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## **Understanding The Learning Process to Effectively Differentiate Instruction**

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### Abstract

The underlying ability a teacher must have to orchestrate differentiated instruction day after day, hour after hour, by assessing his/her students and adjusting strategies and tactics moment by moment, requires sophisticated knowledge and skills.

### Objectives

To successfully use differentiated instruction, a teacher must first have a firm understanding of each of the cognitive components of the learning process, what they look like when they are working, and what the specific subcomponents of each look like when they are breaking down. Next, a teacher must develop a rich repertoire of strategies and tactics from which to pull the exact strategy or tactic that will address a specific breakdown for a specific task, at the right moment. Using a great strategy at the wrong time, or mismatching a strategy with breakdown for which the strategy will yield no gains, will frustrate students and teachers alike when the strategy fails to produce the desired result.

Keywords: differentiated instruction receptive language vocabulary development specific task learning foreign language learning language learning perceptions FL teacher's classroom practices.

There are six interactive components of the learning process: attention, memory, language, processing and organizing, graph motor (writing) and higher order thinking. These processes interact not only with each other, but also with emotions, classroom climate, behavior, social skills, teachers and family.

In order to engage, motivate and teach all learners at optimal levels, teachers must understand the learning process in general, understand and respond to students'

individual emotional and cognitive profiles and select instructional strategies and tactics that are effective for diverse learners.

### Attention

Paying attention is the first step in learning anything. It is easy for most of us to pay attention to things that are interesting or exciting to us. It is difficult for most of us to pay attention to things that are not. When something is not interesting to us, it is easier to become distracted, to move to a more stimulating topic or activity, or to tune out.

The teacher's job is to construct lessons that connect to the learner. Relating what is to be taught to the students' lives can accomplish this. Relate Romeo and Juliet, for example, to the realities in our communities of prejudice, unfounded hatred and gang wars. Or relate today's discrimination to The Diary of Anne Frank, and hold class discussions of discrimination that students have personally experienced or witnessed.

Physical movement can help to "wake up" a mind. When a student shows signs of inattentiveness and/or restlessness, teachers can provide the student with opportunities to move around. Many students with attention challenges actually need to move in order to remain alert. It is wise to find acceptable, non-destructive ways for these students to be active. Responsibilities such as erasing the board, taking a message to the office, and collecting papers can offer appropriate outlets for activity.

### Memory

Memory is the complex process that uses three systems to help a person receive, use, store, and retrieve information. The three memory systems are (1) short-term memory (e.g., remembering a phone number you got from information just long enough to dial it), (2) working memory (e.g., keeping the necessary information "files" out on the mind's "desktop" while performing a task such as writing a paragraph or working a long division problem), and (3) long-term memory (a mind's ever expanding file cabinet for important information we want to retrieve over time).

Children in school have to remember much more information every day than most adults do. Adults generally have more specialized days – mechanics use and remember mechanical information, dentists use and remember information about dentistry, and so on. On the other hand, school expects that children become experts in several subjects – e.g., math, language, science, social studies, a foreign language, the arts.

It is important to remember that when a student understands something, it does not guarantee that he will remember it. For example, a person may understand a joke that he heard at a party on Saturday night, but he may have trouble remembering it when he tries to tell it to his friends on Monday.

In order to enhance the likelihood that all students will elaborate on new information, teachers should activate their prior knowledge and make new information meaningful to them. For example, a teacher may ask second graders how to divide a pan of brownies evenly among the 20 students in the class, and then connect their solution to the concept of equivalent fractions. Relating how algebraic equations need to be equal or balanced on both sides to the benefits of dividing candy or cookies evenly between friends also connects to prior knowledge.

Students who have difficulty with both short-term and working memory may need directions repeated to them. Giving directions both orally and in written form, and giving examples of what is expected will help all students. All students will benefit from self-testing. Students should be asked to identify the important information, formulate test questions and then answer them. This tactic is also effective in cooperative learning groups and has been shown by evidence-based research to increase reading comprehension (NICHD, 2000).

