NYSTCE EAS Exam review

2020-04-28

While this document was written in good faith with no ill intent, at the time of writing, its author:

- has received no pedagogical training of any sort,
- is openly suspicious of the scientific validity of many of the concepts and theories discussed here,
- has never taken the EAS exam, and
- generally knows nothing about anything.

Please adjust your expectations accordingly.

Contents

1 Educational theory

1.1 Constructivist education theory

- continuing and building upon Piaget's theories of cognitive development (1.3), *constructivism* is a theory of education that posits that learning is a process through which students construct knowledge individually through the two fundamental processes of *assimilation* and *accommodation*
- *assimilation* of information is a process in which a learner incorporates new information into a pre-existing framework of conception and understanding
- *accommodation* of information is a process in which learners reframe their mental representation of the outside world in order to render it compatible with new information that may contradict or be otherwise incompatible with the current framework of conception and understanding
- implicit in this theory is the fundamental axiom that all students are capable of learning, and that the best way to promote learning is by helping students to:
    - use their prior knowledge and skills to progressively construct individual understanding of new and increasingly more complex concepts and situations
    - recognize multiple perspectives
    - think critically
    - solve problems
    - work together
- in other words, constructivists tend to adhere to the philosophy that the purpose of schooling is to teach individuals how to think and learn, rather than to fill them with any particular collection of data, facts, and concepts
- this conceptualization of the learning process is in many ways the philosophical backbone of the contemporary American education system, informing decisions and planning at every level from curricular design to best practices in classroom management
- in the rest of this section, we review some of the key figures and concepts associated with constructivist education theory
- the rest of this document (Sections 3 through 8) will explore practical implications of constructivist education theory
- in our discussion of praxis, we will attempt to indicate the theoretical foundations and justifications that gave rise to our contemporary perspectives on the praxis of education with relevant references to Section 1 whenever possible

References: [1, 3, 14]

1.2 Dewey's progressive education movement

- John Dewey (1859–1952) was a philosopher, a psychologist, and an education reformer
- Dewey promulgated the *progressive education movement*
- the philosophy behind Dewey's movement was that education should emphasize and focus on creating and understanding experiences, rather than rote memorization of mindless facts that are soon forgotten

- Dewey also believed that school should not be separate from but rather connected with students' lives and life experiences outside the classroom in order to facilitate more meaningful and, hence, more memorable and valuable learning experiences
- Dewey emphasized the importance of active learning, student participation, and classroom democracy, rather than authoritarianism and rote methods that treat students as empty vessels to be filled with knowledge by an omniscient instructor

References: [22, 31]

1.3 Piaget's theory of cognitive development

- Jean Piaget (1896–1980) was a psychologist who studied childhood development
- Piaget proposed a theory of cognitive development to explain the nature and development of human intelligence
- according to Piaget's theory, humans pass through the following four stages of development:
  - *sensorimotor stage*:
    - this stage typically corresponds to the ages of 0 to 2 years, beginning at birth and lasting until the acquisition of language
    - in this stage, infants construct knowledge by coordinating sensory experiences through physical interactions with objects
  - *preoperational stage*:
    - this stage typically corresponds to the ages of 2 to 7 years
    - during this period, children are not yet able to understand concrete logic, to manipulate information mentally, or to understand the perspectives of others
    - they are, however, able to form stable concepts and magical beliefs
  - *concrete operational stage*:
    - this stage typically corresponds to the ages of 7 to 11 years
    - during this period, a child's thought processes develop and begin to resemble those of an adult
    - the child begins to solve problems logically and perform inductive reasoning
    - nevertheless, the child is not yet able to think hypothetically as his/her problem-solving skills are limited in application to concrete situations
  - *formal operational stage*:
    - this is the final stage of development, typically lasting from the age of 12 years to adulthood
    - during this period, the individual is able to use symbols and abstract concepts logically, to think hypothetically and metacognitively (3.9.1), and to perform deductive reasoning

References: [1, 21, 29]

1.4 Vygotsky's zone of proximal development

- Lev Vygotsky (1896–1934) was a psychologist who developed a theory of bio-social development
- the *zone of proximal development (ZPD)*, as conceptualized by Vygotsky, consists of those tasks that a student can accomplish with help, but could not accomplish without help
- this zone is contrasted with two others:

    - on the one hand, there is the zone consisting of the tasks that a student could accomplish without help, and there's no need for teachers to dwell on tasks that students have already mastered independently, and there's no point in attempting to devote instructional time to tasks that students will not be able to master
    - on the other hand, there is the zone consisting of the tasks that the student could not accomplish even with help
- the ZPD is the Goldilocks territory in between, and teachers should present activities in the ZPD to provide realistic opportunities for student learning

References: [4, 24, 35]

