MI theory: past, current and future[1]
-----A review of MI theory in the past 50 years

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Abstract: recently Prof. Howard Gardner, an outstanding psychologist in the worldwide accepted the interview from Dr. Weiwen Zhang, and talked about a wide range of MI theory and relevant fields, which mainly involved in its core ideas, current situation and future development, and also involved its application in some current hot issues, which gave us important enlightenment in relevant fields.

Key words: MI theory; background; future development; application

1. Introduction

Recently Prof. Howard Gardner, an outstanding psychologist in the worldwide accepted the interview from Dr. Weiwen Zhang, the author of this article, and talked about a wide range of MI theory and relevant fields, which mainly involved in its core ideas, current situation and future development, and also involved its application in some current hot issues, which gave us important enlightenment in relevant fields. As one of the most influential psychological theory around the world in 20th century, MI theory has developed for more than 50 years. How about its past, current and future situation? Here, we will discuss these fields in detail.

2. Background of MI theory

Prof. Howard Gardner often asked how he first got the idea of the theory of multiple intelligences. Probably the most truthful answer is that he didn't know. However, such an answer satisfies neither the questioner, nor, to be frank, Gardner. With the benefit of hindsight, he would mention the following proximal and distal factors:

As a young person Howard Gardner was a serious pianist and enthusiastically involved with the arts. When he began to study developmental and cognitive psychology, he was struck by the virtual absence of the arts. An early professional goal was to find a place for the arts within academic psychology. He is still trying ! In

1967 his continuing interest in the arts prompted him to become a founding member of Project Zero, a basic research group at the Harvard Graduate School of Education begun by a noted philosopher, Nelson Goodman. For 28 years, he was the co-director of Project Zero and he is happy to say that it still thriving.

As his doctoral career was drawing to a close, he first encountered the neurological work of Norman Geschwind. He found fascinating Geschwind's discussion of what happens to once normal or gifted individuals who have the misfortune of suffering from a stroke or some other kind of brain damage. Without planning it that way, he ended up working for twenty years on a neuropsychological unit, trying to understand the organization of human abilities in the brain.

He always enjoyed writing and by the time he had begun his postdoctoral work with Geschwind, he had completed three books. His fourth book, The Shattered Mind, published in 1975, was a description of what happens to individuals who suffer from different forms of brain damage. He showed that different parts of the brain are dominant for different cognitive functions. After he completed The Shattered Mind, he thought that he might write a book that describes different human faculties. In 1976 he actually wrote an outline for a book with the tentative title Kinds of Minds. One could say that this book was never written—and indeed he had forgotten about it for many years. But one could also say that it eventually arose from the dead and became Frames of Mind. So much for distal causes of the book.

In 1979, a group of researchers affiliated with the Harvard Graduate School of Education received a sizeable grant from a Dutch foundation, the Bernard Van Leer Foundation. This grant was designed for a grandiose purpose, proposed by the foundation. Member of the Project on Human Potential (as it came to be called) were expected to carry out scholarly work on the nature of human potential and how it could best be catalyzed. When they carved out our respective projects, he had an interesting assignment: to write a book about what had been established about human cognition from the biological and behavioral sciences. Thus was born the research program that lead to the theory of multiple intelligences.

3. Core ideas of MI theory

Prof. Howard Gardner received an email several weeks ago from someone who said his school had required him to buy a book that claimed Howard Gardner's theory of multiple intelligences was a myth. Naturally, as someone who has written and taught about this theory for the past thirty-four years, he was disturbed by this revelation. To help set the record straight, he list here seven things you should know about the theory of multiple intelligences before going off the track and dismissing the theory altogether.

1) **There Are Actually 8 1/2 Intelligences.** Gardner originally started out with 7 intelligences when his book Frames of Mind first came out in 1983. In 1997 he added the "naturalist" intelligence (because he believed it met the criteria for an intelligence – see point #6 below). In 1999, in his book Intelligence

[Reframed](#), he began to talk about the "existential" intelligence (the intelligence of concern with ultimate life issues) because it also met most of the criteria for an intelligence, but not quite enough to qualify as a full-fledged intelligence, hence the 1/2 (which he talks about to a certain extent with tongue in cheek).

