

**Differentiated Instructional Strategies to Accommodate Students with Varying
Needs and Learning Styles**

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Abstract: Students enter classrooms with different abilities, learning styles, and personalities. Educators are mandated to see that all students meet the standards of their district and state. Through the use of differentiated instructional strategies, teachers can meet the varying needs of all students and help them to meet and exceed the established standards (Levy, 2008). Differentiated teaching provides paths to learning so that the classroom becomes a ‘good fit’ for varied learners (Adami, 2004). In this manuscript, the authors give the theory behind differentiated instruction to enhance learning and provide practical examples of how to differentiate content, process, and product for students.

Keywords: differentiated instruction, learning styles, standards

Introduction

Educators are mandated to see that all students meet the standards of their district and state. Through the use of differentiated instructional strategies, educators can meet the needs of all students and help them to meet and exceed the established standards (Levy, 2008). The objective is accomplished by choosing appropriate teaching methods to match each individual student’s learning needs (Adami, 2004).

Any group of students is likely to demonstrate considerable variation in their learning characteristics and behaviors. When the group includes students with learning deficiencies or other learning disorders, the amount of variation in learning is significantly increased. The diverse learning characteristics displayed by students in today’s schools make it necessary for teachers to implement a wide variety of activities in their classes (Bender, 2012). As classrooms

become more culturally diverse, it becomes more imperative to differentiate instruction (Cox, 2008).

Differentiated instruction is appropriate for virtually all general education classes and is particularly beneficial to students with an array of learning challenges. Students demonstrate varying learning abilities, academic levels, learning styles, and learning preferences and need tailored instruction to meet their unique needs (Bender, 2012). Differentiated instruction recognizes the value and worth that exist in each individual; it allows students from all backgrounds and with diverse abilities to demonstrate what they know, understand, and are capable of doing (Adami, 2004).

Differentiated instruction was originated by C.A. Tomlinson in 1999, basing it primarily on Howard Gardner's concept of multiple intelligences and brain-compatible research literature. Teachers were encouraged to consider students' unique learning styles and differentiate educational activities to provide for their divergent learning styles by differentiating instruction in three areas: content, process, and product (Bender, 2012). In differentiating instruction, teachers proactively modify the curriculum, teaching methods, resources, learning activities, and student products to address the needs of individual students and small groups of students to maximize the learning opportunity for each student in the classroom (Hillier, 2011).

This study reviews the literature on differentiated instruction, surveys a select group of students' interests and learning styles, and provides suggestions for meeting the educational needs of the students.

Review of Related Literature

Tomlinson and Allan (2000) defined differentiation as a teacher's reacting responsively to a learner's needs. The student's need may be to express humor, work with a group, have

additional teaching on a particular skill, delve more deeply into a particular topic, or have guided help with a reading passage – and the teacher responds actively and positively to that need on an individual basis or with a small group of students. The authors further stated that the goal of differentiated instruction is maximum student growth and individual success, and the key principles that guide differentiated instruction include flexibility in learning goals, effective and ongoing assessment, flexible grouping, “respectful” activities and learning arrangements, and collaboration between students and teacher. The elements of the curriculum that can be differentiated are content (the facts, concepts, generalizations or principles, attitudes, and skills related to the subject), process (how the learner comes to make sense of, understand, and “own” the key facts, concepts, generalizations, and skills of the subject), and products (items a student can use to demonstrate what he or she has come to know, understand, and be able to do as the result of an extended period of study). Student characteristics for which teachers can differentiate are readiness, interest, and learning profile. Instructional strategies that facilitate differentiation include learning centers, interest groups, group investigation, complex instruction, compacting, learning contracts, tiered activities, and tiered products.

