Multiple Intelligences and Instructional Technology

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The Animal School

By George H. Reavis

Once upon a time, the animals decided they must do something heroic to meet the problems of "a new world." So they organized a school.

They adopted an activity curriculum consisting of running, climbing, swimming and flying. To make it easier to administer the curriculum, all the animals took all the subjects.

The duck was excellent in swimming, in fact better than his instructor, but he made only passing grades in flying and was very poor in running. Since he was slow in running, he had to stay after school and also drop swimming in order to practice running. This was kept up until his webbed feet were badly worn and he was only average in swimming. But average was acceptable in school, so nobody worried about that except the duck.

The rabbit started at the top of the class in running, but had a nervous breakdown because of so much make-up work in swimming.

The squirrel was excellent in climbing until he developed frustration in the flying class where his teacher made him start from the ground up instead of from the treetop down. He also developed a "charlie horse" from overexertion and then got a C in climbing and a "D" in running.

The eagle was a problem child and was disciplined severely. In the climbing class he beat all the others to the top of the tree, but insisted on using his own way to get there.

At the end of the year, an abnormal eel that could swim exceedingly well, and also run, climb and fly a little, had the highest average and was valedictorian.

The prairie dogs stayed out of school and fought the tax levy because the administration would not add digging and burrowing to the curriculum. They apprenticed their children to a badger and later joined the groundhogs and gophers to start a successful private school.

Does this fable have a moral?

IT'S NOT HOW SMART YOU ARE -
IT'S *HOW* YOU ARE SMART!

Howard Gardner's Theory of Multiple Intelligences

What parent can not see gleaming rays of genius in their child? And yet, how many children come to school and demonstrate their own unique genius? There was a time when it might have been a joke to suggest "Every parent thinks their kid's a genius." But research on human intelligence is suggesting that the joke may be on educators! There is a constant flow of new information on how the human brain operates, how it differs in function between genders, how emotions impact on intellectual acuity, even on how genetics and environment each impact our childrens' cognitive abilities. While each area of study has its merits, Howard Gardner of Harvard University has identified different KINDS of intelligence we possess. This has particularly strong ramifications in the classroom, because if we can identify children's different strengths among these intelligences, we can accommodate different children more successfully according to their orientation to learning.

Thus far Gardner has identified nine intelligences. He speculates that there may be many more yet to be identified. Time will tell. These are the paths to children's learning teachers can address in their classrooms right now. They are:

VISUAL/SPATIAL - children who learn best visually and organizing things spatially. They like to see what you are talking about in order to understand. They enjoy charts, graphs, maps, tables, illustrations, art, puzzles, costumes - anything eye catching.

VERBAL/LINGUISTIC - children who demonstrate strength in the language arts: speaking, writing, reading, listening. These students have always been successful in traditional classrooms because their intelligence lends itself to traditional teaching.

MATHEMATICAL/LOGICAL - children who display an aptitude for numbers, reasoning and problem solving. This is the other half of the children who typically do well in traditional classrooms where teaching is logically sequenced and students are asked to conform.

BODILY/KINESTHETIC - children who experience learning best through activity: games, movement, hands-on tasks, building. These children were often labeled "overly active" in traditional classrooms where they were told to sit and be still!

MUSICAL/RHYTHMIC - children who learn well through songs, patterns, rhythms, instruments and musical expression. It is easy to overlook children with this intelligence in traditional education.

INTRAPERSONAL - children who are especially in touch with their own feelings, values and ideas. They may tend to be more reserved, but they are actually quite intuitive about what they learn and how it relates to themselves.

INTERPERSONAL - children who are noticeably people oriented and outgoing, and do their learning cooperatively in groups or with a partner. These children may have typically been identified as "talkative" or " too concerned about being social" in a traditional setting.

NATURALIST - children who love the outdoors, animals, field trips. More than this, though, these students love to pick up on subtle differences in meanings. The traditional classroom has not been accommodating to these children.

EXISTENTIAL - children who learn in the context of where humankind stands in the "big picture" of existence. They ask "Why are we here?" and "What is our role in the world?" This intelligence is seen in the discipline of philosophy.