1.5 Bloom's taxonomy of objectives

- Benjamin Bloom (1913–1999) was an educational psychologist
- Bloom introduced a *taxonomy of educational objectives*, a rubric attempting to classify levels of learning in within each of three categories of learning: cognitive, affective, and psychomotor
- within the cognitive category, Bloom's taxonomy consists of the following six levels that allow teachers to classify objectives for their lessons:
    - *memorization*: remembering specific facts, details, procedures, and recalling vocabulary, terms, and theories
    - *comprehension*: understanding or using ideas, but not necessarily relating them to other ideas
    - *application*: using concepts in novel situations
    - *analysis*: breaking concepts and statements down into component parts, so that their structure may be understood
    - *evaluation*: judging and critiquing ideas, concepts, statements according to given criteria
    - *creation*: generating new ideas, products, perspectives
- this list is ordered from most basic to most advanced, and learners must generally proceed from level to level in this order
- for instance, it is generally not possible demonstrate comprehension without first having memorized the essential terms and facts involved, and it's not possible to apply concepts before understanding them, etc.
- teachers should keep these levels in mind while planning instruction, starting with activities that help students to master the material at the basic levels of memorization, comprehension, and application, followed by activities that allow students to develop and demonstrate capacities for analysis, evaluation, and creation

References: [1, 4, 9, 10]

1.6 Maslow's hierarchy of needs and human motivation

- Abraham Maslow (1908–1970) was a psychologist
- Maslow proposed a hierarchy of the human needs, with the idea being that individuals must satisfy certain basic, fundamental needs before they can pursue higher-level needs

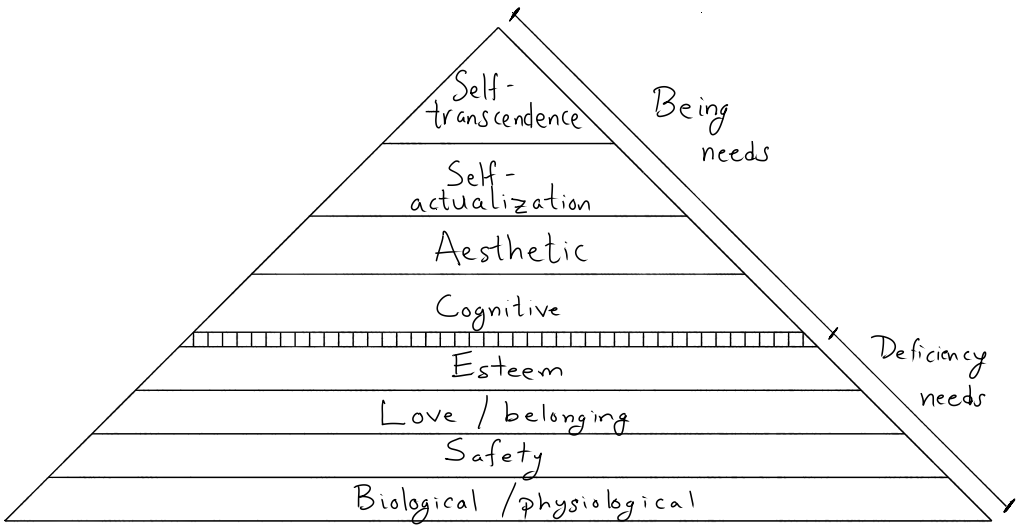

Figure 1.6.1: Maslow's hierarchy of needs and human motivations

- Maslow's hierarchy is relevant to education insofar as learning, understanding, analytical skills, and imagination all pertain to the higher-level needs, and education is not possible unless students' lower-level needs are satisfied
- Maslow's hierarchy is divided into two classes: the lower-level needs, which we refer to as the *deficiency needs*, and the higher-level needs, which we refer to as the *being needs*
- the specific low-level, deficiency needs on Maslow's hierarchy are as follows:
    - *biological* and *physiological needs*: hunger, thirst, bodily comfort
    - *safety*: the feeling of security, the absence of danger
    - *love* and *belonging*: the feeling of acceptance and love from others, including from a family
    - *esteem*: the feeling that one is respected by others and also by oneself, and regarded as capable and valuable
- the specific high-level, being needs on Maslow's hierarchy are as follows:
    - *cognitive needs*: to know, to understand, to explore
    - *aesthetic needs*: to appreciate and to seek out beauty, order, and form
    - *self-actualization*: to pursue self-fulfillment, and to realize one's potential
    - *self-transcendence*: to help others to self-actualize and to fulfill themselves
- the total hierarchy is illustrated in Figure 1.6.1

References: [4, 7, 25]

1.7 Gardner's multiple intelligences

- Howard Gardner (b. 1943) is a developmental psychologist

- Gardner proposed a *theory of multiple intelligences*, according to which human intelligence operates according to various different modalities, as opposed to a single category of "general ability"
- Gardner proposes the following list of modalities:
    - *visual-spatial thinkers* learn best by visualizing problems;
    - *linguistic thinkers* learn best through words and language;
    - *logical-mathematical thinkers* learn best through abstract, scientific thought and through solving numerical problems
    - *bodily-kinesthetic learners* learn best through physical activity, sports, and dance
    - *musical learners* learn best by listening, singing, and playing musical instruments
    - *interpersonal thinkers* learn best by working with others, and they tend to be attuned to the needs of others
    - *intrapersonal thinkers* learn best by working alone, and they tend to be introverted and intuitive
    - *naturalistic thinkers* may learn best by relating material to nature and the world around them
    - there may also be *existential thinkers* and *moral thinkers*
- there is little empirical data to support Gardner's theory, but some educators believe that the theory has practical value insofar as presenting material to students in various ways in accordance with this list of modalities may be more beneficial to students than a one-size-fits-all approach