## Language

Language is the primary means by which we give and receive information in school. The two language processing systems are expressive and receptive. We use expressive language when we speak and write, and we use receptive language when

we read and listen. Students with good language processing skills usually do well in school. Problems with language, on the other hand, can affect a student's ability to communicate effectively, understand and store verbal and written information, understand what others say, and maintain relationships with others.

Most students, especially those with weaknesses in written language, will benefit from using a staging procedure for both expository and creative writing. With this procedure, students first generate ideas. Next they may organize their ideas. Third, they may look at sentence structure. Then they examine their spelling. Finally, they attend to mechanical and grammatical rules. It is also helpful for students to list their most frequently occurring errors in a notebook and refer to this list when self-correcting.

All students will benefit from systematic, cumulative, and explicit teaching of reading and writing. Students who have receptive language challenges such as a slower processing speed must use a lot of mental energy to listen, and, therefore, may tire easily. Consequently, short, highly structured lectures or group discussion times should be balanced with frequent breaks or quiet periods. Oral instructions may also need to be repeated and/or provided in written form.

Cooperative Strategic Reading (Klinger, Vaughan, Hughes, Scum, and Erlbaum as referenced in Mazola 2006) is another way to engage students in reading and at the same time increase oral language skills. This tactic is ideal for promoting intellectual discussion and improving reading comprehension of expository text in mixed-level classrooms across disciplines. Using this tactic, students are placed into cooperative learning groups of four to six students of mixed abilities. The students work together to accomplish four main tasks: (1) preview (skim over the material, determine what they know and what they want to learn), (2) identify clicks and clunks (clicks = we get it; clunks = we don't understand this concept, idea or word), (3) get the gist (main idea) and (4) wrap up (summarize important ideas and generate questions (think of questions the teacher might ask on a test)). Each student in the group is assigned a role such as the leader/involver/taskmaster, the clunk expert, the gist expert, and the

timekeeper/pacer (positive interdependence). Each student should be prepared to report the on the group's conclusions (individual accountability).

Broadening the way, we communicate information in the classroom can connect all students more to the topic at hand, and especially students with language challenges. Using visual communication such as pictures and videos to reinforce verbal communication is helpful to all students, and especially to students with receptive language challenges. Challenge students to invent ways to communicate with pictures and other visuals, drama, sculpture, dance and music, and watch memory of key concepts increase and classrooms come alive.

### Organization

We process and organize information in two main ways: simultaneous (spatial) and successive (sequential). Simultaneous processing is the process we use to order or organize information in space. Having a good sense of direction and being able to “see” how puzzle pieces fit together are two examples of simultaneous processing. Successive processing is what we use to order or organize information in time and sequence. Concepts of time, dates, and order – yesterday, today, and tomorrow, months of the year, mathematical procedures such as division and multiplication, word order in sentences, and sentence order in paragraphs are examples of sequential processing. Students who are good at successive organization usually have little or no trouble with time management and usually find it easy to organize an essay in a sequence that is logical.

Students who have trouble with understanding spatial or geographical problems may need successive verbal explanations given to them. They may benefit from writing written explanations and descriptions of the information contained in charts, graphs or diagrams. Teachers should model this process for all students.

Students who have trouble remembering sequences of information but who are strong in simultaneous processing should benefit from graphic organizers, and making diagrams or flow charts of sequential information such as events in history

rather than the standard timeline. They may benefit from software programs such as Inspiration that organize concepts and information into visual maps.

Practicing cooperative learning allows each student's processing and organizing strengths to be utilized to the benefit of the group. For example, those who are strong in simultaneous organization may create the group's chart, visual, or map, and those strong in successive organization may be the task step organizers, the taskmasters, timekeepers and pace setters.

### Graph motor

The writing process requires neural, visual, and muscular coordination to produce written work. It is not an act of will but rather an act of coordination among those functions. Often the student who seems unmotivated to complete written work is the student whose writing coordination is klutzy. We have long accepted that students may fall on a continuum from very athletic to clumsy when it comes to sports, but we have not known until recently that some students are writing "athletes" while others writing klutzes. Just as practice, practice, practice will not make a football all-star out of an absolute klutz, practice and acts of will not make a writing all-star out of someone whose neurological wiring does not allow her to be a high performing graph motor athlete.

