A CLOSER LOOK AT EACH INTELLIGENCE

THE LOGICAL/MATHEMATICAL INTELLIGENCE

The mathematical/logical intelligence is often associated with what we call "scientific thinking" or deductive reasoning- the ability to observe and understand details as part of a general pattern. Inductive reasoning, on the other hand, is the ability to make objective observations and from the observed data, draw conclusions, make judgments, and formulate hypotheses.

Mathematical/Logical intelligence is the ability to use numbers effectively and to reason well, to recognize and solve problems using logical patterns, to categorize, infer, make generalizations, and test hypotheses. It involves the capacity to recognize patterns, to work well with abstract symbols such as numbers, geometric shapes and to distinguish relationships or see relationships/connections between separate and distinct pieces of information. In other words, these students are often referred to as "Number Smart".

CHARACTERISTICS of a Mathematically Intelligent Student

- asks questions about how things work
- quickly does mental math
- enjoys math activities
- enjoys strategy games
- enjoys logic puzzles or brainteasers
- uses higher-order thinking skills

STRATEGIES for Teaching to Mathematical/Logical Intelligence

Following are recommended approaches that can be used throughout the various curricular areas:

- calculating
- recognizing cause and effect
- using graphic organizers
- mapping
- using pattern games and logic puzzles
- peer teaching and editing
- predicting events
- creating time lines
- using story grids
- composing music from a matrix

VISUAL/SPATIAL INTELLIGENCE

A student who shows visual/spatial tendencies would be considered "Picture Smart." This student relies upon the sense of sight and being able to visualize an object and create mental images. The visual student is sometimes lower in the V/S area due to the fact that they must see the process of the task at hand in order to get the full benefit. They sometimes have a more difficult time picking up verbal cues.

CHARACTERISTICS of Visually Intelligent Student

- thinks in images and pictures
- uses clear visual images and representations
- knows the location of everything
- tends to have an active imagination
- responds to color schemes, painting, and drawing
- recognizes relationships of objects in space
- reads maps, charts, and diagrams easily
- daydreams more than peers
- enjoys puzzles and mazes
- doodles on paper

**STRATEGIES to Teach to Visual/Spatial Intelligence**

- use pictures and mental imaging
- use charts, graphs and flow charts
- illustrate a story
- play "Pictionary"
- graph results of a survey
- create posters/flyers and collages
- visualization exercises
- create visual diagrams or blueprints
- painting or sketching

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**VERBAL/LINGUISTIC INTELLIGENCE**

This intelligence is responsible for words and language, both written and spoken. It dominates Western civilization and its educational system. The verbal/linguistic student is "Word Smart". This student has a sensitivity to the different functions of language: sounds, rhythms, and word definitions.

**CHARACTERISTICS of a Linguistically Intelligent Student**

- writes well
- tells jokes, stories, tales, etc.
- has a good memory for dates, names, trivia, etc.
- enjoys word games
- spells words accurately
- appreciates nonsense rhymes, puns, and tongue twisters
- enjoys spoken words (stories, radio commentary, etc.)
- highly verbal communicator with a large vocabulary

**TEACHING STRATEGIES for Verbal/Linguistic Intelligence:**

As suggested in Seven Ways of Knowing, a hierarchy of strategies can be employed to teach V/L intelligence.

- Awakening of this intelligence through the senses.
  - exercises likely to trigger the intelligence through sound, sight, and speech.
  - sensory activities could include taste, smell, and communication with others.
- Amplifying the V/L intelligence through:
  - drill and practice routine.
  - using these intelligences on a daily basis
- Using the intelligence through:
• lessons designed to use the intelligence in the teaching/learning process
• students learning to trust their skills in various learning tasks.

• Transferring the V/L intelligence:
  • students use these skills to accomplish "real world" problems.
  • students use V/L intelligence skills as tools in the affective, cognitive, and sensory perception of life.

SPECIFIC STRATEGIES for Teaching to Linguistic Intelligence

Some experts feel that linguistic intelligence is the easiest intelligence to develop strategies for. They also feel that too much emphasis has been given to the students that are "lecture-gifted" and "book-oriented." They suggest open-ended language activities, such as:

• Storytelling in the classroom with the teacher weaving ideas, goals and concepts into a story told directly to the students.
• Brainstorming to allow students that have special ideas to be acknowledged for those thoughts. The rules of brainstorming are: share whatever comes to mind, no criticism or put-downs and every idea counts.
• Use of a tape recorder permits students to "talk out loud" about problems they are trying to solve. Students that are poor writers can use the tape recorder as a means of expression. The recordings allow students to reflect upon their cognitive problem solving skills.
• Students should be encouraged to keep a journal. The journal should be an ongoing written record of a specific class project. Journals can be private or shared.
• Student written efforts should be published. In so doing, educators send the message that written communication is important. Published student writings can be photo-copied for individual classes and/or submitted to newspapers and magazines.