2) **Multiple Intelligences is Not a Way of Teaching.** Some of the criticism of multiple intelligences has arisen as a part of the now deeply entrenched "evidence-based" movement in education which seems to require that every teaching strategy should be subjected to random controlled trials, where one group receives a specific instructional intervention and is compared with a group that didn't based on pre- and post-testing. Out of this, a statistic is derived, most often an "effect size" (e.g. .4 is seen as borderline for an "evidence-based" strategy).

Well, you simply can't DO this with multiple intelligences, which, please note, is a theory, not a single classroom intervention. But because one can't derive a single statistic (or set of statistics) from the theory, people assume this means it is a myth. This is crazy talk. It's like saying that the fields of existentialism, humanism, and pragmatism are myths because they can't be reduced to a set of statistics. In reality, there's another "ism" that is at the root of this problem: "logical positivism", which is a philosophy that holds that what is "true" can only be expressed through numbers and logic!

3) **Multiple Intelligences Can Be Applied in Hundreds of Ways.** Dovetailing off of point #2, there are innumerable ways to apply the theory of multiple intelligences, and some of these specific ways are in fact supported by the existing evidence-based literature. Robert Marzano, for example, who is one of the evidence-based gurus of education, [lists one evidence-based approach](#) for teaching vocabulary to students as: "Ask students to construct a picture, pictograph, or symbolic representation of the term." This would be regarded as an excellent spatial (or picture smart) application of multiple intelligences. And there are scores of examples besides this one. Again, you can't roll the whole of multiple intelligences into a ball and tell whether or not it's evidence-based. You need to unwind the strands and examine them one by one.

4) **There Are Several Ways to Goof Up Using Multiple Intelligences.** As noted in point #3, there are hundreds of ways of legitimately applying the theory of multiple intelligences, but there are also a number of ways it can be misapplied. One way is by assuming that each student is strongest in only one intelligence, and then labeling that student with that intelligence (e.g. "our picture- smart child"), and then giving them only material that relates to that intelligence. He actually had to do a video broadcast for Australian media many years ago, because they were reporting how each intelligence was matched to a

specific *racial type!* He is clear in stating that every child has all eight and a half of the intelligences, and can develop them to a degree of proficiency within certain limits.

5) **Multiple Intelligences May Increase Test Scores, But If It Doesn't That Doesn't Mean It's a Myth.** This point also relates to the critics' dismissal of multiple intelligences because of their belief that it doesn't "raise test scores." Well, the jury is out on that, because, again, it depends upon which aspects of multiple intelligences are being applied, and we're back to "effect sizes" (e.g. an effect size is the difference between the standard deviations of two groups based upon, guess what? test scores).   The fact that multiple intelligences may actually make students deeper, more engaged, more thoughtful students doesn't seem to enter the mind of these number-crazed critics.

6) **More People Should Study the Multiple Intelligences Criteria.** The word "evidence" can mean a lot of things – it doesn't have to just refer to statistics and numbers (what about the "evidence" given in a jury trial?).   He actually marshal a great deal of evidence in support of the 8 1/2 intelligences, and that evidence can be found described in ,y first book on the subject: Frames of Mind, published in 1983 (and revised in 2011).   In one chapter of the book, He explains how multiple intelligences are supported by evidence from brain science, developmental psychology, semiotics, cognitive psychology, cognitive archaeology, animal physiology, and the biographies and autobiographies of exceptional people (including savants and the geniuses of culture).

7) **Multiple Intelligences is Best Examined by Studying Life.** Here we come to I think the crux of the matter.   Multiple intelligences is not best assessed, analyzed, or examined through numbers, as seems to be the demand of those who claim this theory is a myth.   Instead, one must look to LIFE for the evidence of this theory's vitality. You can see evidence for the multiple intelligences virtually everywhere: in the symbol systems people use (e.g. words, numbers, pictures, musical notes), in the ways cultures value them (e.g. systems of music, mathematics, physical culture, social organizations), in the great thinkers of our time (e.g. Einstein, Picasso, Martin Luther King, Martha Graham), in the ways animals deploy their assets (e.g. birds use of musical intelligences, ants exploit social intelligence, chimpanzees display use of primitive forms of linguistic intelligence), and there is much more that this theory helps to explain.   In fact, there's such a wealth of material opened up by this theory that could take a person a lifetime to assimilate and digest.