References: [4, 18, 33]

2 Education policy

- the content of this section will most likely not be tested directly on the EAS exam, with the possible exception of the Common Core State Initiative, and the relevant information on that topic will in any case be discussed again in later sections
- nevertheless, this section may contain contextual information that might be of use, for example, while writing the constructed responses

2.1 Committee of Ten

- prior to the late 1800s, American schools varied widely from one region to another in terms of their policies, organization, and guiding philosophies
- in 1892, the National Education Association, a teachers union still in existence today, convened the *Committee of Ten*, consisting of ten prominent figures in higher education, to address this lack of standardization by providing recommendations regarding:
    - important curricular knowledge within the major instructional subjects, including Latin, Greek, English, other modern languages, mathematics, and the sciences
    - the structure of elementary and secondary education
    - tracking (3.6.2) and course differentiation based on the college studies or working trades students intended to pursue
- the Committee made the following recommendations:
    - each student should receive 12 years of education, including eight years of elementary education and four years of secondary education
    - each subject should be taught in the same way to each student, regardless of what the student is likely to do after school, and regardless of how long the student is likely to remain in school
    - each student should be taught English, mathematics, and history or civics in each year of high school
    - by unifying and standardizing courses of study, teaching and teacher-training would become much simpler
- while the report provided by the Committee of Ten did not bear the force of law, it is indicative of a trend towards standardization that gained momentum in this period
- in addition to the report of the Committee of Ten, there was a trend at this time towards accreditation, examination, and admissions standards, among other bureaucratic means of standardization

References: [12]

2.2 National School Lunch Program (NSLP)

- the *National School Lunch Program (NSLP)* was created in 1946 by the Richard B. Russell National School Lunch Act[1] to provide free or low-cost lunches to students based on need

[1] Dick Russell was a racist, and he sponsored the bill to appease his farmer constituents by artificially inflating food prices. He also argued that feeding children is a good way to guarantee a constant supply of healthy individuals to be drafted by the military. Dick's parents named him well.

- the *Summer Food Service Program (SFSP)* was created in 1968 as an amendment to the National School Lunch Act enabling summer activity programs to ensure that students continue to receive nutritional assistance throughout the summer months

References: [28, 32]

2.3 *Brown v. Board of Education of Topeka*

- the Fourteenth Amendment to the United States Constitution, adopted in 1868, asserts, among other things, that all persons, regardless of citizenship, are entitled to equal protection under the law
- *Plessy v. Ferguson* was an 1896 United States Supreme Court decision, in which the Court established the "separate but equal" doctrine, effectively legalizing school segregation
- *Brown v. Board of Education of Topeka* was a 1954 United States Supreme Court decision, which found racial segregation of public schools unconstitutional, overturning the "separate but equal" precedent, arguing that it violates the equal protection clause of the Fourteenth Amendment

References: [30, 11]

2.4 National Defense Education Act (NDEA)

- the *National Defense Education Act (NDEA)*, passed in 1958, provided federal funding for education at all levels in the United States, especially in the areas of science, technology, engineering, mathematics, and foreign languages
- the NDEA was a response to increased demand for scientists and mathematicians in industry, national defense, and higher education:
    - the Soviets having launched the Sputnik satellite in 1957, leading the Americans to fear that they were falling behind in the race for technological superiority
    - computers and computer programming becoming increasingly important for industrial and defense purposes
    - college enrollment increased drastically between 1940 and 1970 while industry was hiring large numbers of mathematicians and scientists, making it difficult for colleges and universities to hire qualified instructors
- the NDEA was an unprecedented instance of federal education legislation, signaling a shift towards increased federal involvement in public education:
    - education falls primarily under the jurisdiction of state and local authorities
    - prior to this act, the federal government had promoted education by granting federal land to states, who could then sell the granted land and use the resulting funds to fund colleges and universities
    - the NDEA, on the other hand, was a much more direct and expansive program, allowing the federal government to provide capital directly

References: [27]

2.5 Civil Rights Act of 1964

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2.6 Elementary and Secondary Education Act (ESEA)

2.6.1 Title I

2.7 Education Amendments of 1972

2.7.1 Title IX

2.8 Rehabilitation Act of 1973

2.8.1 Section 504

2.9 Individuals with Disabilities Education Act (IDEA)

2.10 Americans with Disabilities Act of 1990

2.11 No Child Left Behind Act of 2001 (NCLB)

2.12 Americans with Disabilities Amendments Act of 2008

2.13 Race to the Top

2.14 Common Core State Standards Initiative (CCSSI)

2.15 Next Generation Standards

- in January 2011, New York State adopted the *Common Core State Standards Initiative*, with implementation beginning in September 2012
- in December 2016, New York State adopted Next Generation Science Standards, with implementation beginning in September 2019
- in September 2017, New York State adopted the Next Generation Learning Standards in English Language Arts and Mathematics, with implementation slated to begin in September 2020

