Chapter 1: MI Basics

Introduction

It's early evening in Salisbury, Massachusetts, and the GED preparation class is in full swing. Working alone or in pairs, the students use rulers, Play-Doh®, drawing materials, measuring spoons, even a xylophone, to complete three measuring tasks of their choosing from the 10 diverse options Martha Jean, their teacher, has provided. One student measures and cuts strips of paper; another measures her partner's height, while a pair measures and compares differing amounts of water and Play-Doh®. Lively discussions about inches, gallons, and long and short musical notes create a welcomed din to Martha's ears.

In Providence, Rhode Island, Terri Coustan's low literacy ESOL students are completing entries in their dialogue journals. Because her students had responded enthusiastically to visual media in the past, Terri has begun including in the journals photographs of each student at work in the classroom. The journals are an important part of Terri's attempts to help her students reflect on their own learning. Watching her students so engaged with the photos and intently writing journal responses, Terri is encouraged. She feels she has found one strategy to help circumvent the significant language barrier that has obstructed her previous attempts at guiding her students' self-reflection.

Not far from Terri's classroom, at Providence's Dorcas Place, Lezlie Rocka teaches a basic literacy class. One student stands and reads dramatically from a book. Later, students trace the travels of Sojourner Truth, the book's main character, on individual maps. At another point, they sketch pictures of a scene as they imagine it. Lezlie has devised several diverse hands-on activities, tied to the plot and theme of the readings, that she intermingles with student readings. For Lezlie, these activities help build her students' reading comprehension. For the students, it is fun and an engaging way to learn to read.

Which of these teachers is using multiple intelligences (MI) theory to inform her practice? All three, as the reader has likely guessed. But if that's the case, then why are these MI-informed practices so different from one another? MI theory is a theory of intelligence, not a specific approach or set of teaching strategies merely to be replicated. MI theory serves as a *common theoretical root* that results in many *different practical applications* across many different learning contexts.

The teacher–researchers of the Adult Multiple Intelligences (AMI) Study, including the teachers introduced in our vignettes above, used MI theory in different ways to design applications to address their own goals and circumstances. With MI theory at their root, the diverse practices that emerged across the AMI sites still shared many commonalities.

Whatever the practical outcome, the AMI teachers, like many teachers before and after them, began with the basics, asking, "What is the theory of multiple intelligences? What are the major features of MI theory with implications for the classroom? What are those implications of MI theory?" Beginning with these initial queries, the AMI teachers tried first to understand MI theory well, in order to develop appropriate applications that fit their needs and remained consonant with MI theory.

The goal of this chapter is to provide those "basics" of MI theory: what it is and in what ways it can inform practice. The chapter is organized in two parts: the theoretical basics and practical basics. The theoretical basics include MI theory versus traditional definitions of intelligence, a description of each intel-

ligence, the criteria used to identify intelligences, and features of MI theory with direct implications for the classroom. The theory basics are followed by an overview of how MI theory is put into practice, highlighting examples from the AMI classrooms. Final Reflection and Discussion Questions at the end of the chapter are meant both to help readers check their understanding of MI theory and to consider how they might tap into MI theory in their own setting.

Multiple Intelligences: The Theory Behind the Practice*

The Traditional View

The traditional view of intelligence can be traced to French psychologist Alfred Binet. At the request of the French Ministry of Education in the early 1900s, Binet and his colleague Theodore Simon developed a test that identified children at risk for school failure. The test was effective for that purpose. However, it was soon used as the basis for "measuring" individuals' general intelligence. Since that time, intelligence tests have been heavily weighted with the types of highly predictive abilities Binet measured in his test, such as verbal memory and reasoning, numerical reasoning, and appreciation of logical sequences.

In 1912, German psychologist Wilhelm Stern came up with the Intelligence Quotient, or IQ, which represents the ratio of one's "mental age" to one's chronological age, as measured by intelligence tests. Lewis Terman, an American psychometrician, is credited (or blamed) for popularizing the IQ test in the United States starting in the 1920s. Terman introduced the Stanford-Binet IQ tests, the first paper-and-pencil, group-administered versions of the test.

In large part as a result of Terman's work, the intelligence test quickly became a standard part of the U.S. educational landscape. Since that time, conventional wisdom has equated intelligence with this psychometric view. Terman's work also had a significant role in the development of two additional beliefs about intelligence: that it is inherited and largely unchangeable. Current conventional wisdom about intelligence includes three main dimensions: Intelligence is measured by a test; we inherit our intelligence from our parents and are born with whatever intelligence we will ever possess; and because intelligence is one general capacity, we can all be measured against the same yardstick, plotted on a single line somewhere between "very stupid" and "highly gifted."

In recent years IQ tests have gradually seen less use. Legal battles have made public schools back away from them. For the most part IQ testing is limited to cases where there is a problem, like a suspected learning disability, or where selection procedures apply, like entry into a gifted program. However, the line of thinking to which intelligence testing gave rise maintains a powerful presence. Most directly, many academic measures are thinly disguised intelligence tests. Most pervasively, the traditional view of intelligence, internalized on a societal level, plays a major role in shaping our educational policies and practices. The traditional view of intelligence has played a significant role in determining standard school fare, with its emphasis on the same narrow set of language and math skills that revert to test items. "Core curricula" as well as determinants of who are the "good" or "smart" students find their roots in this long-held view of intelligence.