In other words, the main reason why he has been so enamored of this theory since my discovery of it over forty years ago is because it brings to life so many dimensions of the human condition that he is always discovering new things within it.   This compares with the excruciatingly boring statistical analyses

used by those who accuse multiple intelligences of being a myth.   Well, the Greek word for myth is "mythos" which means "story.".   So, critics, stop already with the devaluations and denigrations, and take a moment or two to turn toward the big picture of existence, and a theory that can illuminate so many aspects of our lives that were previously hidden from view.

Several of his books are available in Chinese, ably translated by his friend Shen Zhilong. Also, they have written about MI adoptions in China in his 2009 book *Multiple Intelligences Around the World*, edited by his colleague Jie-Qi Chen, born and raised in China.

Gardner developed MI theory in the late 1970s and early 1980s. In doing so, he drew on evidence from a wide variety of sources, disciplines, and research tradition. He presented the theory for the first time in 1983, in his book <u>Frames of Mind: The Theory of Multiple Intelligences</u>. The theory is a critique of the standard psychological view of intellect: that there is a single intelligence, adequately measured by IQ or other short answer tests. Instead, on the basis of evidence from disparate sources, he claim that human beings have a number of relatively discrete intellectual capacities. IQ tests assess linguistic and logical-mathematical intelligence, and sometimes spatial intelligence; and they are a reasonably good predictor of who will do well in a 20th (note: NOT 21st) century secular school.

But humans have several other significant intellectual capacities. In his original book, Gardner described musical intelligence, bodily-kinesthetic intelligence, interpersonal (social) intelligence, and intrapersonal intelligence(understanding of self). A few years later, he added the naturalist intelligence: the capacity to make consequential distinctions in the world of nature. He also has speculated about two other possible intelligences: existential intelligence, the intelligence of 'big questions'; and pedagogical intelligence, the intelligence that allows human beings to convey knowledge or skills to other persons. For something to qualify as an intelligence, it has to satisfy the eight criteria laid out in chapter 4 of <u>Frames of Mind</u>. In comparing MI to traditional psychological view of intelligences, Gardner found it useful to invoke the metaphor of the computer. Belief in a singular intelligence implies that humans possess a single general purpose computer, which can perform well (hi IQ), average (normal IQ) or poorly (low IQ). Belief in multiple intelligences theory implies that human beings possess several relatively independent computers; strength in one computer does not predict strength (or weakness) with other computers. Put concretely, one might have high (or low) spatial intelligence and yet that does not predict whether one will have high (or low) musical or interpersonal intelligence.

4. Major scientific & educational implications of MI theory

There are two interesting implications. The intelligences constitute the human intellectual toolkit. Unless grossly impaired, all human beings possess the capacity to develop the several intelligences. At any one moment, we will have a unique profile, because of both genetic (heritability) and experiential factors. Identical twins will have similar cognitive profiles. But the profiles will not be identical; even though the genetic constitution is the same, identical twins have different experiences (even in utero!) and once born, they can be motivated to distinguish themselves from their genetic clone.

It is important to stress that MI theory began as a psychological theory, one that also drew on brain and genetic knowledge in the early 1980s. I was surprised that the principal interest in the theory came not from psychologists but from educators. And that has remained largely true until today. Initially, he did not have strong ideas about how to apply MI theory to education. And indeed, no scientific theory can be translated directly into educational applications because education is suffused with values.

That said, Gardner think that there are two principal educational implications: Individuation and Pluralization. The first, individuation (also termed personalization), suggests that since human beings have their own unique configuration of intelligences, we should take that into account when teaching, mentoring or nurturing. As much as possible we should teach individuals in ways that they can learn and we should assess them in a way that allows them to show what they have understood and to apply their knowledge and skills in unfamiliar contexts.

Traditionally, individuation was possible only for families with means. Nowadays, with the easy accessibility of powerful digital devices, it is possible to individualize education for everyone. If you think that this description is a critique of standardized testing, you are correct! As for pluralization, that is a call for teaching consequential materials in several ways. Whether you are teaching the arts, the sciences, history, or math, you should decide which ideas are truly important and then you should present them in multiple ways.