Every teacher differentiates instruction in one way or another, for example, by giving a student more time to finish an assignment, allowing children choice in what to read, or giving different types of assessments. However, a teacher can make the classroom more responsive to student needs with a systematic approach to differentiation (Levy, 2008). Differentiated instruction means that teachers create different levels of expectations for task completion, and emphasize the creation of environments where all learners can be successful; it addresses the "how to" question for teachers and calls upon educators to be responsive to learners (Tobin, 2008). Hillier (2011) specifies four major principles of differentiated instruction: it focuses on

the essentials (manipulate the complexity of activities and expectations), links assessment and instruction, involves collaborative learning between the teacher and students, and all students participating in respectful work. It is teaching with student variance in mind to maximize the capacity of each learner by bridging gaps in understanding and skills and helping each learner grow as much and as quickly as he or she can (Cox, 2008).

Differentiated instruction integrates knowledge about constructivist learning theory, learning styles, and brain development with empirical research on influencing factors of learner readiness, interest, and intelligence preferences toward students' motivation, engagement, and academic growth within schools (Tomlinson & Allan, 2000). Teachers who differentiate instruction incorporate best practices in moving all of their students toward proficiency in the knowledge and skills established in state and local standards (Anderson, 2007). Differentiated instruction adapts learning to students' unique differences (Chapman & King, 2005) based on students' current abilities and understandings, personal interests, and learning preferences (Chamberlin & Powers, 2010). Effective characteristics of differentiated instruction include clear learning goals, ongoing and diagnostic assessments that modify instruction and challenging tasks for all students (Chamberlin & Powers, 2010). Modifying instruction to draw on student interests is likely to result in greater student engagement, higher levels of intrinsic motivation, higher student productivity, greater student autonomy, increased achievement, and an improved sense of self-competence (Cox, 2008).

The balance of this literature review focuses on the theoretical basis of differentiated instruction, the three areas of differentiation, significance of learning and teaching styles, and some promising strategies for meeting the needs of students with varying educational and learning needs.

Theoretical basis for differentiated instruction

Differentiated instruction was primarily based on the theory of multiple intelligences by Howard Gardner and brain-compatible research. Gardner postulated eight different intelligences that are relatively independent but interacting cognitive capacities. The intelligences are verbal-linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, naturalistic, interpersonal, intrapersonal, and a tentative ninth one, moral intelligence. Some students demonstrate strong intelligence in one area, whereas other may demonstrate strengths in several intelligences (Bender, 2012). Each child will have his or her own unique set of intellectual strengths and weaknesses (Brualdi, 1998). For clarity, learning style, learning preference, and multiple intelligences are often used synonymously (Bender, 2012; Brualdi, 1998).

It is important, from a multiple intelligences perspective, that teachers take individual differences among students very seriously. They should gear how to teach and how to evaluate to the needs of the particular child. The bottom line is having a deep interest in children and how their minds are different from one another to help them use their minds well. Linking the multiple intelligences with a curriculum focused on understanding is an extremely powerful intellectual undertaking (Brualdi, 1998; Checkley, 1997).

Brain-compatible instruction is related to the multiple intelligences concept but it is more solidly grounded in the neurosciences. Brain-scanning techniques allow scientists to study performance of the human brain while the subject concentrates on different types of learning tasks. It has been discovered that brains perform best when highly motivated and involved and experiencing “manageable” stress (Bender, 2012).

Three areas of differentiated instruction

The core of differentiated instruction is flexibility in content, process, and product based on students' strengths, needs, and learning styles. Content is what students are to master or learn from the instruction; process is how the students must complete the learning content; and product is how the learning is demonstrated or observed (Bender, 2012; Cox, 2008). In the content area each child is taught the same curriculum but it may be quantitatively or qualitatively different (Adami, 2004; Levy, 2008). Process includes how teachers teach and how students learn. The activities provided for student learning must address differing student abilities, learning styles, and interests. Teachers must adjust their teaching style to reflect the needs of different students by finding out where students are when they come into the process and building on their prior knowledge to advance their learning (Adami, 2004; Levy, 2008). Product is the way students demonstrate what they have learned. It must reflect student learning styles and abilities (Levy, 2008). Differentiation by product, or response, must also acknowledge, respect, and value the various ways that students may respond to an activity; but unfortunately, written work is still the predominate mode used by teachers for receiving feedback (Adami, 2004).