A New View

Howard Gardner was certainly not the first to take issue with IQ tests and the concept of intelligence that they support. Criticisms emerged from the inception of intelligence testing, particularly when IQ tests first hit the U.S. educational scene in the 1920s. The influential American journalist Walter Lippman took Lewis Terman to task in a series of debates that were published in the *New Republic*. He criticized the superficiality of the test items and the risks of assessing intellectual potential through a single, brief method, and he pointed out possible cultural biases. However, nothing really changed. As Gardner (199b) notes,

> So long as these tests continued to do what they were supposed to do—that is, yield reasonable predictions about people's success in school—it did not seem necessary or prudent to probe too deeply into their meanings or to explore alternative views of what intelligence is or how it might be assessed. (p. 13)

It is in his own work in neuropsychology and cognitive development that Gardner began to question the traditional view of intelligence. In the 1970s and 1980s he worked in two contexts studying the

* Much of the text for this section, "Multiple Intelligences: The Theory Behind the Practice," draws from Gardner (1999), *Intelligences Reframed*.

nature of human cognitive capacities. At the Boston University Aphasia Research Center, Gardner conducted studies to understand the patterns of abilities of stroke victims suffering from impaired language and other kinds of cognitive and emotional injury. At the same time, he worked with ordinary and gifted children at Project Zero, at the Harvard Graduate School of Education, in an attempt to understand the development of cognitive abilities. Gardner (1999) observed something different, not explained by the psychometric view of intelligence. He noted,

> The daily opportunity to work with children and with brain-damaged adults impressed me with one brute fact of human nature: People have a wide range of capacities. A person's strength in one area of performance simply does not predict any comparable strength in other areas.
>
> In most cases, however, strengths are distributed in a skewed fashion. For instance, a person may be skilled in acquiring foreign languages, yet be unable to find her way around an unfamiliar environment or learn a new song or figure out who occupies a position of power in a crowd of strangers. Likewise, weakness in learning foreign languages does not predict either success or failure with most other cognitive tasks. (p. 31)

Both groups with which he worked sent Gardner the same message:

> The human mind is better thought of as a series of relatively separate faculties, with only loose and non-predictable relations with one another, than a single, all-purpose machine that performs steadily at a certain horsepower, independent of content and context. (p. 32)

Most theories of intelligence looked only at problem-solving and ignored the creation of products. They also assumed that their notion of "intelligence" would be apparent and appreciated anywhere, regardless of cultural values and beliefs. In this respect, Gardner (1999) distinguished his theory of intelligence from others by defining intelligence as "the ability to solve problems or to create products that are valued within one or more cultural settings" (p. 33).

Gardner (1999) recently refined his definition of intelligence:

> Intelligence [is] a biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture. (pp. 33–34)

His revised definition suggests that intelligence represents *potential* that may or may not be realized depending on the values, available opportunities, and personal decisions made by individuals of a particular culture.

Gardner's definition locates intelligence in what people can do and the products they create in the real world, in contrast to intelligence implied by a test score. It suggests a qualitative expression, a description, of an individual's collection of intelligences rather than a quantitative expression of a general ability.

The Eight Intelligences

At present eight intelligences—eight qualitatively independent ways to be intelligent—have been identified. Each intelligence is relatively distinct neurologically as well as in the symbol system it uses, the subabilities included in each, and how each is used in the real world. In the pages that follow, each of the intelligences is described according to several categories defined in Figure 1.1.

Figure 1.1. Key to Intelligence Descriptions

Key abilities are broad abilities central to that intelligence.

Subabilities are the more specific abilities within each of the intelligences.

Roles or **Domains** refer to societal niches that emphasize that particular intelligence. For example, the journalist role requires a great deal of linguistic intelligence. Domains refer to the disciplines of the real world, activities that are valued and at which we can get better. The domains listed for each intelligence require a great deal of that intelligence. (Roles are played within domains.)

Strategies or **Products** refer to ways of learning or engaging in a task associated with that intelligence, or the products that emerge from work that emphasizes that particular intelligence. Interviewing is a strategy and an article is a product of a journalist who is to a great degree relying on his linguistic intelligence.

Everyday Uses: As our intellectual toolkit, we use our multiple intelligences in combination for everyday activities. This category describes everyday contexts in which the intelligence is heavily drawn on.

"NOT" refers to common misconceptions about the nature of that intelligence. For example, liking to talk does not imply a high level of linguistic intelligence.

Linguistic Intelligence

> Linguistic intelligence is the capacity to use language, your native language, and perhaps other languages, to express what's on your mind and to understand other people. Poets really specialize in linguistic intelligence, but any kind of writer, orator, speaker, lawyer, or a person for whom language is an important stock in trade, highlights linguistic intelligences.
>
> ~ Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Linguistic Intelligence

...involves perceiving or generating spoken or written language.
...allows communication and sense making through language.
...includes sensitivity to subtle meanings in language.

Subabilities

expressive language, invented narrative/storytelling
descriptive/instructional language, reporting
poetic use of language, wordplay

Roles or Domains that require significant linguistic intelligence

novelist	stand-up comedian	law
journalist	preacher	coaching
poet	dispatcher	teaching

Strategies or Products that emphasize linguistic intelligence

instructions/manuals	script	word game
novel	newspaper	discussion
debate/speech	play	lyrics/libretto

Everyday uses of linguistic intelligence

reading the newspaper
writing a letter
participating in a meeting

Linguistic Intelligence is NOT

...bilingualism (but might include facility with learning languages).
...being talkative, liking to talk.

Logical-Mathematical Intelligence

> People with highly developed logical-mathematical intelligence understand the underlying principles of some kind of a causal system, the way a scientist or a logician does; or can manipulate numbers, quantities, and operations, the way a mathematician does.
>
> -- Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Logical-Mathematical Intelligence

...enables individuals to use and appreciate abstract relations.
...includes facility in the use of numbers and logical thinking.

Subabilities

numerical reasoning (calculations, estimation, quantification)
logical problem-solving (focusing on overall structure and relationships, making logical inferences)

Roles or Domains that require significant logical-mathematical intelligence

math teacher	scientist	engineering
architect	computer programmer	building
budget analyst	accountant	knitting

Strategies or Products that emphasize logical-mathematical intelligence

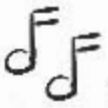
graph	spread sheet	flow chart
timeline	equations/mathematical proof	invention
computer program	business plan	logic puzzle

Everyday uses of logical-mathematical intelligence

reading the bus schedule
solving puzzles
managing family checkbook

Logical-mathematical ability is NOT

...only oriented to numbers (and includes nonnumerical logical relations).



Musical Intelligence

> Musical intelligence is the capacity to think in music, to be able to hear patterns, recognize them, remember them, and perhaps manipulate them. People who have a strong musical intelligence don't just remember music easily—they can't get it out of their minds, it's so omnipresent. Now, some people will say, "Yes, music is important, but it's a talent, not an intelligence." And I say, "Fine, let's call it a talent." But, then we have to leave the word intelligent out of all discussions of human abilities. You know, Mozart was damned smart!
>
> — Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Musical Intelligence

- ...involves perceiving and understanding patterns of sound.
- ...includes creating and communicating meaning from sound.