If you can present the art works of Michelangelo, or the laws of supply and demand, or the Pythagorean Theorem in several ways, you achieve two important goals. First of all, you reach more students, because some students learn best from reading, some from building something, some from acting out a story, etc.

Second, you show what it is like to be an expert—to understand something really well. Think about anything with which you have a deep familiarity: your family, your neighborhood, your work, your hobby. Presumably you can describe and convey it in several ways. Indeed, if you are limited to only one way of conveying an important concept or topic, your own understanding is probably tenuous. We teachers discover that sometimes our own mastery of a topic is tenuous, when a student asks us to

convey the knowledge in another way and we are stumped. So much for the 'nutshell.'

The rest of this Q and A is organized by topic and so you may want to skim the headers so that you can be guided toward your own area of curiosity as expeditiously as possible.

5. MI theory and relevant experiments

The term "theory" oscillates between two quite different meanings. Among physical scientists, the term is reserved for an explicit set of propositions which are linked conceptually and whose individual and joint validity can be assessed through systematic experimentation (Think of physics in the manner of Isaac Newton or Albert Einstein). Among lay persons, the term is used promiscuously, to refer to any set of ideas put forth orally or in writing—as the man on the corner says, "I've got a theory about that." Multiple Intelligences falls somewhere in between these two uses. There is no systematic set of propositions which could be voted up or down by a board of scientists.

On the other hand, the theory is not simply a set of notions that he dreamed up one day. Rather, Gardner offer a definition, a set of criteria for what counts as an intelligence, data that speak to the plausibility of each individual intelligence, and methods for revising the formulation. The criteria are laid out in chapter 4 of Frames of Mind.

In many sciences, theories occupy this intermediary status. Certainly, theories in the social sciences attempt to be as systematic as possible yet they are rarely proved or disproved in a decisive way. And broad theories in the natural sciences, like evolution or plate tectonics, are similarly immune from a single, simple test. Rather, they gain or lose plausibility on the basis of an accumulation of many findings over a long period of time.

This is how Gardner think about MI theory. He has put forth a candidate set of intelligences that are said to have their own characteristic processes and to be reasonably independent of one another. Over time, the particular intelligences nominated, and their degree of dependence or independence of one another, will be more firmly established.

Individuals in search of a decisive "thumbs up" or "thumbs down" vote on any theory of intelligence are naive. Still, it is important to indicate the kinds of consideration that will lend greater or lesser plausibility to the theory. Suppose that it was discovered that a certain region of the brain in fact subserved more than one intelligence; or that individuals who were strong in one intelligence were invariably

impaired in another intelligence; or that symbol systems that were ostensibly associated with one intelligence actually drew on the same cognitive processes as another intelligence. Each of these lines of evidence would cast doubt on the validity of the overall theory, though, following appropriate revision, there might continue to be some validity to the theory. We do not reject Piaget's overall theory of cognitive development or Freud's theory of unconsciousness processes just because some of its specific claims have been undermined by subsequent research.

6. A set of tests and the intelligences

Almost always, this question comes up—as psychologist Jean Piaget famously quipped, it is "the American question." At one time, Gardner thought it would be possible to create a set of tests of each intelligence—an intelligence-fair version, to be sure—and then simply to determine the correlation between the scores on the several tests. He now believe that this would be an extremely difficult feat to accomplish. Indeed, Gardner think it could only be accomplished if one were to develop several measures for each intelligence, and then make sure that individuals were comfortable in dealing with the materials and methods through which each intelligence were measured. And so, for example, spatial intelligence would be a product of one's performances in such activities as finding one's way around an unfamiliar terrain, playing chess, reading blueprints, and remembering the arrangement of objects in a recently vacated room. Were such a measurement of intelligence to be done, the findings would be of scientific interest—at least to me!

However, one reason why Gardner has moved away from the creation of such measures is that they may lead to new forms of labeling and stigmatization. As he has argued, the intelligences should be mobilized to help individuals learn important content and not used as a way of categorizing individuals. To use the language of one of his critics, Gardner did not want to inspire the creation of a new set of "losers."