Teachers are now working on assimilating this knowledge into their strategies for helping children learn. While it is too early to tell all the ramifications for this research, it is clear that the day is past where educators teach the text book and it is the dawn of educators teaching each child according to their orientation to the world.
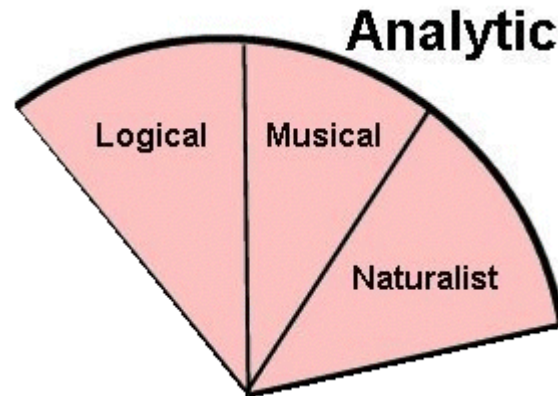
http://surfaquarium.com/MI/overview.htm

The Intelligences: A Pneumonic Device

M.I. theory can help find the...

Skill In Me!

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p   i  n  i  o      n  a      u  x
a   n  t  n  g      t  t      s  i
t   e  e  g  i      r  u      i  s
i   s  r  u  c      a  r      s  t
a   t  p  i  a      p  a      c  e
l   h  e  s  l      e  l      a  n
    e  r  t         r  i      l  t
    s     i         s  s         i
    o     c         o  t         a
    n                n           l
    a                a
    l                l
    i
    c
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http://surfaquarium.com/MI/skillinme.html

The Wheel of Domains

The analytic domain consists of the logical, musical and naturalist intelligences. These are the intelligences that promote analysis of knowledge that is presented to the learner.

Consider Ms. Gamboro's class. They have created instruments that simulate the sounds of the rain forest, and each child is now creating his or her own composition that makes use of these sounds. As a child comes before the class to present and conduct his or her composition, students must follow the patterns of sound and imitate them accurately in order to successfully perform the piece. There is a careful auditory analysis of each rhythm presented to the class, and in cases where the student has created sheet music with symbols for the different instruments as they play, there is visual analysis of patterns evident as well.

Then consider that the logical intelligence has a highly analytical component. Li and Marla are working to create a bridge out of popsicle sticks that will be able to hold the weight of a motorized twelve-pound truck as it crosses their structure. They have studied many kinds of bridges and they are employing what they have learned to make a structure strong enough to successfully do the job. As they attempt different designs, they are careful to analyze their failures and build on their successes. After two weeks of working a little every day, Marla and Li come up with a design that is effective in safely holding the truck's weight. Problem solving is a very analytical process!

Finally, consider Shanae, who is sorting leaves by different attributes at a first grade learning center. She sorts them by color, then by size, then by texture. As she comes up with a classification system for the leaves that makes sense to her, she glues each leaf down on a large sheet of paper that serves as an organizer. She then presents her leaf classification system to be displayed in the classroom so that children can compare and contrast one another's strategies for classification.

I characterize these three intelligences as analytic because even though they can have a social or introspective component to them, they most fundamentally promote the process of analyzing and incorporating data into existing schema. The analytical intelligences are by nature heuristic processes.

Verbal

Interpersonal
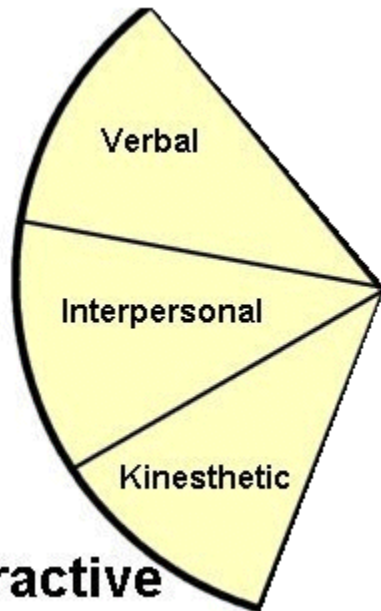
Kinesthetic

Interactive

The interactive domain consists of the verbal, interpersonal, and kinesthetic intelligences. These are the intelligences that learners typically employ to express themselves and explore their environment.

Consider five year old Selange in his Kindergarten classroom. He not only uses language to demonstrate his knowledge or express his needs, he also uses language to explore, inquire and prompt responses from others. This can include the use of nonsensical expressions, repetitive recountings of favorite books, and even reverting to "baby talk". Regardless of the many functions of language Selange is using, he consistently makes use of talk to interact with others and his environment.

