Internet, and/or use different materials)?
- What else does the student need to be successful? In response to that last question, the student would write or draw what is needed.

After an agreement has been reached, the teacher and student would sign the learning contract. The student would be held accountable for the knowledge gained and for demonstrating growth in the way that they mutually decided is best.

Interests

A variety of interests—from sports to the arts—can be taken into consideration in a classroom, and weaving these interests into instruction can lead to "flow" for the students. "The concept of flow, according to Csikszentmihalyi (1990), involves a state of consciousness in which a person becomes so totally immersed in an activity that time flies by unnoticed" (Hipsky, 2006b, p. 188). Through active differentiated learning in combination with the students' interests, the state of flow can be reached in the classroom.

Technology: Software for Differentiating Instruction

Kent State University professor, Leskovec (2005), studied the effect of CC Lab software on differentiating instruction in math and reading on first grade students. The results of the study were determined by surveys, observations, interviews, and pre- and post-tests. It established that all of the students who participated made gains in the standards that were to be met. The students can access the software and work at their own appropriate level. The CC Lab Software generates reports for a communication and assessment tool.

In 1979, Bernice McCarthy created the 4MAT Method (http://www. aboutlearning.com/) which is a cycle for delivering instruction of any kind in a way that: (1) connects to learners, (2) offers an opportunity for practice, (3) provides relevant information, and (4) allows for creative adaptation of material learned. The process of the 4MAT Method can now be found in a software package developed for instructors to engage learners and go beyond the "drill and kill" redundancy of traditional instruction.

Scholastic's Read 180 (http://teacher.scholastic.com/products/read180/overview/) is adaptive and instructional software that utilizes high-interest literature, and direct instruction in reading and writing to differentiate instruction for English/Language Arts classes. The Enterprise version of the Read 180 software is available to meet the needs of students who speak Spanish, Cantonese, Hmong, Vietnamese, and Haitian Creole. The management system utilizes an achievement manager that captures data on student performance