Subabilities

- musical perception
- musical production
- musical composition/notation

Roles or Domains that require significant musical intelligence

musician	choreographer	music critic
conductor	disc jockey	piano tuner
composer	sound engineer	cheerleader

Strategies or Products that emphasize musical intelligence

composition/song	critique/analysis	jingle
recital/performance	sound effects	musical/opera
dance set to music	soundtrack/accompaniment	recording/sampling

Everyday uses of musical intelligence

- appreciating a song on the radio
- singing in a choir
- playing a musical instrument
- distinguishing different sounds of the car

Musical intelligence is NOT

- ...engaged by playing "background" music.

Spatial Intelligence

> Spatial intelligence refers to the ability to represent the spatial world internally—the way a sailor or airplane pilot navigates the large spatial world, or the way a chess player or sculptor represents a more circumscribed spatial world. Spatial intelligence can be used in the arts or in the sciences. If you are spatially intelligent and oriented toward the arts, you are more likely to become a painter or a sculptor or an architect than, say, a musician or a writer. Similarly, certain sciences like anatomy or topology emphasize spatial intelligence.
>
> – Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Spatial Intelligence

...involves perceiving and transforming visual or 3-D information.
...allows for the re-creation of images from memory.

Subabilities

understanding causal or functional relationships through observation
use of spatial information to navigate through space
sensitive perception or observation of visual world and arts
production of visual information or works of art

Roles or Domains that require significant spatial intelligence

gardener	sculptor	surgeon
mechanic	house painter	carpenter
photographer	dancer	athlete

Strategies or Products that emphasize spatial intelligence

graph/chart	painting	blueprints
diagram	film, TV program	map
sculpture	model	invention

Everyday uses of spatial intelligence

finding one's way in an unfamiliar town
giving/using directions
playing chess/checkers

Spatial intelligence is NOT

...necessarily visual (note that blind people gain excellent spatial abilities).

Bodily-Kinesthetic Intelligence

> Bodily-kinesthetic intelligence is the capacity to use your whole body or parts of your body—your hand, your fingers, your arms—to solve a problem, make something, or put on some kind of a production. The most evident examples are people in athletics or the performing arts, particularly dance or acting.
>
> ~ Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Bodily-Kinesthetic Intelligence

...allows an individual to use one's body to create products or solve problems.
...refers to the ability to control all or isolated parts of one's body.

Subabilities

athletic movement
creative movement (including responsiveness to music)
body control and fine motor abilities
generating movement ideas (such as in choreography)

Roles or Domains that require significant bodily-kinesthetic intelligence

dancer	athlete	actor
coach	artisan	mime
sculptor	sign language interpreter	surgeon

Strategies or Products that emphasize bodily-kinesthetic intelligence

dance performance	mime	performance art
play	weaving	painting or other
sports/games	jewelry	art product

Everyday uses of bodily-kinesthetic intelligence

playing on a softball team
standing and staying balanced in a moving subway car
riding a bike
fixing something delicate

Bodily-kinesthetic intelligence is NOT

...necessarily demonstrated by an "antsy" or physically active child.
...unstructured release of "energy" through physical activity.

Interpersonal Intelligence

Interpersonal intelligence is understanding other people. It's an ability we all need, but is at a premium if you are a teacher, clinician, salesperson, or politician. Anybody who deals with other people has to be skilled in the interpersonal sphere.

~ Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Interpersonal Intelligence

...is a sensitivity to the feelings, beliefs, moods, and intentions of other people.
...involves the use of that understanding to work effectively with others.
...includes capitalizing on interpersonal skills in pursuit of one's own ends.

Subabilities

assumption of distinctive social roles (e.g., leader, friend, caregiver)
ability to reflect analytically on the social environment, others
taking action (e.g., political activist, counselor, educator)

Roles or Domains that require significant interpersonal intelligence

educator	counselor	diplomat
activist	social scientist/researcher	religious leader
community organizer	management consultant	negotiator/arbitrator

Strategies or Products that emphasize interpersonal intelligence

tutoring/teaching	democratic classroom	community action
moral dilemmas	action research	peer mediation
play	leadership opportunities	community service

Everyday uses of interpersonal intelligence

retail transactions
asking or giving directions
interactions with coworkers
parenting

Interpersonal intelligence is NOT

...a preference for working in a group.
...being well-liked.
...being polite, possessing the "social graces."
...being ethical or humane.

Intrapersonal Intelligence

> Intrapersonal intelligence refers to having an understanding of yourself, of knowing who you are, what you can do, what you want to do, how you react to things, which things to avoid, and which things to gravitate toward. We are drawn to people who have a good understanding of themselves because those people tend not to screw up. They tend to know what they can do. They tend to know what they can't do. And they tend to know where to go if they need help.
>
> ~ Howard Gardner (Gardner & Checkley, 1997, p. 12)

Key Abilities of Intrapersonal Intelligence

...enables individuals to have self-knowledge.
...involves using self-knowledge to make decisions.
...includes the ability to distinguish one's feelings, moods, and intentions and to anticipate one's reactions to future courses of action.

Subabilities

self-understanding, the ability to self-reflect analytically
articulating that understanding through other types of expression/ intelligences (poetry, painting, song, and so on)
using that self-knowledge well, toward personal or community goals

Roles or Domains that require significant intrapersonal intelligence

therapist	poet	motivational speaker
psychologist	artist	activist
musician	spiritual/religious leader	philosopher

Strategies or Products that emphasize intrapersonal intelligence

family tree	portfolio/reflections	sermon
poem	journal/diary	action plan
artwork	musical composition/lyrics	autobiography

Everyday uses of intrapersonal intelligence

job/career assessment
religious practices
therapy

Intrapersonal intelligence is NOT

...preferring to work alone and/or in isolation.

Naturalist Intelligence

> Naturalist intelligence designates the human ability to discriminate among living things (plants, animals) as well as sensitivity to other features of the natural world (clouds, rock configurations). This ability was clearly of value in our evolutionary past as hunters, gatherers, and farmers; it continues to be central in such roles as botanist or chef. I also speculate that much of our consumer society exploits the naturalist intelligences, which can be mobilized in the discrimination among cars, sneakers, kinds of makeup, and the like.
>
> – Howard Gardner (Gardner & Checkley, 1997, p. 12).