3 Educational praxis

3.1 Successful learning

- students that are engaged in the learning process are likelier to be successful learners
- independent work is less conducive to learning that teaching and supervision
- material and activities of appropriate levels of difficulty are more conducive to effective learning
- teachers should maintain high expectations for student mastery and utilize instructional time for learning activities to promote successful learning
- positive classroom environments and constructive criticism are more conducive to learning than negative classroom environments and unconstructive criticism
- students have positive attitudes towards teachers who offer them warmth, praise, and respect

References: [4]

3.2 Successful teachers

- successful teachers are accepting of children within the teacher-student relationship
- successful teachers set boundaries and limits that firm, clearly established, and flexible
- successful teachers are firm and consistent in their enforcement of rules
- successful teachers establish and clearly communicate positive, realistic expectations for student achievement
- successful teachers have rational, logical explanations for their expectations for student behavior and achievement, and communicate these reasons clearly
- successful teachers model acceptable behavior and hold themselves to the same standards as their students
- successful teachers do not take students' actions personally

References: [4]

3.3 Student motivation

- beginning lessons with motivation helps to generate student interest and maintain student focus for the duration of the lesson
- motivation may be either *intrinsic* or *extrinsic*
- *intrinsic motivation*:
    - intrinsic motivation makes topics inherently interesting to, enjoyable for, or popular with students
    - for example, starting a history lesson on a certain historical period by discussing a recent popular movie set in that period would constitute an attempt at providing intrinsic motivation
    - tasks involving individual work provide good opportunities to incorporate intrinsic motivation by appealing to the interests of individual students
- *extrinsic motivation*:

    - extrinsic motivation is the technique of offering external rewards for students who accomplish established goals, complete tasks well and on time,
    - for example, offering the whole class a trip or a party upon successful completion of a class project would constitute an extrinsic motivation
    - for another example, introducing point or token systems in which students earn and lose points for appropriate and inappropriate activity, respectively, would also be forms of extrinsic motivation
    - extrinsic rewards are most effective when they are offered for goals that most students can achieve
    - when offering extrinsic rewards, take care not to create an unnecessarily competitive environment that is not conducive to optimal learning
    - praise can be used effectively to generate extrinsic motivation
    - praise is most effective as extrinsic motivation when given for specific accomplishments and focused on the student's own behavior rather than on a comparison of the student's behavior with that of the other students in the class
- in order to maintain motivation throughout the lesson, consider the following points:
    - ensure that the objectives are clear and unambiguous
    - choose tasks that are stimulating and of an appropriate level
    - maintain students' attention
    - allow students some choices throughout the lesson
- optimal motivation tends to occur under the following circumstances:
    - students enjoy the topic or activity
    - students believe that the lesson is relevant to them
    - students believe that they will succeed

References: [4]

3.4 Student background knowledge

- connecting lessons and learning objectives with students' prior knowledge and experiences is an effective learning tool
- by validating students' descriptions of their individual experiences, teachers help to motivate students and increase their students' self-esteem
- by starting a lesson by asking students to think metacognitively (3.9.1) about what they already know and what they hope to learn about a certain topic, teachers increase student engagement
- incorporating student-generated questions into the lesson, either in place of or in addition to textbook questions, and allowing these student-generated questions to guide the lesson, is a strategy for motivating students to learn about a given topic
- moreover, collecting student-generated questions helps teachers to form a pre-assessment of the students' prior knowledge, allowing the teacher to tailor the lesson plan to the students' achievement levels, and to provide appropriate scaffolding (3.5) and differentiation (3.6.1)

References: [3, 4]

3.5 Scaffolding

- effective teachers utilize a variety of teaching approaches adapted to the abilities of their students and to their particular lesson objectives
- effective teachers are constantly aware of the various ways their students develop cognitively
- *scaffolding* is a technique whose theoretical justification lies in Vygotsky's concept of the zone of proximal development (ZPD), as recalled in 1.4
- in other words, scaffolding is a practical application of the concept of the ZPD within the classroom
- specifically, *scaffolding* is a technique whereby teachers provide assistance to students to help them to learn material within their individual ZPD
- as the students master the material, the teacher gradually withdraws this help
- finally, the students no longer need any help and, like a building undergoing construction work, the scaffolding is completely removed upon completion of the job
- effective scaffolding should take the following considerations into account:
    - the learning task should guarantee that students employ the skills needed to achieve the learning objectives
    - the learning task should be engaging to maintain student interest and involvement
    - the learning task should be of an appropriate level of difficulty
    - the teacher should anticipate the errors that the students are likely to make in order to provide appropriate assistance and direction throughout the scaffolding process
    - the assistance provided by the teacher while scaffolding is not limited to cognitive skills: emotional support and encouragement is also an important component of scaffolding, for example, when confronted with students experiencing frustration or loss of interest during the learning experience
- Doug Lemov describes a gradual-release model for scaffolding, in which a lesson progresses incrementally from teacher-centered instruction, a teacher-student-collaborative stage, to student practice:
    - the process begins with an "I do" component, in which the teacher provides establishes the objectives of the lesson, then provides direct instruction and modeling, while students listen, take notes, and ask for clarification when needed
    - the next stage is the "we do" component, based on interactive instruction, with the teacher working with students, posing questions, offering prompts and clues, providing additional modelling, while students ask and respond to questions while working with the teacher and their classmates
    - the final stage is the "you do" component, in which students continue to practice independently and/or in small groups while the teacher circulates and provides support