As you may know, many other people have devised MI tests. The best known is probably the MIDAS test, developed by Branton Shearer. These tests typically give a rough-and-ready sense of people's interests and preferences. They suffer from two deficiencies: l) They don't actually measure strengths—you would need performance tasks to determine how musically intelligent, or spatially intelligent, or interpersonally intelligent a person is; 2) The tests assume that the person has good intrapersonal intelligence—that is, he or she knows himself well. But many of us think that we know ourselves better than we really do. Gardner doubt that anyone would score herself or himself low in the personal intelligences, but some of us must have lesser personal intelligence than others.

Gardner should add that in recent years, Shearer has begun to accumulate evidence that performance on the MIDAS correlates with abilities in certain areas, as

determined by other indexes. Such findings suggest that, in addition to being a reliable measure, the measure also has some validity. It is perfectly fine for a person to use the MIDAS or other measurements to learn about the idea of multiple intelligences. Indeed, people—both young and old—often find it interesting and illuminating to think about their own and/or other person's intellectual profile.

And yet, he must stress, we can only learn about a person's intelligences if we actually measure how well they perform on tasks that presumably draw on specific intelligences. If you want to see the multiple intelligences in action, he can suggest three venues.

First of all, classrooms that have been developed using the materials of Project Spectrum. This Project, initially developed to assess the intelligences in a preschool classroom, consists of many attractive games which provide a rough-and-ready measure of the intelligences of young users.

Second, is a theme park in Denmark called Explorama. Explorama consists of several dozen games which individuals across the age spectrum can play. In the process of playing these games, individuals gain insight to the intelligences where they are strong and the intelligences which they should exercise more often. Also, one has the opportunity to predict how one will fare at the various play stations—this turns out to be a measure of intrapersonal intelligence.

Third, the application may give individuals the opportunity to create experiences which draw on the several intelligences. Informed observers can watch users at work and infer the nature of their intellectual profiles.

7. Brain evidence and MI theory

In brain sciences, a decade is a long time, and the theory of multiple intelligences was developed four decades ago. We now know much more about the functioning and development of the nervous system. Gardner found the neurological evidence to be amazingly supportive of the general thrust of MI theory. The evidence supports the particular intelligences that he described and provides elegant evidence of the fine structure of such capacities as linguistic, mathematical, and musical processing.

It is sometimes said that the brain is a very flexible organ, subject to the events of early experience, and that that fact calls into question the theory of multiple intelligences. This remark is not pertinent. The fact of "neural plasticity" is independent of the issue of different intelligences. A multiple intelligences theory demands that linguistic processing occurs via a different set of neural mechanisms than does spatial or interpersonal processing. The fact that the processing may occur in somewhat different regions of the brain across individuals, by virtue of their early

experience, or even the loss of brain tissue for some reason, is interesting to know but not relevant to the identification of intelligences per se.

Indeed, suppose that, in one person, musical processing occurred in region A and spatial processing in Region B. Suppose, further, that these representations were reversed in another person. MI theory would not thereby be affected. Even if musical intelligences were represented in regions A, B, and C, in one person, and regions D, E, and F, in a second person, that still would not affect the theory. If, however, musical and spatial processing were identically represented in a population of persons, that fact would suggest that we are dealing with one intelligence, and not with two separate intelligences. From time to time Gardner present pertinent research on the website (multipleintelligencesoasis.org).

8. The connection between mathematical and musical intelligences

There is no doubt that individuals who are mathematically talented often show an interest in music. Gardner think that this linkage occurs because mathematicians are interested in patterns, and music offers itself as a goldmine of harmonic, metric, and compositional patterns. Interest, however, is not the same as skill or talent; a mathematician's interest in music does not predict that she will necessarily play well or be an acute critic of the performances of others. Of equal importance, the imputed link rarely works the other way. We do not expect of randomly chosen musicians that they will be interested, let alone skilled, in mathematics. There may also be a bias in the kind of music at issue. Those involved in classical music are far more likely to be oriented toward science and mathematics than those involved in jazz, rock, rap, and other popular forms.