Key Abilities of Naturalist Intelligence

...is the ability to understand the natural world well and to work in it effectively.
...allows us to distinguish among, classify, and use features of the environment.
...is also applied to nonnatural classifying and patterning.

Subabilities

observational skills
pattern recognition and classification
employing knowledge of the natural world to solve problems

Roles or Domains that require significant naturalist intelligence

florist	fisherman	chef
botanist	environmental educator	farming
biologist	forest ranger	sailing

Strategies or Products that emphasize naturalist intelligence

plants/flowers	surveys of flora/fauna	field notes
animal husbandry	studies/experiments	nature walks
"Outward Bound"	creating and using classification systems	

Everyday uses of naturalist intelligence

cooking
gardening
organizing CDs or other collection

Naturalist intelligence is NOT

...limited to the outside world.

Identifying Intelligences

If there are qualitatively different ways to be intelligent, then how does one identify and characterize each of these separate abilities? In his investigation Gardner looked at the many abilities human beings possess and the diverse roles we play, and he asked what might be the basic biological faculties responsible for these abilities that we observe every day.

To determine these faculties, or "intelligences," Gardner turned to several different areas of study across disciplines, including cognitive psychology, brain research, human development, evolutionary theory and history, cross-cultural comparisons, and the arts and humanities. Gardner's work gave rise to a list of eight criteria he and his colleagues used to identify whether an ability should be designated as a basic human intelligence. These criteria are described in more detail below.

Drawing from different disciplines, several of the criteria provide different ways to tease apart a particular candidate intelligence from other abilities. The idea is that if we can consistently isolate a particular ability in different disciplines and tasks, then that is strong evidence as to its designation as an intelligence—a basic human ability. For example, linguistic intelligence can be isolated: In the brain, as stroke victims lose or preserve language ability apart from other abilities; among special populations, where individuals demonstrate high levels of linguistic ability alone, and developmentally, in that a developmental path for language has been identified.

Some criteria emphasize the universality of a particular ability; for example, evidence of music has been found in all known cultures. Other criteria represent the societal and cultural value placed on particular abilities, for example, identifying abilities for which human beings have developed symbol systems, like language, music, and math.

The Eight Criteria Used to Identify Intelligences

1. *Potential Isolation by Brain Damage/ Neurological Evidence*

This criterion calls for evidence that one intelligence can be isolated from others at the neurological or brain level. The extent to which a specific ability is destroyed or spared as a result of brain damage, such as with stroke patients, tells us about the character of our most basic faculties. In Gardner's (1999) words,

> Every stroke represents an accident of nature from which the careful observer can learn much. Suppose, for example, one wants to study the relation between the ability to speak fluently and the ability to sing fluently. One can mount arguments indefinitely about the relatedness or the independence of these faculties, but the facts of brain damage actually resolve the debate. Human singing and human language are different faculties, that can be independently damaged or spared. Paradoxically, however, human *signing* and human speaking are similar faculties. Those parts of the brain that subserve spoken language in hearing people are (roughly speaking) the same parts of the brain that subserve sign language in deaf people. So here we encounter an underlying linguistic faculty that cuts across sensory and motor modalities. (p. 30, emphasis in original)

The existence of a separate musical intelligence is strongly suggested by cases of brain injury in which musical ability is preserved, but other abilities, such as language, are lost. In other words, musical ability has been isolated in the brain. Other findings, such as the identification of brain centers for linguistic and musical processing, provide more neurological evidence that these and other abilities are basic human abilities, or intelligences. For example, specific areas of the brain have been identified as playing important roles in music perception and production, suggesting a separate musical intelligence.

2. *Evolutionary History and Evolutionary Plausibility*

Evidence from evolutionary science is central to any understanding of human cognition or intelligence. For example, we see evidence in early human beings of a naturalist intelligence, that is, the understanding and use of flora and fauna. The existence of an intelligence is also suggested when evolutionary evidence of it is found in other species.

for example, highly developed spatial capacities in other mammals. Evolutionary evidence for musical intelligence is drawn from its central role in Stone Age societies and its link to other species, as in the case of birdsong.

3. *An Identifiable Set of Core Operation(s)*

Although intelligences operate in rich contexts, usually in combination with other intelligences, it is helpful to isolate abilities that seem central to an intelligence. For example, linguistic intelligence includes the following core operations: distinguishing meaningful sounds (phonemic discrimination), a command of grammar and sentence structure (syntax), a sensitivity to the practical uses of language (pragmatics), and acquisition of word meanings (semantics). The core operations of spatial intelligence include sensitivity to large-scale, local, three- and two-dimensional spaces, whereas the core operations that trigger musical ability include sensitivity to pitch, rhythm, and timbre. The existence of specified core operations for an ability contributes to its identification as an intelligence.

4. *Susceptibility to Encoding in a Symbol System*

Human beings spend a great deal of time learning and using different kinds of symbol systems. Our primary communications occur through symbol systems like written and spoken language, mathematical systems such as logical equations, and picturing (e.g., charts and graphs). Over time people developed these symbol systems to communicate information in an organized and accurate manner. Indeed, symbol systems seem to have arisen to code those meanings to which human intelligences are most sensitive. Therefore, a fundamental criterion of an intelligence is its embodiment in a symbol system. Musical notation is another example of a distinct symbol system.

5. *Distinctive Developmental Path*

Intelligences are not demonstrated "in the raw." Rather, they operate in different domains and in combination with one another. For example, musical intelligence is expressed in many domains and adult roles, including musician, composer, and sound engineer. Within any given domain, intelligences have their own developmental histories. Both the musician and the sound engineer will develop their musical intelligence, but along the developmental path needed for their respective roles. An individual who wants to be a softball player must develop his or her abilities in ways distinct from those of the aspiring dancer. Other people follow distinctive developmental paths to develop the interpersonal intelligence to become, for instance, clinicians or clergymen. The developmental paths within domains help us to identify the abilities, or intelligences, at their root across domains.