Learning styles and teaching styles

How much a student learns in a class is governed in part by that student's native ability and prior preparation but also by the compatibility of his or her learning style and the instructor's teaching style. If mismatches exist between learning styles and teaching styles students become bored and inattentive in class, do poorly on tests, get discouraged about the courses, the curriculum, and themselves, and in some cases change to other curricula or drop out of school (Felder & Silverman, 1988). Students whose learning styles are compatible with the teaching style tend to retain information longer, apply it more effectively, and have more positive post-

course attitudes toward the subject than do their counterparts who experience learning/teaching style mismatches.

Felder and Silverman (1998) synthesized findings from a number of studies to formulate a learning style model with dimensions. A student's learning style may be defined in part by answers to five questions: 1. What type of information does the student preferentially perceive: sensory (sights, sounds, physical sensation) or intuitive (memories, ideas, insights)? 2. Through which modality is sensory information most effectively perceived: visual (pictures, diagrams, graphs, demonstrations) or verbal (sounds, written and spoken words and formulas)? 3. With which organization of information is the student most comfortable: inductive (facts and observations are given, underlying principles are inferred) or deductive (principles are given, consequences and applications are deduced)? 4. How does the student prefer to process information: actively (through engagement in physical activity or discussion), or reflectively (through introspection)? and 5. How does the student progress toward understanding: sequentially (in a logical progression of small incremental steps), or globally (in large jumps, holistically)? The dichotomous learning style dimensions of this model are a continua and not either/or categories. A student's preference on a given scale may be strong, moderate, or almost nonexistent, either of which may change with time or vary from one subject or learning environment to another (Felder, 1993).

According to Katsioloudis and Fantz (2012), learning styles are personal qualities that influence the way students interact with their learning environment, peers, and teachers. They reported four learning style dimensions: sensing learners (concrete, practical, oriented towards facts and procedures) or intuitive learners (conceptual, innovative, oriented towards theories and meanings); visual learners (prefer visual representations – pictures, diagrams, flow charts) or

verbal learners (prefer written and spoken explanations); active learners (learn by trying things, working with others) or reflective learners (learn by thinking things through, working alone); and sequential learners (learn in small incremental steps, linear, orderly) or global learners (learn in large leaps, holistic, systems thinkers (cited from Felder, 1996, p. 19).

Just as students have preferred learning styles, teachers have preferred teaching styles. Jain (2008) categorized teaching styles as: formal authority (teacher provides and controls flow of content, students expected to receive content); demonstrator or personal model (teacher acts as role model, demonstrating skills and processes; coaches students in developing, applying skills and knowledge); facilitator (teaching emphasizes student-centered learning); and delegator (students choice in designing, implementing learning projects; teacher in consultative role). Grasha (1994) posited that teachers actually possess each of the qualities described (including “expert” style – possessor of knowledge, expertise that students need) to varying degrees; they use some styles more often than others, and some blends of styles are dominant and others are secondary. The author further advanced that a given teaching style creates a particular mood or emotional climate in class. For example, the expert/formal authority blend may suggest “I’m in charge here” and may create a “cool” emotional climate; whereas, the expert/facilitative/delegative blend may suggest “I’m here to consult and explore with you” and may create a “warm” climate.

Katsioloudis and Fantz (2012) stated that teachers who adapt their teaching style to include both poles of each of the given learning style dimensions should come close to providing an optimal learning environment for most, if not all, students in a class. Matching teaching strategies to a student’s preferred learning style is likely to promote understanding and retention of information. Complementary, through an awareness of the preferred teaching style, teachers

may gain a better understanding of themselves and how their teaching style can be changed, modified, or supported to improve their interactions with students (Evans, Harkins, & Young, 2008). When teachers do master differentiated teaching, ensuring that each student consistently experiences the reality that success is likely to follow hard work, the result is enhanced job satisfaction (Adami, 2004; Tomlinson, 1999).