BODY/KINESTHETIC INTELLIGENCE

Body/kinesthetic intelligence is the ability to use the body to experience learning. It is defined as expertise in using one's body to express ideas and feelings. These students are considered to be "Physically Smart". Included in kinesthetic intelligence are coordination, balance, dexterity, strength, flexibility, and speed.

Learning by doing has been recognized as an important component of education. An ancient Chinese proverb claimed, "Tell me, I forget; show me, I remember; involve me, I understand." Kinesthetic learners who experience involvement in the lesson plan have a higher probability of learning and retention. If we accommodate students' varying intelligences, students' interest levels increase; thus motivation to engage in the learning process increases resulting in higher academic achievement. When instruction concentrates on the other intelligences, kinesthetic learners tend to fall behind, to drop in self-esteem, and to view school as a place that is uncomfortable. (Corlet) Society's emphasis on the other intelligences may alienate many gifted kinesthetic students from school. For example, an inappropriate label is that of a child who has been diagnosed hyperactive. A variety of learning strategies would better meet the needs of the kinesthetic intelligence. (Reiff) Poor performance of a student may be the result of an educator's naive belief that providing similar instruction for all children suggests that they are being taught on "equal terms." (Dunn, Shed, 1991, 93-94) However, based on the conclusions of multiple intelligence studies, including the work of Howard Gardner (1983), students are at-risk of an unsuccessful educational experience because not all students' individual educational needs are being met. This demonstrates that all students are not being educated on "equal terms."

Research has found that kinesthetic learners compose fifteen percent of the student population (Barbe and
Milone, p. 45) Too many curriculum and instructional approaches are structured toward auditory and/or visual learners. (Barbe and Milone) Research has documented that when students are taught through approaches that match their strengths, they achieve at higher levels and demonstrate better on task behavior.

**CHARACTERISTICS of a Kinesthetically Intelligent Student:**

- excels in one or more sports
- moves, twitches, taps or fidgets while seated for a long time
- enjoys taking things apart and putting them back together
- touches new objects
- enjoys running, jumping, or wrestling
- expresses herself/himself dramatically
- enjoys clay and finger painting

**STRATEGIES for Teaching to Kinesthetic Intelligence:**

- physical exercise
- aerobic routines
- dances of different cultures and periods of history
- measurement with fingers, feet, hands, or arms
- illustrate geometrical figures with body parts
- hands-on experiments
- role-playing
- acting out scenes from stories
- inventing something
- preparation of food
- sports games
- field trips
- body language
- crafts

**Musical/Rhythmic Intelligence**

Carolyn Chapman states that musical/rhythmic intelligence Ôis the ability to use the core set of musical elements (pitch, rhythm, and tone) and the awareness of sound in oneÔs environment. In other words, itÔs the ability to understand and learn through patterns of sound. This is often referred to as being a Ômusical smartÔ.

There are a number of ways for teachers to keep the attention of the students by using Musical/Rhythmic strategies. Teachers can begin by recognizing the speech patterns that catch the musical/rhythmic student. Teachers can plan lessons that start with a musical hook. Think of a song that ties in to what the lesson is trying to teach. Make music the center of the some lessons. While studying different cultures, have students do a compare/contrast on the music of those cultures. And by using music as a closing activity, the lesson can be reinforced for the students with this intelligence.

The steps to musical/rhythmic intelligence development start from the basic (i.e. rhythm recognition and reproduction and sound association.) The more complex development would include rhythm and/or beat production, and the enjoyment of different types of music. The higher-ordered development state would see the ability to teach music to others and grasp the meanings of musical symbols.
CHARACTERISTICS of a Musically/Rhythmically Intelligent

- Persons that possess the musical/rhythmic intelligence are more likely to
- Identify when music sounds off-key or disturbing in some way.
- Remember melodies of songs.
- To sing with a pleasant tone.
- Play an instrument or sing in a choir or other group.
- Speak in a rhythmic manner.
- Unconsciously hum to him/herself.
- Tap rhythmically on the table or desk as they work.
- Be sensitive to environmental sounds.
- Respond when a piece of music is played.

STRATEGIES for Teaching to Musical/Rhythmic Intelligence

- Create musical mnemonics.
- Recite choral reading. (poems, popular songs etc.)
- Offer opportunities to learn about, listen to, and play instruments.
- Listen to rhythmic sounds and patterns.
- Listen for tonal patterns.
- Create dances that illustrate concepts.
- Try music and dance of different cultures.
- Allow background noises and music.
- Compose songs.
- Create dances that illustrate concepts.
- Practice rhythms.
- Practice unison recall.
- Move to the beat.