It is important to assume a cross-cultural perspective, because an intelligence may be brought to bear in cultures that exhibit quite different roles and values. For example, both the clinician in American culture and the shaman in a tribal culture are using their interpersonal intelligences, but in different ways and for somewhat different ends (Gardner, 1999).

6. *Existence of Savants, Prodigies, and Other Individuals Distinguished by the Presence or Absence of Specific Abilities*

Individuals who have unusual profiles of intelligence offer another area to explore in identifying intelligences. These profiles often include high-level ability in an isolated area of ability, suggesting that that particular ability may be an intelligence.

Savants, prodigies, and autistic individuals exhibit a high level of ability in one area while other abilities are typically ordinary or severely impaired. Many autistic children, for example, possess outstanding abilities in areas like calculations, musical performance, and drawing. At the same time, they demonstrate severe impairments in communication, language, and sensitivity to others.

As with autism, prodigious ability tends to show up in domains that are rule-governed and that require little life experience, such as chess, mathematics, representational drawing, and other forms of pattern recognition and reproduction. The specific, isolated abilities among these groups provide evidence as to which abilities should be considered intelligences, that is, those that have biological bases and operate relatively independently (Gardner, 1999).

7. *Support From Experimental Psychological Tasks*

We should also be able to use experimental psychological tasks to isolate intelligences. For example, task interference can help us to identify discrete intelligences. In studies of task interference, researchers study the extent to which two actions are related to each other by observing how well—or poorly—individuals carry out both simultaneously. If doing one activity does not interfere with the successful completion of the other, then we can assume that the activities draw on different abilities. For example, most individuals are able to walk while they talk. The intelligences most involved in walking (bodily-kinesthetic, spatial) and having a discussion (linguistic, interpersonal) work separately from one another. And yet most people find it hard to hold a conversation when working on another highly linguistic activity, like doing a crossword puzzle or listening to a song with lyrics. Being able to separate out a certain type of ability experimentally provides strong support for that ability as an intelligence.

8. *Support From Psychometric Findings*

A high correlation between certain subtests on standardized tests suggests a single intelligence at work in both subtests, whereas a low correlation suggests separate intelligences are at work. Therefore, one can say that much current psychometric evidence is a criticism of MI theory, given that the high correlation in scores among various tasks suggests a general or unitary intelligence.

However, as psychologists have broadened their definitions of intelligence and added to their tools for measurement, psychometric evidence has emerged favoring MI theory. For example, more recent studies of spatial and linguistic intelligences strongly suggest that these two areas are relatively separate, having at best only a weak correlation when tested. Similar measures of musical acuity can be teased apart from other tasks, supporting the identification of a separate musical intelligence. Research on social intelligence (inter- and intrapersonal intelligences) suggests abilities that are different from standard linguistic and logical intelligences (Rosnow, Skedler, Jaeger, & Rind, 1994).

The Criteria in Conclusion

With varying amounts and quality of research on the different candidate abilities, Gardner and his colleagues asked whether an ability met the set of criteria reasonably well. If it did, it was designated an intelligence. If the ability did not meet the criteria reasonably well, then it might be set aside, or recast and reinvestigated against the criteria. Naturalist intelligence was added in 1995, 12 years after the initial presentation of MI theory, which featured seven intelligences, but soon after sufficient brain evidence emerged.

An existential intelligence is under consideration by Gardner and his colleagues. Existential ability refers to the human inclination to ask very basic questions about existence (Who are we? Where do we come from? Is there a God?) and finds a home in mythology and philosophy. However, it has not sufficiently fulfilled the criteria. In particular, neurological evidence has not been established. The question remains as to whether existential abilities are not an amalgam of logical and linguistic intelligences (Gardner, 1999).

The criteria have served well as the principal means to identify a set of intelligences that captures a reasonably complete range of abilities valued by human cultures. By keeping the criteria in active use, MI theory can and has been modified to reflect our increasing understanding of the ways in which people are intelligent. Using the criteria to identify our basic human intelligences, MI theory offers the most accurate description to date of intelligence in the real world, and it continues to be a helpful articulation and organization of human abilities.

Figure 1.2. Distinguishing Features of MI Theory

- Definition of intelligence based on real world intelligence
- Pluralistic view of intelligence
- All eight (or more) intelligences are universal
- Unique profiles of intelligence that develop and change
- Each intelligence involves subabilities or different manifestations
- Intelligences work in combination in domains, not isolation

Key Features of MI Theory

At least six distinguishing features of MI theory have particular implications for educational practice (Figure 1.2). Each is presented in this section.

A Definition of Intelligence Based on Real World Intelligence

MI theory's definition of intelligence sets it apart from the conventional understanding of intelligence: "Intelligence [is] a biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (Gardner, 1999, pp. 33–34). MI theory's definition of intelligence locates intelligence in real world problem-solving and product making and accounts for the cultural dimension of what counts as intelligence. In contrast to the "implied" view of intelligence of IQ tests, MI theory is based on an understanding of how people's intelligences really operate.

A Pluralistic View of Intelligence

The second feature is that there exists a plurality of intelligences, each with its own symbol system and ways of knowing and processing information. This is in distinct contrast to the traditional view of intelligence, which asserts the existence of one general intelligence that is put to use to solve any problem, no matter what the task or domain. Using the criteria (see above), eight distinct intelligences have been identified.

All Eight (or more) Intelligences Are Universal

MI theory holds that intelligence originates biologically; that is, all human beings are at promise for each of the intelligences. All the intelligences have been identified across all known cultures/societies. This propensity for the intelligences might indeed be considered a significant contributor to what makes us human.

Unique Profiles of Intelligence That Develop and Change

Although MI theory claims a biological basis of intelligence, this does not suggest that intelligence is purely genetic and inherited. Nature suggests we are all at promise for all the intelligences. How and to what extent the intelligences manifest themselves depend on "nurture" to a significant degree.

An individual's intelligences develop and change; intelligence is not solely inherited and develops based on interaction with our environment. Cultural, societal, and individual factors shape how much we see of a particular intelligence and how it is manifested. For example, in the case of linguistic intelligence, writing might dominate in one context and storytelling in another. A child in the first context, where the written word is emphasized at school and home, who has access to a computer, books, and writing implements might develop his or her linguistic ability in the area of writing. A child in a culture with a strong oral tradition might develop his or her oral linguistic intelligence in the area of storytelling or preaching. Whatever the specific nature of the intelligence, the more time an individual spends using an intelligence, and the more accessible and better the instruction and resources, the smarter one becomes within that area of intelligence.