These observed correlations and lack of correlation suggests another factor at work. In certain families and perhaps also certain ethnic groups, there is a strong emphasis placed on scholastic and artistic accomplishment. Youngsters are expected to do well in school and also to perform creditably on an instrument—typically piano or string. These twin goals yield a population with many youngsters who stand out in math and music. There may be other common underlying factors, such as willingness to drill regularly, an inclination toward precision in dealing with marks on a piece of paper, and a desire to attain high standards. One would have to sample a wide variety of skills—from being punctual to writing cogent essays—before jumping to the conclusion that a privileged connection exists between musical and mathematical intelligence.

9. "Critical thinking" and MI theory

As with the concept of executive function, Gardner is not irredeemably opposed to the notion of critical thinking. Indeed, he would like himself, his children, his students, and his friends to think critically, and anything that can aid in that process should be encouraged. Gardner doubt, however, that there is a particular species of thinking called "critical thinking." As he has suggested with reference to memory and other putative "cross-the-board" capacities, closer analysis calls their existence into question. Particular domains seem to entail their own individual and often idiosyncratic forms of thinking and critique. Musicians, historians, taxonomic biologists, choreographers, computer programmers, and literary critics <u>all</u> value critical thinking. But the kind of thinking required to analyze a fugue is simply of a different order from that involved in observing and categorizing different species, or editing a poem, or debugging a program, or creating and revising a new dance

There is little reason to think that training of critical thinking in one of these domains is of the same order as training of critical thinking in another domain; nor would he expect appreciable "savings" or "transfer" when one broaches a new domain. That is because each of these domains exhibits its own particular objects, moves, and logic of implications. To be sure there may be certain habits of thought that are useful across domains. One can get purchase from so-called "weak moves" like taking one's time, considering alternatives, brainstorming, eliciting critical feedback from sympathetic peers, putting work aside for when she hits a snag, and so forth. Such habits of mind ought to be cultivated early and widely. But even these habits must be practiced explicitly in every domain where they are applicable; indeed, they are called "weak" precisely because they do not in themselves get you very far.

It is unrealistic to expect that the individual who takes her time in, say, investing in the stock market will necessarily do so when completing her homework or falling in love. For these reasons, Gardner do not place much stock in courses that feature critical thinking per se. He much prefer that critical thinking be featured in each and every course or activity where it could prove valuable. Courses that help individuals to draw on these lessons can be helpful; courses that are expected to substitute for, or render unnecessary, the modeling of critical thinking in particular domains strike me as a waste of time.

Ultimately, the surest road to critical thought "across the board" is a regimen where critical thinking is inculcated in one discipline and domain after another. And then it is up to the individual to determine which 'moves' can be applied in several domains and which seem restricted to one sphere of practice.

Gardner often encountered the greatest resistance to this perspective when he speak to mathematicians or logicians. To these individuals, thinking is thinking wherever you encounter it; if one knows how to be logical, one should be able to apply logic everywhere. (And if you don't, life is hopeless!) No doubt mathematics and logic merit our admiration precisely because those domains strive for the greatest

generality for the propositions and patterns that they feature. However, neither in their practice nor in their person do such individuals epitomize what they believe. Often these individuals prove to be quite impractical or illogical in their own personal lives. Or, equally suspect, they seek to apply logical approaches in areas where they are manifestly inappropriate, such as in pursuing a love relation; in dealing with a difficult student, child, or colleague; or even, as we have seen with reference to both Vietnam and the Middle East, when foreign policy is set in light of Rand Corporation-style algorithms. Psycho-logic turns out to be quite a different affair from mathematical logic.

10. MI theory and artificial intelligence

This is an intriguing subject. Gardner has suggested that his list of intelligences is one way of characterizing human intellect. However, it also offers a set of categories which be applied to other entities that might be deemed intelligent. One could conduct an inventory of intelligences and then apply them to other organisms. Such an inventory might reveal that rodents have considerable spatial intelligence, that primates have superior bodily-kinesthetic intelligence, and that birds exhibit musical intelligence. Perhaps some species—like bats or dolphins or elephants or pigeons—exhibit intelligences that are unknown or not developed in human beings. And certain intelligences—like intrapersonal or existential—may be the exclusive purview of human beings.

In A Year at the Races (2004) the novelist Jane Smiley has applied MI theory to an analysis of the intelligences of horses.