References: [1, 2, 3, 4, 20]

3.6 Differentiation

3.6.1 Differentiated instruction

- effective teachers are responsive to the individual needs, achievement levels, and backgrounds of their students

- *differentiation* or *differentiated instruction* is the technique of tailoring instruction according to these individual needs
- differentiated instruction is a practical response to the educational theories of Dewey (1.2), Piaget (1.3), Maslow (1.6), and Gardner (1.7)
- the following are some concrete examples of differentiation:
    - *tiered assignments*: the teacher provides assignments structured with various levels of abstraction and difficulty to meet varying student needs
    - *learning contracts*: teachers give students a freedom in planning within established guidelines for responsible work completion
    - *self-directed learning*: students are allowed to make individual choices as to what they want to learn, to set individual goals, to assume responsibility for work completion, to solve problems they encounter during their learning experiences, and to perform self-evaluations of their work
    - *problem-based learning*: teachers provide students with real-world situations, leaving the students to identify the resources and data they will need, to solve problems, and to choose how to present their findings and demonstrate their learning
    - *seminars*: in small groups, students explore topics not covered in class, or further develop topics presented in class
- *pre-assessment* is an important component of differentiated instruction: in order to appropriately target instruction to individual student needs, the teacher must first determine what those needs are, typically by means of an informal test taken before a new unit

References: [3, 16, 6]

3.6.2 Tracking

- *tracking* is the practice of assigning students to classes according to their achievement levels, e.g., above average, average, below average
- for example, a school in which students all students in eighth grade take algebra, but are placed into either the "advanced" class, the standard class, or the "remedial" class, would be an instance of tracking
- tracking might be regarded as a very broad form of differentiated instruction, but in practice achievement levels within any given tracking level are still quite varied, and more individualized differentiation is still required
- while there is a long tradition of tracking in American schools, it is not regarded as an effective strategy by many contemporary education experts
- among the disadvantages of tracking are:
    - implicit racial and social bias and discrimination
    - inherent inequity as high-track classes may tend to attract the most effective teachers and possibly more resources
    - social stigmatization of students in lower tracks
    - tracking tends to be permanent and inflexible: it is difficult for students to move from one track to another, and so tracking choices made early on, possibly based on data of questionable accuracy or relevance, have disproportionately profound effects on each student's education

- from the perspective of the EAS exam, tracking and any practices resembling tracking are to be regarded as very poor form

References: [34]

3.6.3 Grouping

- *grouping* is another broad-scale form of differentiation, an alternative to tracking (3.6.2) that retains some of the benefits, in particular, providing gifted students with material adapted to their level of achievement, while avoiding the pitfalls of the more rigid tracking system
- there are various methods for implementing grouping:
  - *enrichment clusters*, in which students are grouped by interest, possibly with students coming from several different classrooms
  - *cluster grouping*, in which students of similar ability levels are grouped together in a regular classroom
  - within-class flexible grouping
- while there is a certain amount of ambiguity in the difference between grouping and tracking, proponents of grouping suggest the following:
  - grouping should be flexible, it should be targeted, it should not be permanent, and groups are not necessarily based on perceived ability level, but possibly based on shared student interests
  - tracking is an inflexible strategy that places students in tracks from which they cannot easily move
- that said, a rose by any other name…

References: [3, 17, 5]

3.6.4 Acceleration

- *acceleration* is a strategy that allows gifted students to cover the same curriculum and material with the same level of understanding as other students, but in a shorter period of time
- the following are examples of acceleration:
  - Advanced Placement (AP) courses
  - *continuous-progress curriculum with flexible pacing*: the curriculum, instructional content, and pace of instruction are adapted to student strengths, needs, and readiness levels as determined through pre-assessment
  - *dual* or *concurrent enrollment*: students enroll simultaneously in elementary and middle school, middle school and high school, or high school and college
  - *curriculum compacting*: material that gifted or advanced students have already mastered is eliminated from the lesson plan to save time for more challenging learning experiences more adapted to the students' achievement levels
  - *early entrance*: students begin school at an earlier age than expected
  - *skipping*: students advance two grades at once, for example, from second grade to fourth grade
  - *subject acceleration*: students take courses at higher grade levels than the rest of their class
- beware that skipping, while a traditional strategy for acceleration, is controversial

References: [3, 17, 8]

3.6.5 Enrichment

- *enrichment* is the practice of providing students with supplemental learning experiences, beyond the established curriculum, in their regular classrooms
- the following are examples of enrichment strategies:
    - academic competitions
    - independent study
    - *learning* or *interest centers*, in which students pursue individual interests within a subject area by using areas within classrooms designated by teachers
    - field trips
    - mentorships
    - weekend or summer programs, in which students take enrichment classes through public or private organizations or universities

References: [3, 17]