Each Intelligence Involves Subabilities or Different Manifestations

No one is simply "musically" or "linguistically" intelligent. One's musical intelligence might be demonstrated through the ability to compose clever tunes or to hear and distinguish instrument parts in a song. In the case of linguistic intelligence, ability might emerge through creative writing, word play (poetry), closing arguments in the courtroom, or acting in a play. Strengths are demonstrated through end-states or domains.

Intelligences Work in Combination in Domains, Not Isolation

As described earlier, each intelligence is relatively autonomous in its "raw" state. Each intelligence represents a different way of thinking, solving problems, and learning. Although each intelligence operates relatively independently—that is, the brain has distinct mechanisms and operations for each intelligence—in reality they work in combination, in the context of a domain or discipline. The distinction between intelligences and domains becomes clear when one considers that effective work in any domain is realized through the use of several intelligences.

Intelligence refers to biological and psychological potential and abilities, whereas domains or disciplines are social constructs. Whereas intelligence is the raw material we bring to bear in solving problems or fashioning products, domains are culturally organized and valued activities "in which individuals participate on more than just a casual basis, and in which degrees of expertise can be identified and nurtured" (Gardner, 1999, p. 82). Computer programming, car mechanics, gardening, and soccer are all examples of domains.

For example, a violinist needs musical intelligence to be successful, but only in combination with interpersonal abilities, such as communication with other musicians in the orchestra; intrapersonal, such as translating the emotion of the piece; and bodily-kinesthetic, such as the physical act of playing the instrument. Put simply, the musical domain generally requires high levels of musical intelligence, but other intelligences must be tapped to perform successfully in this domain.

Similarly, a particular intelligence like spatial intelligence is not isolated to a specific domain, such as the arts. Indeed, any particular intelligence can be applied in many domains. In the case of spatial intelligence, these abilities come to the fore in the arts, as well as sailing, gardening, and even surgery. An individual's strength in a particular intelligence may manifest itself in one (or more) domain and not others. For example, someone with a high level of spatial aptitude may have little ability or interest in the artistic domain and may be attracted to more scientific applications of spatial intelligence embedded in, say, biology or topology.

The Journey From Theory to Practice

> [Multiple intelligences] is not a technique, it's a mind set.
>
> ~ Helen Sablan, AMI Pilot Teacher

Introduction

As a theory, MI does not prescribe any particular approach or activities. Rather, classroom practices are based on an understanding of what such a theory of intelligence suggests and how it can inform practice. Just as practices in today's schools are rooted in the conventional wisdom of intelligence, an understanding of intelligence from the perspective of MI theory has its own set of implications for the classroom. In other words, the educator asks herself, "If intelligence is as MI theory describes it, then what does that imply for how I set up my classroom, how I approach instruction, and what activities I make available to my students?"

There is indeed no single right way to apply MI theory, but using MI theory as a "lens" or "mind set" in the classroom can and has helped inform excellent, and often quite distinct, teaching and learning practices. Because it is an act of interpretation from a theory of intelligence to actual classroom practices, applying MI theory in the classroom provokes a critical process of practice and reflection on the part of the educator. Teachers decide for themselves how to apply it, reflecting and making revisions and additions along the way.

Many educators have enthusiastically accepted the challenge of creating and implementing applications for MI theory. For many of them, MI theory confirms what they have always believed: Students possess a range of abilities that standard classroom fare neither acknowledges, celebrates, nor nurtures.

> This theory provides the means to articulate beliefs about my teaching that I've always held dear, but had a limited vocabulary to express.... It provides a well-defined vision of the breadth of [students'] strengths and where we might find them. (Robert Bickerton, Director of Adult Education, Massachusetts Department of Education, personal communication, June 1, 2000)

MI Goes to School

Several models and approaches have been developed to apply MI theory into practice in K–8 classrooms (Baum, Viens, & Slatin, in press; Faculty of the New City School, 1994; Kornhaber & Fierros, 2000). Since the start of the AMI Study, we found that no existing model offered a proper fit with the goals and contexts of adult basic education. Accordingly, we (the AMI research team) articulated a model of MI application in adult basic education contexts based on the classroom efforts of the AMI teachers to apply MI theory and guided by the Pathways model developed by Baum and her colleagues.

We identified four distinct approaches for MI application in adult basic education (Figure 1.3): MI Reflections, Bridging Students' Areas of Strengths to Areas of Challenge, Entry/Exit Points, and Projects. Although we use different terminology, our designation for each approach was influenced by the Pathways model for applying MI theory in the elementary classroom: Explorations, Building on Strengths, Understanding, and Authentic Problems. (A fifth pathway, Talent Development, does not have an analogous cohort in adult basic education.) Like the Pathways, each of the AMI approaches is tied to specific goals for using MI theory. Our somewhat different terminology reflects the fact that the goals for using MI theory in adult basic education are similar to those sought in elementary education but not exactly like them.

We discuss the AMI model and its four different approaches to applying MI theory in this chapter. Each approach is described below in terms of its primary goal, the theoretical features of MI in which the practice is rooted, and examples from AMI teachers to their classrooms. Where relevant, myths or misconceptions about MI theory related to that approach are described.

Figure 1.3. How Teachers Apply MI Theory

MI Reflections

- Uses MI theory as a basis to reflect on and identify students' strengths and preferences.
- Emphasizes student participation in MI-based self-reflections.

Bridging Students' Areas of Strengths to Areas of Challenge

- Creates a "bridge" from students' MI strengths to appropriate learning strategies.
- Emphasizes using students' particular strengths to assist in areas of particular difficulty.

Entry/Exit Points

- Provide a range of MI-informed ways to introduce and explore a topic (entry points) and for students to demonstrate their learning of the topic (exit points).
- Develop or use entry and exit points that tap into students' strengths.

Projects

- Develop project-based curriculum using MI theory as a framework.
- Emphasize authentic problems and activities.