We already know that highly intelligent computer programs have been created. There are programs that compose music, carry out complex calculations, defeat chess champions in mind-to-mind combat. Whether computers can also develop personal intelligences is a subject of considerable dispute. Many experts in artificial intelligence believe that it is just a matter of time before computers exhibit intelligence about human entities. Gardner personally feel that this is a category error. One cannot have conceptions of persons in the absence of membership in a community with certain values and in the absence of the certitude of death; and it seems to me an undue stretch to attribute such a status to computers. However, in some years, both humans and computers (or some new amalgam of these entities) may chuckle at my ignorance.

Almost anything that we can think about clearly will be done by AI sooner or later. And so it is creativity and broad synthesizing that will be the biggest challenge to AI.

11. Current MI theory in the world

In terms of claims, "soft" data and "hard" data, there is much evidence that schools influenced by multiple intelligences theory are effective schools. The testimonials from satisfied administrators, parents, students, and teachers are numerous. And many of the classes and schools claim that students are more likely to come to school, to like school, to complete school, and to do well in various assessments.

But there are problems with this evidence. It is almost entirely based on self-reports. We would not expect individuals who did not like MI theory to spend much time reporting their failures. We would expect individuals who like MI theory to chronicle its positive effects. Even if these claims could be independently substantiated, however, we would not know for sure just which effects are due to MI theory. Schools are incredibly complex institutions, located in incredibly complex environments. When numbers or performances go up or down, it is easy to attribute these "highs" or "lows" to one's favorite hero or villain. But absent the kind of controlled studies that are almost impossible to mount outside of medical or agricultural settings, it is simply not possible to prove that it was MI that did the trick.

For these reasons, Gardner has been reluctant to claim that MI is a proved changer of schools. He had thought that he might be admired for this reticence; but instead his silence has been perceived in many quarters as a sign that MI does not work, or that he disapproved of what is being done in MI schools.

However, we have an important new resource. Mindy Kornhaber and her colleagues undertook the SUMIT project (Schools Using Multiple Intelligences Theory). The research team studied a set of forty-two schools that had been using MI theory for at least three years. The results from these schools were very encouraging. 78% of the schools reported positive standardized test outcomes, and 5/8 of these attributed the improvement to practices inspired by MI theory. 78% of the schools reported improved performances by students with learning difficulties. 80% of the schools reported improvement in parent participation, and 3/4 of these attributed the increase to MI theory. Finally, 81% of the schools reported improvement in student discipline, and 2/3 of these attributed the improvement to MI theory.

Even if these figures show a positive spin, they are based on hard data; and it is not possible for an impartial party to dismiss these results. Gardner strongly recommend the book Multiple Intelligences, by Kornhaber, Fierros, and Veenema, published in 2004. In 2009, Jie-Qi Chen, Seana Moran and I published a collection called Multiple intelligences Around the World. In the book, 39 scholars from 15 countries on five continents reported their "MI experiences". The contributions different greatly from one author to the next, while all were informative. Anyone who is considering the adoption of MI in an institution in their home land would do well to consult this resource.

Briefly, MI theory can reinforce the idea that individuals have many talents that can be of use to society; that a single measure (like a high stake test) is inappropriate for determining graduation, access to college, etc.; and that important materials can be taught in many ways, thereby activating a range of intelligences.

12. Future development of MI theory

Close to forty years after Gardner first began to write about the concept "Multiple Intelligences," the topic still dominates my mailbox, with questions arising each day, often from scholars, researchers, or educators in remote corners of the world. And while nearly every question has been posed before, Gardner tried when possible to provide a succinct and useful response.

But Gardner also frustrated. Rarely if ever does a questioner talk about the <u>uses</u> to which the several intelligences are to be put. The assumption: It's desirable <u>in and of itself</u> to discover what intelligences a person has and/or what intelligences can be cultivated; and that their uses (presumably benign) will take care of themselves.

Alas, that's <u>not</u> the case. For decades, Gardner has sought to make the point that <u>intelligences are morally and ethically neutral</u>. One can use the same intelligence for benign or malignant ends. The examples are familiar. Both Nelson Mandela and Slobodan Milosevic had plenty of interpersonal intelligence. Mandela used his interpersonal intelligence to inspire his fellow citizens as well as human beings around the world; Milosevic used his interpersonal intelligence to foster ethnic hatred and ultimately genocidal endeavors.