3.7 Learning styles

- as recalled in 1.7, Gardner's theory of multiple intelligences hypothesizes that human intelligence operates under various modalities
- although there's an abundance of scientific evidence to the contrary, this has led some educators to reason that individuals with predominant intelligence modalities may also have predominant "learning styles", i.e., that there might be such things as "visual learners" or "auditory learners" or "kinesthetic learners"
- even if we as scientists don't believe in learning styles, we are likely to encounter educators who do, and it's important to understand their perspectives on education
- operating under the hypothesis that learning styles exist, teachers should adapt their strategies accordingly: if students have different learning styles, then it is their teachers' responsibility to present material to them in accordance with these different styles so that each student has an equal opportunity to succeed
- *auditory learning*:
    - to accommodate students who learn best by listening to spoken information:
        - incorporate e-reader technology and oral reports into the lesson
        - include periods of instruction in which oral expression is as important as written expression
        - encourage students to repeat difficult words and ideas aloud
- *visual-spatial learning*:
    - to accommodate students who learn best by reading and viewing tables, charts, and maps:
        - consider writing on the board while speaking
        - incorporate a wide selection of written resources and materials
        - encourage students to write reports
        - when a lesson or activity requires complicated instructions, provide these instructions both orally and in a typed handout
- *kinesthetic learning*:
    - to accommodate students who learn best through physical activity:

    - ▷ employ role play or dramatization to introduce concepts
    - ▷ encourage students to take notes or to draw sketches or diagrams of what they are hearing in a lesson
    - ▷ incorporate hands-on experiences like abaci and tangrams into math lessons
    - ▷ incorporate experiments and hands-on experiences into science lessons
    - ▷ allow kinesthetic learners to take breaks

References: [4, 23]

3.8 Teacher-centered instructional strategies

- *teacher-centered instruction* is what we might regard as the most traditional form of instruction, characterized by teacher presentations, factual questions posed by the teacher, and knowledge-based responses from students

3.8.1 Lectures and explanations

- teacher-centered instruction often relies on lectures or explanations provided by the teacher to communicate information to students verbally
- from the perspective of the constructivist educational theory as espoused by Dewey, Piaget, and Vygotsky, lectures and explanations are not ideal methods of instruction: they force learners into passive roles
- this is not to say, however, that they are to be avoided at all costs: active-learning-based lessons can require a much greater investment of time from teachers in terms of preparation and planning, and less demanding modes of instruction are sometimes practical necessities
- to mitigate the inherent passivity of lessons and explanations, teachers should consider the following guidelines while lecturing or explaining material to students:
    - ○ start the lesson by providing motivation
    - ○ maintain eye contact
    - ○ punctuate the verbal presentation with gesture, but without extraneous movements
    - ○ adapt the duration of the presentation to the age of the students
    - ○ have a clear objective
    - ○ make the presentation easy to follow and of an appropriate level

References: [1, 4]

3.8.2 Demonstrations

- a *demonstration* is a variant of the lecture or explanation in which the teacher models the skill or task that the students are to master
- for example, a teacher could provide a demonstration of a method for solving a certain type of math problem by modeling the process at the board while students watch
- demonstrations should adhere to the same guidelines as lectures

References: [1, 4]

3.8.3 Teacher-posed questions

- another standard modality of instruction consists of a teacher posing questions to students during class
- teacher-posed questions are most effective when they adhere to the following guidelines:
    - each question should have a clear purpose
    - questions have are clearly stated, succinct, and of an appropriate level of difficulty
    - teachers should avoid rhetorical questions
    - keeping Bloom's taxonomy of objectives in mind (1.5), teachers should ask questions of lower levels (memorization, comprehension, application) *and* higher levels (analysis, evaluation, creation)
    - in particular, teacher's should avoid question-and-answer drills in which the teacher asks an extended series of questions at the memorization level of Bloom's taxonomy, as such lines of questioning are too limiting
    - teachers should pause before calling on a student to answer a question: this gives all students, including those not chosen to respond, a chance to engage with the question and formulate a response, and it also improves the odds that the student chosen to respond will provide a correct or more thoughtful answer
    - teachers should call on a wide range of students, rather than simply those that are most or least likely to respond correctly
    - give students several seconds to answer and do not cut off students struggling to respond
    - rephrase questions that seem unclear to students

References: [4]

3.8.4 Self-reflection

- self-reflection is an essential tool for every teacher, to be used in addition to peer feedback in order to ensure continual improvement of teaching skills
- teachers should consider recording and analyzing everything that occurs during a lesson to identify any potential flaws in their teaching strategies
- post-lesson journals and video-recordings are two effective means of collecting the data upon which self-reflection should be based
- student observations are another good source of information, in the form of questionnaires or surveys
- care is needed when crafting student surveys
- when engaging in self-reflection, consider the following questions:
    - Did the students understand the lesson?
    - Was the lesson of an appropriate level of difficulty?
    - Which learning materials works effectively in this lesson?
    - Which learning materials did not work effectively in this lesson?
    - Did the learning materials maintain student engagement?
    - Did students remain on task during the lesson?
    - Which were the most and least engaging parts of the lesson?