MI Reflections

The intelligences describe the "smarts" that students bring to the learning context, each student possessing a unique amalgam of intelligences that distinguishes him or her from the others. The focus of an MI Reflections approach to applying MI is getting to know students through an MI lens, that is, identifying their strengths and interests.

MI theory provides the vocabulary for articulating observations and descriptions of students' strengths and interests. An MI-based description of students' preferred intelligences presents a stark contrast to a numerical IQ measurement, particularly in terms of its usefulness ("What do I do with the information?"). With MI theory, the question moves from "How smart are you?" (a 70 IQ, a 120 IQ) to "How are you smart?" (I can take anything apart, fix it, and put it back together. I have an amazing backhand. I make hats.).

In the AMI Study, MI Reflections (MIR) referred to strategies or activities that used MI theory to better know and understand students (see Chapter 2). MIR was applied in two different ways, each with a different emphasis. In one approach the teacher observed her students and identified their strengths and preferences by noting patterns over time in the course of observations. The second approach put students at the center of the reflection process, with the goal being for the students to "own" their intelligences and see themselves as intelligent people with a variety of abilities.

MI theory says that intelligence is demonstrated in real world contexts, in the problems individuals solve and the things they make. Therefore, an MI-based perspective on assessment—including the observation and identification of student strengths—would suggest assessment that involves observing individual students, amidst authentic uses of their "smarts." AMI teacher Terri Coustan observed her students, jotting down notes that she later organized by student, so that she could identify patterns of behavior and preferences for each of them. She observed them across a range of activities, including gardening projects, computing, art activities, building projects, and basic literacy activities.

MI theory also claims that intelligence is learnable; we can get smarter. In other words, our profiles of intelligence change. Moreover, a single intelligence can manifest itself across a number of domains. Thus, knowing students means watching them grow, get better, and develop new or renewed interests. MI observations might best be described as peering through MI lenses in an ongoing quest to "catch students at their best." Observations are informal, over time, and across different contexts.

Another approach to MIR puts students at the center of the reflection process, providing the tools and opportunities for self-reflection and understanding their own unique collections of strengths and preferences. Basic adult education students often see themselves as failures, having low self-esteem and feelings of incompetence when it comes to school. Teachers use MI to counter this negative self-perception, to bolster students' self-esteem through reflection activities that identify and validate students' strengths. Teachers provide different ways for students to understand and articulate their own strengths, such as paper/pencil surveys, journal reflections, or postactivity discussions, and other hands-on activities that call on students to use and reflect on their strengths (see Chapter 2). With these activities, students face substantive evidence that they are smart and have the tools and knowledge to articulate how.

Several AMI teachers used MI self-reflection surveys and other activities to help students see and believe their intelligences (see Chapter 2). Meg Costanzo used dialogue journals that included student reflections about their strengths. Wendy Quiñones had students debrief about a film they watched together, each drawing on observations based on personal strengths.

Knowing their students from the perspective of their strengths and interests becomes a primary source from which teachers identify learning strategies and activities that map onto students' strength areas and interests. Any information culled from student reflection activities—that is, students' own understandings of their strengths and preferences—can and should be used to inform the curriculum and instruction. Thus MIR is also the first step to personalizing instruction and curriculum for students.

MI Reflections: Myths and Misconceptions

Unfortunately, some individuals have translated MIR or assessment into eight (or nine) tests, one for each intelligence, setting MI theory within a conventional understanding of assessing intelligence through paper-and-pencil tests. This is problematic on at least two fronts.

First, it assumes that intelligence can be properly or fully assessed using the paper-and-pencil, multiple-choice mode, which reflects a psychometric view of intelligence that is contrary to MI theory. Within the framework of MI theory, no single paper-and-pencil test can assess the breadth and depth of any individual's intelligence.

Second, this misconception assumes that one can come up with a definitive assessment of an individual's intelligences. It is probably not possible, and certainly not practical, to pursue definitive or final assessments of students' intelligences. Each intelligence includes subabilities, each suggesting different ways a student might demonstrate one form of intelligence. Moreover, there are too many different domains in which particular students might demonstrate one or another intelligence. For example, only by looking at art activities, you miss the spatial abilities of the builder or the photographer. In other words, there is too much ground to cover for a truly definitive assessment of any individual's unique collection of intelligences.

Getting an accurate "reading" of the ways an individual is intelligent would require using an extensive array of assessment activities to ensure a comprehensive assessment. An individual would likely have strengths that any single or small collection of assessments (or observation events) would not gauge. Again, this is a classic case of new wine in an old bottle; an understanding of intelligence as static and measurable is transferred to MI theory.

Another less pervasive, but more disconcerting, myth is that MI theory validates cultural and racial stereotypes. MI theory is quite to the contrary and serves to disaggregate individuals within the same cultural or racial groupings, rather than aggregating cultural or racial groups by intelligences (and intelligence levels). MI theory should not be used to label one group as naturally better or worse at one intelligence or the other. As human beings, we are all at promise for all intelligences. The form intelligences

take might be culturally defined, but the extent to which any individual of a given racially or culturally defined group possesses a particular intelligence is not culturally defined. Put simply, race and culture do not determine in what ways and how smart an individual is (Gray & Viens, 1994).

Bridging Students' Areas of Strengths to Areas of Challenge

In some cases, teachers use MI to develop activities and learning strategies that are tailored to students' strengths. In this case the teacher's goal is to apply her understanding of MI theory—and of her students' particular strengths and preferences—to develop different ways to engage students in a particular topic or skill. Teachers are always seeking ways to involve and to reach and teach more of their students. Developing ways to approach a topic or skill area that draws on students' particular strengths and interests can help them do so. (Approaches based on this bridging idea can be found in Chapter 3.)

Using the information culled in MI Reflections, teachers identify related learning strategies for individuals or groups of students. For example, through her ongoing observations and analysis, or pattern finding, Terri Coustan, came up with language arts strategies that connected with her students' musical and spatial abilities. In one case, Terri developed chants to help a student—who used chants as a shaman—to learn vocabulary words. In the second case, several students were able to find or create spatial representations of words they were learning. Some students found photographs in magazines that depicted particular vocabulary words; others made scenes or figures out of clay to represent new words. The students' work— photograph collages and sculptures—also helped Terri determine whether her students had an accurate understanding of the words.