Some Principal Differentiated Instructional Strategies and Their Effectiveness

Wu (2013) presented a number of instructional strategies that teachers can use to differentiate instruction. One of the most important strategies is a teacher working with a small group of students. With 6 or 8 students in close proximity the teacher can ask individual questions and ascertain where students are stuck or when they are ready to move ahead. Learning stations are useful for differentiation. They are areas in the room where the students go to do specified work. Instructions at the station provide guidance on how to complete work appropriately, how to get help, where to put completed work and so on. Learning contracts are another helpful strategy. They allow teachers to design tasks targeted to particular student needs and also to give all students some in-common tasks. Typically students have the same number of tasks on their contracts and are all working on the same fundamental learning goals, but the work can emphasize a student's particular next steps toward those goals. Edwards and Pula (2008) discussed conferencing as a differentiated strategy to improve writing skills and ensure student success. Other differentiation strategies include "tiered activities," where the teacher keeps the concepts and skills the same for each student but provides "routes of access" that vary in complexity, abstractness, and open-endedness. Teachers may also use interest centers and anchor activities (Cox, 2008), focusing on the diverse needs of the individual learners (Chapman & King, 2005). But in spite of the many available strategies, Adami (2004) indicated that

unfortunately many teachers still favor the whole-class teaching strategy rather than flexible grouping based on readiness, interests, or learning profile. Students' gender, culture, learning style, and intelligence preference can shape their learning profile (Cox, 2008).

Cusumano and Mueller (2007) reported on their elementary school's effort at implementing differentiated instruction to address their students' diverse learning needs. The school's API scores increased steadily and their AYP targets were met. Concurrently, there was a significant decline in student discipline referrals; teacher morale was higher; and there was remarkable improvement in students' reading, writing, and math performance levels. A key method used was fluid and flexible groupings through requisite assessment and continuous progress monitoring. In another study differentiated instruction based on students' readiness, interests and learning profile led to enhanced achievement, study habits, social interaction, cooperation, attitude toward school, self-worth, motivation and engagement (Chamberlin & Powers, 2010). Differentiated instruction can also demonstrate institutional effectiveness and equip students with diverse learning experiences to highly respond to increased challenges in the global society. In higher education teaching is becoming more challenging as student populations become more culturally, socially, and academically diverse and the notion of "one-size-fits-all" does not work effectively (Pham, 2012). Unfortunately, differentiated instruction is not readily implemented in college, despite evidence supporting learning gains and other benefits in grades kindergarten-12 (Chamberlin & Powers, 2010).

Purpose

This study included an extensive review of the literature to establish a theoretical basis for differentiated instruction, to conceptualize and refine the three basic areas of differentiated instruction, and to determine some key differentiated instructional strategies that have promise

for success with students with varying learning styles and abilities. A further objective of the study was to develop a survey instrument and assess the learning characteristics of a select population to determine their interest, abilities, and learning styles to which recommendations could be made on how instruction might be differentiated to meet their academic needs.

Method

After reviewing the literature, a survey instrument was developed and validated to assess the learning characteristics of students. The instrument was constructed around tenets of the theories of multiple intelligences and brain instruction. The five-component questionnaire, consisting of 25 items, was first presented to a graduate class in advanced assessment to validate its authenticity. Nine graduate students reviewed the draft and made comments for its improvement. Their comments were taken into consideration to formulate the final instrument, which was then administered to a class of undergraduate teacher education candidates.

The subjects for the study were 30 undergraduate teacher education majors enrolled in a basic course in special education. Their majors included elementary education, special education, physical education, and speech pathology and they were of junior or senior classification.

The descriptive information provided from the survey instrument was submitted to data analysis. The findings are presented in tabular form and key observations are discussed and implications are offered.

Findings

To keep the study in perspective, the findings begin with key tenets of differentiated instruction as reported in the review of literature. Afterward, findings are reported from the administration of the survey instrument.