INTRAPERSONAL INTELLIGENCE

Intrapersonal intelligence deals with one's ability to take greater responsibility for one's life and one's learning. It deals with metacognitive thinking (the way we think about thinking), and how we feel about our inner states of being. It involves self confidence, responsibility, self management and ethics. This intelligence could be called "Self Smart." The ancient Greek philosopher, Aristotle, wrote "Know thyself.", a thought that still applies today. Gardener suggest that too few students know or feel they can take responsibility for their learning, especially when they find themselves in an environment (school) where recognition is based on external motivation. (Chapman, p. 153)

Everyone from athletes to physicians can benefit from learning to harness the power of the mind to find the pathway to achieve peak performance. We all have a human need to feel part of our family, our culture, our society and our world. Using quiet reflection we learn to examine what we are doing to belong and contribute to our world. (Chapman, p. 153)

Many eastern cultures value the development of the inner self, but it is most evident in China where a major emphasis is place on intrapersonal development. Developing concentration and carrying it into all aspects of their curriculum is a priority. In New Zealand, reflective journals, metacognition, integrated thinking skills, and process writing are integral parts of their approach to education. (Chapman, p. 154)

Intrapersonal intelligence is the most private intelligence and this creates many unique needs to achieve
success using this intelligence. The trends in the business world toward goal setting, problem solving skills and thinking skills have led American schools to work on developing metagacognitive skills.

Intrapersonal intelligence follows three steps in its path to development. The first step is the most basic step and includes expression of a range of body states at different times and awareness of a separate self-identity. The second step is a complex step and includes "why" questioning to make sense of life, self improvement skills acquisition and concern. The last step is a higher order step which involves conscious control of emotional states and an emerging personal belief/philosophy system. (If the Shoe Fits..., Chapman, p. 154)

Students with strong intrapersonal intelligence know themselves, recognize their strengths and limits and hold high expectations to improve and challenge themselves. They tend to live balanced lives due to paying close attention to their physical, psychological and academic well-being. These students tend to be goal centered, reflective problem solvers and see themselves as in control of their learning and their life. They are usually confident that their success is due to their efforts, planning, and persistence. (Chapman, p.155)

CHARACTERISTICS of an Intrapersonally Intelligent Student

- displays a sense of independence
- has a realistic sense of her/his strengths
- has a good sense of self-direction
- prefers working alone to working with others
- learns from his failures and successes
- has self-esteem

STRATEGIES for teaching to the Intrapersonal Intelligence

Intrapersonal intelligence requires that students have time to think, reflect and do self assessments that will help them take control and be responsible for their learning choices. As educators we need to incorporate the use of journals, allow time for reflection, encourage the study of oneself and one's world, allow time for independent work, conduct surveys, include time for learning centers, and make the classroom a safe and inviting place to learn. Goal setting is of particular importance to this intelligence.

- create a selection of self esteem building activities
- have students list and work on their strengths
- encourage students to draw pictures that describe their moods or feelings
- discuss thinking strategies and suggest independent projects
- individualize instruction
- create activities that help increase self awareness
- provide comfortable study areas such as bean bag chairs

INTERPERSONAL INTELLIGENCE

The interpersonal component is used in person to person relationships through verbal and non-verbal communication. This intelligence involves the ability to interact with, work with, and motivate others toward a common goal.

Example: The solution to the problem in a science laboratory classroom needs to be mapped out by following the guidelines to the scientific method. Student lab groups collectively state the problem, write a hypothesis, and conduct experiments in order to achieve the group goal and solving the problem.

The interpersonal intelligence also includes the ability to have empathy for others' feelings, values, needs and
be able to understand what other people are "going through in life." Whenever a conflict or problem arises this social model does not compromise until a win-win solution is the result for the parties involved. Peer mediation is a strategy used to diffuse the situation. This is often referred to as being "People Smart".

**CHARACTERISTICS** of an Interpersonally Intelligent Student

- leaders among peers
- encourages togetherness for a feeling of belonging
- "street smart"; has a high degree of common sense
- has many friends in a variety of social groups
- hates to study or work alone, would rather do things collectively
- possesses a high degree of social skills
- belongs to clubs, committees, other organizations
- shows concern for others
- has one or more close friends

**STRATEGIES** for Teaching to Interpersonal Intelligence

- build rapport
- peer tutoring
- cooperative study groups
- group problem solving
- group laboratory investigation
- class discussions
- conflict/peer mediation
- group research projects
- debates/oral presentations
- role-playing
- team games and activities
- create a "we" or team atmosphere