Eleven year old Selina is a prime example of the interactive function of the interpersonal intelligence. As her class reads E.G. Speare's The Witch of Blackbird Pond she continually prompts her teacher to ask about the mores of seventeenth century New England. Selina initiates class discussion on the social dynamics of prosecuting witches in Colonial New England, not for the sake of the discussion itself but to help her better understand the plot and setting of the story. When it comes time to be assessed for comprehension of the novel, Selina excels in an interview format, in which she can discuss her understandings and ideas at length. In fact, her teacher is offering several assessment options, including the opportunity to be interviewed by a classmate as the heroine from the book.

Finally, consider Susan's use of her kinesthetic intelligence as an interactive process. Susan has been learning about electrical circuits in her third grade class. This week the teacher has set up an experiment as a learning center where Lin and her classmates must use batteries, copper wiring and light bulbs to create electrical circuits. Susan and her group of three classmates quickly create a complete circuit. They then ask their teacher Mrs. Morales for some paper clips so that they can experiment making a switch that will open and close the circuit. Finally Susan and her group take the experiment a step further by creating a parallel circuit using two light bulbs. Susan has repeatedly

interacted with her environment and her peers to create a greater understanding of how electrical circuits work.

I characterize these three intelligences as interactive because even though they can be stimulated through passive activity they typically invite and encourage interaction to achieve understanding. Even if a student completes a task individually, s/he must consider others through the way s/he writes, creates, constructs and makes conclusions. The interactive intelligences are by nature social processes.
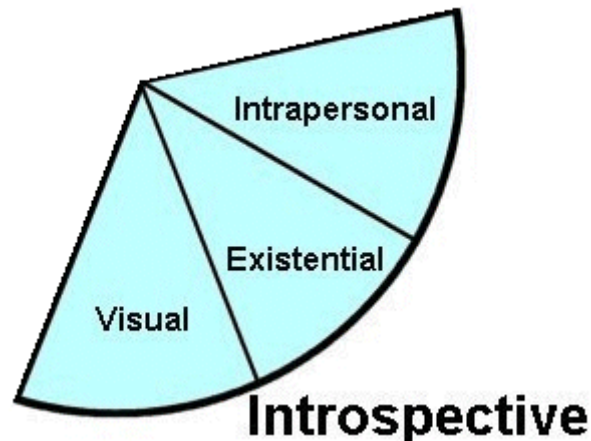
The introspective domain consists of the existential, intrapersonal and visual intelligences. These are the intelligences that have a distinctly affective component to them.

In the case of the visual intelligence, consider Michelangelo celebrating the discovery of a large slab of marble because he wants to free the angel encased therein through his act of sculpting. There is a uniquely emotional component to envisioning a piece of art before the artist actually creates it. In the same way, recall a student you have worked with who served as a class leader simply because s/he was able to visualize where s/he wanted to go with a project before the rest of the group even got its collective self together to begin discussing the possibilities. There is an intuitive release of energy that sparks the enthusiasm and imagination of others when the visual intelligence is unleashed.

The existentialist intelligence displays similar emotional, introspective characteristics. When Soeren Kierkegaard described looking at the infinite depth of the night sky and having an emotionally charged response that "Yes, I am part of something bigger in the universe!" he was referring to this experience. It is necessary to make that leap of faith in order to contribute to the collective human experience. By the same token, place yourself in the presence of the Pieta and feel the emotional response as your senses take in the aesthetic beauty of one of mankind's great expressions of human love and suffering. It moves many unsuspecting onlookers to tears. It is another example of that emotional response to cognitive stimulus.

The intrapersonal intelligence may be the most obvious example of this. Consider fourteen year old Kathleen who filters everything she is learning through her strong sense of social justice. She lights up when learning about the plight of Native Americans

in the nineteenth century, the ethical dilemmas presented by genetic engineering, and reading Alan Paton's Cry, the Beloved Country. In fact, with an upcoming presidential election in the Fall, Kathleen is very interested in helping out at her local party headquarters and campaigning for the candidates of her choice. Everything Kathleen is learning is reinforced and mastered by the emotional connection she has with the different kinds of content she is studying.