Key tenets of differentiated instructions

Several core principles guide differentiated instruction. First, teachers should articulate what is essential for students to learn, which helps to link assessment to curriculum and instruction. Second, teachers should attend to student differences. Third, students must participate in meaningful work. Fourth, teachers and students must collaborate in learning. Fifth, teachers should be flexible in their use of groups and whole class discussion. Sixth, differentiated instruction is proactive rather than reactive, addressing learner variance from the outset. And finally, space, time and materials should be used flexibly to suit the needs of various learners (Chamberlin & Powers, 2010). In perspective, differentiated instruction is not synonymous with individualized instruction, which could be overwhelming too time-consuming; it is not to be used during every class, whole class instruction is still purposefully used; it does not result in an unbalanced workload for students, they just work at suitable levels; and there is no one way to differentiate instruction, it is as varied as the needs of the students (Chamberlin & Powers, 2010).

To differentiate instruction effectively, teachers should identify students' readiness levels, modify the instructional content, process, and product, and enhance both collaborative learning and autonomous learning (Pham, 2012). Some basic strategies that represent accumulated thought for brain-compatible instruction are: create a safe and comfortable environment; use comfortable furniture and proper lighting; offer water and fruits where possible; encourage frequent student responses; teach using bodily movements to represent content; teach with strong visual stimuli; use chants, rhythms, and music; offer appropriate wait time; offer students choices; and foster social networking around learning content (Bender, 2012; Chamberlin & Powers, 2010; Chapman & King, 2005). Further, to ensure effective

differentiated instruction teachers should: exhibit a passion for teaching; provide a wide variety of materials and resources; know the students and match materials and strategies to each learner's needs; assess before, during, and after the learning; plan student-focused opportunities; and use curriculum compacting (Chamberlin & Powers, 2010; Chapman & King, 2005).

Varying stimulating instructional strategies and activities intrigue and challenge minds. More students grasp information and adapt it when their learning styles, modalities, intelligences, and interests are engaged (Chapman & King, 2005). Students may even be taught about their learning styles in order to encourage them to challenge themselves in task selection by choosing tasks that may not be particularly congruent with their own learning style. Researched teaching tips are available to tap strengths in each of the intelligences (Bender, 2012).

Research suggests that there is a positive impact of differentiated instruction coupled with increased brain-compatible instructional activities on student achievement. In one study student achievement scores jumped as much as 30% in some academic areas. In another study a school was able to effectively close the reading achievement gap between young males and young females in only one year (Bender, 2012).

Findings from the survey:

The questionnaire administered to a class of undergraduate teacher education majors consisted of five components: interests, favorite subjects, learning abilities, learning styles, and preferred teaching styles. Table 1 provides data on the first three components and Table 2 provides data on the latter two components.

The things that the students liked to do most during their spare time, when requested to list two different things, were read or study (36.7%), participate in activities with family or others (23.3%), exercise or dance (23.3%), and shop (20.3%). They also liked cooking and

listening to music. The candidates' favorite subject areas, when requested to list two different subjects, were language arts (53.3%), the social sciences (46.7%), and math (30.0%). They also liked science. When requested to list two of their strongest learning abilities or intelligences, the students most frequently indicated intrapersonal (50.0%), verbal-linguistic (40.0%), and interpersonal (36.7%). Other intelligences of note were musical, logical-mathematical, and moral (see Table 1). Differentiated instruction ensures that learning activities are relevant to students' own experiences and sources of motivation (Adami, 2004).

The learning styles were presented to the candidates in dichotomy form. From the four principal learning style categories, the students were requested to indicate the style that they preferred. In category one, they preferred Sensing – the concrete and practical (73.3%) versus Intuitive – the conceptual and theoretical (20.0%). They preferred Visual representations (80.0%) over Verbal explanations (16.7%). Active learning – trying things out or working with others, was favored over Reflective learning – thinking things through or working alone, by a margin of 60.0% to 36.7%. They saw themselves as Sequential learners – mastering things in small incremental steps, rather than Global learners – grasping materials in large leaps, by a margin of 76.7% to 16.7%. In terms of teaching styles, when requested to list the two that appealed most to them, the candidates specified Demonstration/modeling (86.7%) and Facilitation (73.3%). They did not report Formal authority and Delegation to be very appealing teaching styles for them (see Table 2). A majority of students learn and retain information best by seeing, hearing, saying, and doing; this indicates that teachers do well to use a combination of instructional strategies and ways of presenting materials for learning (Adami, 2004).