Working with students one or two at a time, Betsy Cornwell was able to observe which strategies were working with her students, which ones were not, and change the latter accordingly. In one lesson, Betsy was able to offer a more hands-on, bodily-kinesthetic and spatial approach to subtraction for one student, using beans and plates, while the other found it easier to use the traditional paper-and-pencil method. Meg Costanzo used students' own reflections and self-described strengths to work with them in constructing appropriate ways for each student to learn the material at hand. For example, Meg helped one student, a carpenter, rally his spatial skills to set up and solve math problems visually/spatially.

Bridging Students' Areas of Strengths to Areas of Challenge: Myths and Misconceptions

MI theory is often confused with learning styles. MI theory suggests that people respond, individually, in different ways, to different kinds of content, such as music or language or other people. MI theory describes the different ways in which people process information as well as the types of problems they process and products they create. This is very different from the notion of a learning style. Learning styles refer to different ways of receiving information, in terms of sensory modalities (e.g., auditory, visual, or tactile) and social contexts (i.e., extrovert, introvert, field-sensitive, or field-independent). Learning styles refer to global preferences in how we take in information. In other words, individuals are described as being "auditory" learners or "visual" learners regardless of the task at hand.

Consider a poem. How a person "takes in" the poem is a stylistic dimension. That is, whether one reads the poem, hears it, sits in a favorite chair, or reads the poem first thing in the morning because one is a "morning person," all of these refer back to learning styles and to preference. However, how one processes and makes meaning of the poem taps into the individual's multiple intelligences. For example, one might focus on powerful words in the poem, imagine the subject or an image representative of the work. One might focus on the shape of the poem—where the line breaks occur. These are examples of how MI theory, the intelligences, works to process the poem and to develop one's understanding of it.

Gardner (1999) points out that there is little evidence to suggest that a person who uses or prefers one style in one context will use the same style in another or all other contexts. The link between MI theory and learning styles needs to be worked out empirically, on a style-by-style basis. Consider

the example of an individual who has difficulty learning from the spoken word. Meetings, conferences, and classrooms where lecture is primary all present a challenge to this person's learning. However, if music or sound effects are the auditory content, this individual is a quick study. In this case, it would be inaccurate to label this person globally as an "auditory" learner.

In summary, MI theory is distinct from learning styles in at least two major ways:

- MI theory refers to the ways we process and make meaning of different kinds of content, whereas learning styles refer to modes of receiving information.
- Learning styles are used as global descriptors, whereas MI theory varies with the domain or content in question.

Entry Points and Exit Points

MI theory's most distinguishing characteristic, that intelligence is pluralistic, suggests creating for students a context for a broad range of experiences—in domains and across intelligences. MI theory also serves as a framework to organize and develop those diverse learning experiences, commonly referred to as "entry points" or "exit points." Entry points refer to how students engage in the subject or content, in other words, the activities in which they participate. Exit points refer to what they do to demonstrate their learning, in other words, how students' learning is assessed. Building MI-based entry and exit points is a common starting point for many teachers new to MI theory.

MI theory becomes a lens onto teachers' classroom offerings through which teachers identify strengths and gaps. Giving students a number of choices based on MI theory is widely used by teachers as a vehicle to provide different entry and exit points for students. For example, Martha Jean gave her students different learning options related to specific GED-related content.

Entry Points and Exit Points: Myths and Misconceptions

A popular myth has developed, which goes something like this: "If there are eight different intelligences, then I need to teach everything at least eight different ways." Every lesson becomes a round-robin of MI activities. The more fitting question is, "How can I use MI theory to help my students learn about '...' or learn how to '...'?"

Intelligences should not be the goal of the lesson but the means to the learning goals. Trying to do everything eight different ways puts getting all the intelligences "in" at the top of the priority list, to the detriment of learning goals. Furthermore, intelligences work in combination, within a domain. A lesson in the science domain requires, but is not limited to, logical-mathematical intelligence. Dividing all lessons into eight intelligence-based experiences is inauthentic to how intelligences really work.

Projects

Multiple intelligences describes the "tools" people bring to any task. Intelligence is couched in what people can do and make, in the problems they solve. Therefore, in many MI classrooms, MI theory has been translated into the implementation of authentic curricula, such as problem-based curriculum and projects that, at the very least, simulate real world activities. The assumption is that students will engage and learn more successfully if provided with opportunities to solve real problems and make real things. Teachers have found that providing authentic learning opportunities also gives them a chance to see students in new contexts and perhaps to observe student strengths that have as of yet remained untapped.

Meg Costanzo had students participate in a real recruitment project at the Tutorial Center, each taking on one or more tasks to increase student enrollment at the center (which they did). For example, one student developed a public service announcement that was used on a local radio station. Other students worked on changing the sign in front of the Tutorial Center. They dealt with everything from zoning to phrasing in order to post a new sign that would attract new students. Terri Coustan used projects that built on her students' real projects at home. For example, she was able to secure a plot in a community garden for her students, almost all of whom were avid gardeners. This project included not only the naturalist intelligence but required the interpersonal, spatial, and bodily-kinesthetic abilities needed to share and tend to the garden.

Conclusion

What these approaches to MI application have in common is that they are rooted in an understanding of MI theory, its major features, its implications for teaching and learning, and a desire to know and use students' intelligences. It is important to note that these approaches are not mutually exclusive. In fact, all the AMI teachers tried different interpretations of MI theory consecutively or in tandem.

Terri Coustan observed students over time (MI Reflections), instituted student options that gave students different entry points into the lessons (Entry Points), and offered student-centered projects, such as gardening (Projects). Over time and through their explorations, AMI teachers settled on MI applications that responded to their needs and goals, worked well in practice, and received positive responses from students.

MI theory did not direct the AMI teachers to any particular teaching techniques, but it served as a catalyst in their MI journeys. MI theory offers a framework and a language to develop practices that best fit one's context while acknowledging, celebrating, and building on the abilities adult students bring to their learning.

Chapter 1 Reflection and Discussion Questions

- What is your opinion of MI theory's definition of intelligence?
- How is the traditional view of intelligence reflected in your teaching or the requirements your students must meet?
- What evidence have you seen in your learners that supports the idea that there are many ways to be "smart"?
- What implications do you think MI theory has for teaching and learning?