    - Were my directions clear?
    - Was my pace appropriate?
    - Did all students participate?
    - Overall, how effective was the lesson?
    - Were all the learning objectives for this lesson met?
    - In what ways could I improve the lesson for next time?

References: [3]

3.9 Student-centered instructional strategies

- in *student-centered* or *active-learning environments*, the teacher is no longer the sole source of information
- rather, in these environments, learning takes on a more democratic form, as espoused by Dewey (1.2)
- in active-learning environments, teachers tend to pose open-ended, indirect questions
- in active-learning environments, students are encouraged to be active participants in class and to create knowledge rather than simply absorbing it
- student-posed questions, encouragement from the teacher, and the teacher's incorporation of student-generated ideas into the lesson are all fundamental components of active-learning environments
- while student involvement is a necessary component of active learning, beware that it is not sufficient in itself to create an active-learning environment
- for example, teacher-posed question drills mentioned in 3.8.3 rely on student involvement, but they are not an example of active learning

References: [4]

3.9.1 Metacognition

- *metacognition* is the awareness and understanding of one's own cognition and thought processes
- metacognition is an important part of active learning
- metacognition is a useful tool for students in problem-solving situations as it allows students to:
    - perceive important information about the problem
    - determine whether they have solved such problems before and by what means
    - determine what strategies they have mastered that might be applicable to the problem
    - determine what relevant contextual knowledge they have
- teachers can encourage students to think metacognitively by, for example, suggesting that students pursue a line of self-questioning:
    - Have I solved problems like this before?
    - What do I already know about this subject?
- teachers can also encourage students to think metacognitively by creating flowcharts and concept maps

References: [1, 4, 26]

3.9.2 Cooperative learning

- *cooperative learning* is a modality in which groups of two to six students work together to master skills, learn concepts, or complete projects
- these groups are either assigned a specific learning task or project by the teacher, or they choose their own
- the group then devises a plan for working together to complete the task in consultation with the teacher
- students use resources, including the teacher, and mutual assistance assuming responsibilities for subtasks as they work towards their objective
- typically, upon completion, students will summarize their efforts, and make a presentation to the class or the teacher
- cooperative learning is a good example of active learning
- cooperative learning promotes full participation and democracy
- the following are some standard examples of cooperative-learning activities:
    - *tea party*:
        - ▷ students form two facing lines
        - ▷ the teacher asks a question
        - ▷ students discuss answers in facing pairs for one minute
        - ▷ one line moves sideways by one to form new facing pairs
        - ▷ repeat
    - think-pair-share
    - round robin

References: [3, 4, 15]

3.9.3 Inquiry-based learning

- *inquiry-based learning* is a modality in which students learn concepts, solve problems, or discover relationships through by following their own thought processes
- this modality is often the most demanding in terms of the teacher's preparation
- in particular, it's important that the teacher be confident that the subject in question will lead to useful results
- typically, the process begins with the teacher explaining inquiry procedures to students through examples
- the teacher then presents the problem or situation to be studied
- students then gather information and ask questions to gain further information
- once students have completed their inquiry process, the teacher should encourage students to think metacognitively (3.9.1) by asking them to contemplate their process and summarize it

References: [4, 19]

3.10 Learning tasks

- effective lessons rely on many different types of activities and tasks
- the following are some of the most common activities and tasks:
    - *critical thinking*: mental exercises involving logic and reasoning, in particular those relying on comparison, classification, causation, patterns, sequences, analogy, deductive and inductive arguments, hypothesizing, critique
    - *creative thinking*: mental exercises involving the creation of new ideas, concepts, arguments, art, in particular those relying on brainstorming, elaboration, modification, imagination, associative thought, metaphor
    - *problem solving*: tasks in which students apply critical and creative thinking skills to the solution of a fixed problem
    - *invention*: tasks in which students apply creative thinking skills to create something new or to improve on something that exists
    - *memorization*: tasks at the lowest level of Bloom's taxonomy (1.5), possibly incorporating mnemonic devices
    - *concept mapping*: a task in which students create or examine a graphical representation of relations between concepts or some other organization of concepts, such as a flow chart
    - *project*: a task in which students explore a certain topic, rather than a specific skill or a specific concept, and, in the process, develop a variety of skills and ideas pertaining to the given topic
    - *community experts*: tasks in which members of the community, possibly but not necessarily parents or guardians of students in the class, share their expertise in a particular field to help students to learn
    - *primary resources*: tasks in which students learn about a subject by examining original documents or artifacts rather than descriptions thereof

References: [4, 13]

3.11 Looping

- students perform better when teachers exhibit caring, nurturing attitudes towards them
- *looping* is a method for promoting caring educational environments
- specifically, looping is a system in which a teacher will work with the same class of students for two or more years
- for example, a teacher might teach a group of fourth-grade students one year, teach the same group of students in fifth grade the following year, then "loop" back to a new group of fourth-grade students the year after
- looping has the following benefits:
    - it allows teachers to learn more about student strengths, needs, interests as the looping teacher has more time to get to know each student
    - it helps to foster trust both between classmates and between students and teachers
    - it allows teachers to implement more effective differentiation techniques and more individualized instruction as they get to know students better

References: [3, 19]