Suggestions for accommodating students in the survey:

In terms of interests, the undergraduate teacher education majors indicated that they especially like to read/study, interact with others, and exercise/dance. To accommodate these students the teacher should consider providing written instructions in advance; having group activities; and letting students move around the environment. The principal favorite subjects for the candidates were English, social studies, and math. To accommodate the students based on their favorite subjects the teacher should include allowing them to be vocal/verbal; discuss current/historical events; and make use of computational skills (Bender, 2012).

In regard to learning abilities and intelligences the candidates indicated strength in areas of intrapersonal, verbal/linguistic, and interpersonal capacities. To accommodate the students in these areas the teacher should consider encouraging journal-keeping and self-expression; using pictures, illustrations, and discussion of material; and promoting group work and developing leadership skills. The candidates reported that their basic learning styles were visual, sequential, sensing, and active. To accommodate these learning styles the teacher should consider using pictures, diagrams, and charts; progressing in small incremental steps; being concrete and practical; and trying things out and working with others. The candidates' preferred teaching styles were demonstration and facilitation. To accommodate students who prefer these teaching styles the teacher should consider striving to be a good role model, demonstrate, coach students, and let students apply skills and knowledge; and permit students to process and apply content in creative and original ways (Bender, 2012).

Summary and Recommendations

Differentiated instruction is a beneficial teaching approach to address students' varying educational levels. Effective differentiation includes identifying students' readiness levels, modifying instruction, applying collaboration and autonomy in learning, and integrating teaching

and practice to enhance learning. It gives students tools and methods to be self-directed, creative, and contextually responsive to seek for knowledge by using core principles and concepts (Pham, 2012).

It is evident that all learners are different and this creates the need for all teaching to be differentiated (Adami, 2004) and to capitalize on multiple intelligences which allow a wider range of students to successfully participate in classroom learning (Brualdi, 1998). Successful practice with the use of differentiated instruction produces students who have a higher sense of self-efficacy, engagement, and passion for learning (Hillier, 2011).

In view of the fact that students vary tremendously in interests, abilities, and learning styles, differentiated instruction is recommended as a teacher's lifeline to success in the classroom. It should be readily available and viewed as a useful teaching strategy in today's schools.

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Table 1
 Students' interests, favorite subject, and abilities (N = 30; Two options each)

Item	Number	Percent
Interests		
Activities with other people	7	23.3
Baking; cooking	4	13.3
Exercise; Dance	7	23.3
Games, table	2	6.7
Laugh and talk	2	6.7
Movies	3	10.0
Music (listen, write, sing)	4	13.3
Read/Study	11	36.7
Shopping	6	20.3
Television	2	6.7
Travel; vacations	2	6.7
Work; homework	2	6.7
Others (Babysitting, Church, Drive, Graphic design, Makeup, Relax – 1 each)	6	20.3
Favorite subjects		
English; Language Arts	16	53.3
Math	9	30.0
Physical education	2	6.7
Reading	3	10.0
Science	7	23.3
Social studies; History; Politics	14	46.7
Teacher Education courses	2	6.7
The Arts	2	6.7
Others (Music, Philosophy, Photography, Psychology – 1 each)	4	13.3
Learning abilities		
Verbal-linguistic	12	40.0
Logical-mathematical	5	16.7
Musical	6	20.0
Spatial	2	6.7
Bodily-kinesthetic	2	6.7
Naturalistic	2	6.7
Interpersonal	11	36.7
Intrapersonal	15	50.0
Moral	5	16.7

Table 2
 Students' favorite learning and teaching styles (N = 30)

Item	Number	Percent
Learning styles		
Sensing/Intuitive	22/ 6	73.3/20.0
Visual/Verbal	24/ 5	80.0/16.7
Active/Reflective	18/11	60.0/36.7
Sequential/Global	23/ 5	76.7/16.7
Teaching styles		
Formal authority	4	13.3
Demonstration/modeling	24	86.7
Facilitation	22	73.3
Delegation	4	13.3