I characterize these three intelligences as introspective because they require a looking inward by the learner, an emotive connection to their own experiences and beliefs in order to make sense of new learning. The introspective intelligences are by nature affective processes.
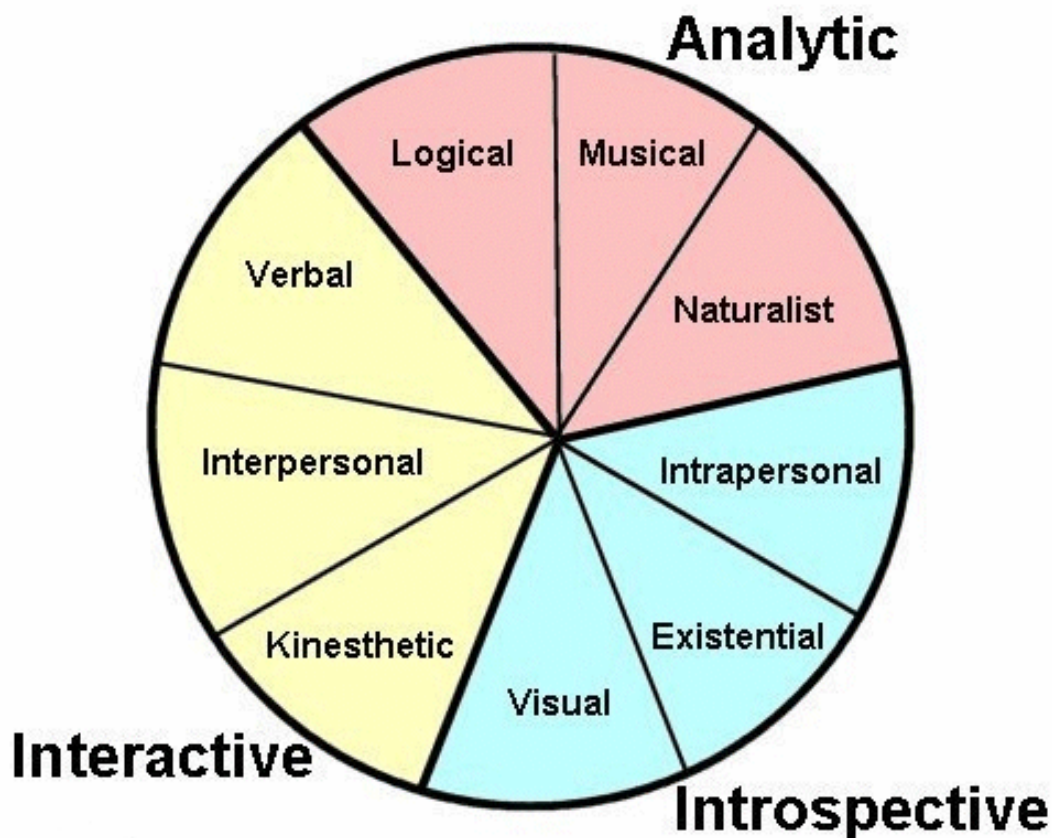
Understanding basic definitions of each intelligence in place is important, but not as important as the working understanding of how the intelligences work with one another. After all, if these different paths to learning always act in consort, we're really not providing for the full potential of this model unless we look at all of the intelligences in operation together.

This can be difficult to do, because once you begin observing a specific child the intelligences become very fluid and free flowing. What might be easily recognizable in isolation becomes much less clear when observing the intelligences in action holistically.

In presenting Gardner's theory to educators, teachers always come up with questions about this overlapping of intelligences. We are so used to theory that nicely packages teaching and learning into neat compartments, we tend to cling to the individual integrity of each intelligence. It's hard to let go and accept the fact that, since Gardner's theory is based on the way these intelligences actually function within human cognition, it's a little less easy to compartmentalize and parcel out in tight, tidy packages. Once teachers get past the traditional definition of intelligence, there are powerful new possibilities for learning in the classroom.

The Wheel of MI Domains serves as an organizer for understanding the fluid relationship of the intelligences. In this organizer, I have grouped the intelligences into three regions: the interactive, analytic, and introspective domains. These three domains are meant to align the intelligences with familiar learner attributes teachers routinely observe in the classroom.

By referring to the wheel of domains when planning for instruction, teachers can plan lessons and units which effectively address all of the intelligences in the classroom. Here are two strategies for utilizing the wheel:

To Balance Intelligences:
In planning a lesson, a teacher may wish to select one intelligence from each domain in order to provide for a well-balanced accommodation of the intelligences.