4 Professional responsibilities of the teacher

4.1 Planning instruction

4.1.1 Objectives

- an *objective* is an answer to one of the following questions:
  - What will students understand when instruction is complete?
  - What skill will students master when instruction is complete?
- note that an objective is *not* a description of what a teacher will do during the instruction period
- objectives should not be convoluted or overly specific
- the following are examples of objectives:
  - Students will be able to multiply binomials.
  - Students will be able to identify thesis statements.
  - Students will be able to differentiate between sedimentary, igneous, and metamorphic rocks.
- objectives should be *measurable*, in the sense that the teacher will be able to determine the extent to which students have achieved the objective when instruction is complete by means of an assessment
- objectives often include the following verbs: identify, decide, differentiate, explore, observe, appreciate, experiment, construct, create
- objectives of the form "Students will be able to understand . . . ", for example, often fail to be measurable in this sense
- choosing objectives is the first step in effective lesson planning: different lesson objectives call for different teaching methods and activities, so it's important to make the objectives explicit beforehand
- many objectives are established at the national, state, district, and school levels, and these objectives are often the foundation for standardized achievement tests
- nevertheless, teachers generally have some freedom in choosing and sequencing objectives for their units and lessons
- making objectives explicit, for example, by displaying them in a visible location in the classroom, can be beneficial to student learning: students who know what is expected of them and what they should be attempting to accomplish are more likely to succeed
- displaying objectives in the classroom can also result in more valuable feedback from other teachers and administrators observing lessons, as they are better able to determine how effective your lesson is if they know what the goals are
- while choosing objectives, incorporate objectives from each level of Bloom's taxonomy (1.5): memorization, comprehension, application, analysis, evaluation, and creation
- while choosing and sequencing objectives, consider the following points:
  - the objectives should meet expectations established by the school district
  - objective should conform to applicable national, state, and local standards
  - each objective should be of an appropriate level for the students in the class
  - objectives should be responsive to academic, cultural, and linguistic diversity in the classroom

References: [2, 4]

4.2 Lesson planning

4.2.1 Hunter instructional model

- Madeline Hunter (1916-1994) was an educator who developed a model for teaching and learning that was very influential in the late 20^{th} century
- Hunter's *instructional model* delineates the following components of effective lessons:
  - objectives
  - standards
  -

4.2.2 5E instructional model

-

References: [4]

4.2.3 Double-entry planning

- while a lesson plan must obviously account for what the teacher will be doing during the lesson, it should also account for what students should be doing at each step
- following Doug Lemov, one way to create effective lesson plans accounting for both teacher and student activity is to use a planning form with two columns:
  - the left column will list what the teacher does throughout the lesson
  - the right column will list what the students do throughout the lesson
  - entries in both columns should be aligned horizontally, so that each row indicates what the teacher and students are doing at a single moment

Teacher	Students
model the solution of a two-step equation	take notes

References: [2]

4.3 Planning process

4.4 Assessment

4.4.1 Assessment instruments

4.4.2 Norm- and criterion-referenced tests

4.4.3 Assessment and instruction

4.5 Classroom environment

4.5.1 Classroom management

4.5.2 Creating an effective learning environment

5 Legal responsibilities of the teacher

5.1 New York State teacher responsibility and the law

5.2 Legal, legislative, and political influences

5.3 It's the law

6 Social responsibilities of the teacher

6.1 School-home relations

6.2 Teacher-parent communication

6.3 Diversity in society and culture

6.4 The school and society

6.5 The family

6.6 Societal problems

7 Diversity

7.1 Diverse student populations

- according to the United States Census Bureau, Figure 7.1.1 illustrates the ethnic diversity in New York State in comparison with the rest of the country:

	New York State	United States
Black or African American alone	17.5%	13.2%
Asian alone	8.2%	5.3%
Two or more races	2.3%	5.3%
Hispanic or Latino	18.4%	17.1%
White alone, not Hispanic or Latino	57.2%	62.6%
Foreign-born persons	22.0%	12.9%
Language other than English spoken at home	29.8%	20.5%

Figure 7.1.1: Ethnic diversity

- according to recent reports ["recent" in 2015], the State of New York ranks fourth in terms of numbers of people living in poverty
- specifically, these reports indicate that almost 40% of female-led households with children in New York State live in poverty
- approximately 27% of Latinos and 25% of African Americans live in poverty, whereas less that 12.5% of people of other ethnicities live in poverty in New York State
- in some areas of New York State, 50% of children live in poverty
- there are typically over $100\,000$ homeless children in New York State at any given time
- New York ranks second after Washington, DC, in terms of income disparity for wage earners in all income categories
- teachers in New York must therefore be responsive to this ethnic and economic diversity, and, in particular, to childhood poverty and homelessness

References: [4]

8 Students with disabilities and other special needs

8.1 Visual-processing problems

8.2 Learning disabilities

8.3 Attention-Deficit Disorder and Attention-Deficit Hyperactivity Disorder

8.4 Intellectual disability

8.5 Behavior disorders in children

8.6 Inclusion mainstreaming, and least restrictive environment

8.7 Collaborative teaching

8.8 Adapting instruction

8.9 Changing behavior

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