Students with handwriting difficulties may benefit from the opportunity to provide oral answers to exercises, quizzes, and tests. Having computers in place for all children helps level the playing field for the graph motor klutz. Parents and teachers should be aware, however, that many children with graph motor challenges may also have difficulty with the quick muscular coordination required by the keyboard.

### Higher Order Thinking

Higher order thinking (HOT) is more than memorizing facts or relating information in exactly the same words as the teacher or book expresses it. Higher order thinking requires that we do something with the facts. We must understand and manipulate the information.

HOT includes concept formation; concept connection; problem solving; grasping the “big picture”; visualizing; creativity; questioning; inferring; creative, analytical and practical thinking; and metacognition. Metacognition is thinking about thinking, knowing about knowing, and knowing how you think, process information, and learn.

All students will benefit from advance organizers that relate the big picture and the main concepts to be covered. Also, all students should be explicitly taught how to build concept maps (graphic organizers that connect all components of a concept, and may also connect one concept to another concept).

Give choices for projects and exams that include analytical, practical and creative thinking options. For example, an analytical choice might be to compare and contrast the events of the Holocaust to events in Rwanda. A practical choice might be to show how we can apply the lessons learned from the Holocaust to how we treat one another in our schools. A creative choice might be to write a play about tolerance, create a dance that communicates the emotions of the Holocaust, or write a poem or paint a picture that tells a story about how you feel about the conditions in Darfur.

Providing ample opportunities in the classroom for self-evaluation and self-reflection helps students develop self-understanding. Self-Evaluation... Helping Students Get Better At It! By Carol Rolheiser is listed in the reference section following this article and is a helpful resource for teachers who want to incorporate more student self-evaluation in their classrooms.

A student with metacognition can answer the question, “How am I smart?” The first part of metacognition is thinking about thinking. If a person has metacognition, he understands the way he thinks, and he understands his strengths and challenges in specific skill areas, subjects and activities.

A person with metacognition also monitors and regulates how he learns. He can take a task and decide how best to accomplish it by using his strategies and skills effectively. He knows how he would best learn a new math procedure and which



strategies he would use to understand and remember a science concept. He understands the best way for him to organize an essay – whether he would be more successful by using an outline, a graphic organizer or a mind map. He has mental self-management.

Psychologist Robert Sternberg lists six components of mental self-management:

1. Know your strengths and weaknesses.
2. Capitalize on your strengths and compensate for your weaknesses.
3. Defy negative expectations.
4. Believe in yourself (self-efficacy).
5. Seek out role models.
6. Seek out an environment where you can make a difference.

Ultimately, this is where we hope students who attend our schools will be upon graduation. As adults, we should model our own metacognition, talk about metacognition, and give meaningful examples of metacognition often and well.

Teaching students about the six components of the learning process – attention, memory, language, processing and organizing, graphomotor (writing) and higher order thinking, then, demystifies learning and provides an opportunity to increase their metacognition. It also enhances their sense of self-worth. A student who understands that she may need to use a particular strategy to help her working memory function better or that taking frequent breaks will help her stay more focused on her homework assignments is much better off than thinking that she is stupid or lazy.

## Emotions

Emotions control the on-off switch to learning. When we are relaxed and calm, our learning processes have a green light. When we are uptight, anxious, or afraid, our learning processes have a red light. In the classroom, tension slams the steel door of

the mind shut. Creating a non-threatening classroom environment or climate where mistakes are welcomed as learning opportunities reduces tension, opens the mind and increases the opportunity for learning.

The more teachers know about how learning takes place – how information is processed, manipulated and created, the more we will know about what it looks like when it's working and what it looks like when it starts to break down. Then, rather than thinking a student isn't motivated, teachers will look to see if it is attention, memory, language, organizing, graphomotor or higher order thinking that needs an intervention.

### Motivation

It is every teacher's job to motivate every student. Learning more about the brain and the development of the mind, studying new information on learning, making learning meaningful and learning about learning, watching the learning process, monitoring closely for breakdowns, and celebrating the successes of every student – these are our challenges as we create schools that honor diversity – the schools all children deserve.

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