Example:

Mrs. Reed 's lesson on iambic pentameter may benefit from using the verbal (interactive), musical (analytic) and existential (introspective) intelligences. By tapping into all three of these ways of knowing she can accommodate learners across the spectrum in her classroom.

It might look like this:

Objective: Given a sonnet, the learner will recite the sonnet with proper meter and interpretation of its content.

Intelligences:

Verbal - recite of the sonnet
Musical - experience the sonnet's meter
Existential - interpret the sentiment expressed in the sonnet

To Target Intelligences:
In planning instruction for a learner or group of learners, a teacher may wish to target all the intelligences of a specific domain to provide for experiences that strengthen that particular domain.

Example:
Mr. Esposito realizes that his class needs to improve their critical thinking skills in order to be prepared for Spring standardized testing in Biology. In dissecting earthworms, he wants to emphasize the analytical nature of the task. He decides to map to the logical, musical and naturalist intelligences in this lesson:
It might look like this:

Objective: Given an earthworm to dissect, the learner will follow specific step-by-step instructions, categorizing organs by body systems and identifying patterns found within those systems.

Intelligences:
Logical - follow body systems throughout the organism
Musical - identify patterns within and between body systems
Naturalist - categorize organs and body systems by function

http://surfaquarium.com/MI/mi_domains.htm

Walter's Online MI Course:
http://surfaquarium.com/MI/Course/ways_of_knowing.htm

"If the only tool you have is a hammer..... everything around you looks like a nail!"

To meet Gardner's definition, technology must:
- be <u>flexible</u> for all intelligences
- be <u>adaptable</u> to multiple objectives
- be <u>transferable</u> to different disciplines
- be used in <u>rich and varied</u> contexts
- offer <u>real world</u> applications

Software tools can be used:
- to create
- to solve problems
- by students with different approaches
- across all disciplines
- to meet varied objectives
- to immerse students in rich, real world tasks

Software resources can be used:
- to simulate real world applications
- to target objectives by subject area
- to structure a scope and sequence of student learning
- to track and document student progress

Tutorial – offering content, concepts and skills with the opportunity for their application

Assessment – evaluation of student mastery of specified skills and concepts through appropriate tasks

Guided Practice – application of specific skills with support, interaction and feedback

Independent Practice – use of specific skills to reach an identified goal

Heuristic – learning activities that require problem solving skills and provide for more than one strategy to successfully complete the tasks

Simulation – providing a vicarious experience for the students through electronic means

Productivity – used for writing, composing, organizing, sorting, calculating, drawing, painting and publishing

Software by Intelligence and Level of Thinking

Software Category	Intelligences	Bloom
Tutorial	Logical Verbal	Knowledge Comprehension
Assessment	Logical Verbal	Knowledge Comprehension
Guided Practice	Logical Verbal Musical Naturalist	Knowledge Comprehension Application
Independent Practice	Logical Verbal Musical Naturalist Intrapersonal	Knowledge Comprehension Application Analysis
Heuristic	Logical Verbal Musical Naturalist Intrapersonal Interpersonal	Knowledge Comprehension Application Analysis Synthesis
Simulation	Logical Verbal Musical Naturalist Intrapersonal Interpersonal, Visual Existentialist Kinesthetic	Knowledge Comprehension Application Analysis Synthesis
Productivity	Logical Verbal Musical Naturalist Intrapersonal Interpersonal, Visual Existentialist Kinesthetic	Knowledge Comprehension Application Analysis Synthesis Evaluation

Resources

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McKenzie, Walter. <u>Multiple Intelligences and Instructional Technology: A Manual for Every Mind</u>. Eugene, Oregon: ISTE,2002. ISBN 1-56484-192-8. http://surfaquarium.com/MI/book1.htm

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Walter McKenzie's Multiple Intelligences Pages
http://surfaquarium.com/MI/

Multiple Intelligences Discussion Group
http://groups.yahoo.com/group/M-I/

Howard Gardner
http://www.howardgardner.com/Links/links.html

Thomas Armstrong's Multiple Intelligence Pages
http://www.thomasarmstrong.com/

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http://www.thirteen.org/edonline/concept2class/month1/index.html

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