By the same token, both Johann Wolfgang von Goethe and Joseph Goebbels had considerable linguistic intelligence (in German). Goethe used this talent to write great prose and poetry; Goebbels used his linguistic intelligence to create the vilest forms of propaganda. And one could make the same point about each of the remaining intelligences—musical, spatial, bodily, naturalist, logical—though it's quite difficult to delineate a malignant use of intrapersonal intelligence—perhaps masochism.

Gardner proposed a new set of "rules of the road." From now on, when he has asked about "MI," He will respond, "To what uses do you propose to put the intelligence or intelligences in which you are interested?" By this "move," Gardner hopes to nudge people towards considering the values that they are seeking to promote (and, at least by implication, those values that they would spurn or work hard to abolish). And perhaps, once they reveal what they would like to achieve with a battery of intelligences—or, for that matter, through activation of a specific intelligence—then we can consider <u>how</u> best to achieve that goal. Or, if the goal seems pointless or destructive, we should engage the correspondent in a discussion of ends and means.

Of course, once one begins to discuss what is good, and what is not, we enter the domains of values—an area which scientists (as well as many non-scientists) are wary of. It's okay to minimize the issue of values when one is discussing atoms or genes—but that neutrality can be pushed too far. After all, atoms can be split to produce energy—and that energy can be used for benign or malignant purposes. So too, we can now create and manipulate genes—again, for positive or questionable purposes.

And so, as we touch upon these issues, we enter a domain that my colleagues and Gardner have been working on almost as long as the study of intelligences: what it means to be good, and what it means to do well. This is the province of what we now call The Good Project. Gardner has sought to identify the three components (the three Es, represented as a "triple helix") of good work: good work is technically Excellent; it is personally Engaging; and it is carried out in an Ethical manner.

By the same token, we have identified the three components of good citizenship.   Once again, the good citizen is excellent—he or she knows the laws; is engaged—cares about what happens in the society; and, again tries to carry out duties in an ethical way.

What of the spheres in which "goodness" is manifest? For thousands of   years,. individuals have pondered how to deal with others in their immediate circle—what we have termed "neighborly morality." The key tenets of neighborly morality are captured in the Golden Rule, the Ten Commandments and other fundamental sayings, proverbs, tales and, in recent millennia, texts that arise and circulate within an identified community.

But over this period, societies have become more complex, Human relations have become increasingly transactional and are carried out over long distances. In this changed and increasingly global environment, it's important to delineate a new set of roles—which we call the role of worker/professional and the role of citizen. It becomes important to define the rights, but also the obligations, of those who spend a fair amount of their lives in a community of workers or a community of citizens. To encompass this terrain, and to complement neighborly morality, we have coined the phrase "the ethics of roles."

Even carrying out neighborly morality can be difficult. And once one contemplates the newer roles of worker and citizen, a determination of what is ethical, and what is not, constitutes a considerable challenge. There is no formula for ascertaining the ethical—in fact, an issue becomes an ethical one precisely because it does not permit of an easy, formulaic solution.

To make progress on tackling this terrain, on tackling specific ethical issues, we find it useful to delineate—in rough order of activation and application—several Ds:

- Dilemma (recognized as such initially or pointed out by a knowledgeable individual)
- Discussion or debate about the dilemma, how best to articulate and approach is resolution
- Decision (and resulting action or inaction)
- Debriefing, about what happened, and whether the dilemma could have been handled more effectively, and how to handle a similar one when it arises in the future.

It is easiest to think of the deliberative process as involving language. But one can also contemplate ethical dilemmas as they are portrayed in works of art—for example, dramas or documentaries or even scrolls or paintings. And of course, these are matters of the heart, as well as of the head.

Deciding what is good, and then pursuing the good, has never been easy. And in the time of the Internet, digital media, social networks, artificial intelligence, deep learning, and the like, it is harder than ever. Misinformation is more rampant than ever before, and it is often more widely circulated and more easily accepted than is well-researched, reliable information.

But unless we want to toss a coin, or disregard "the good" altogether, we have no choice but to marshal our strongest resources, seek to delineate and defend what we believe to be good, and then achieve it.

And perhaps—and this is Gardner's fondest hope—we can mobilize our several intelligences to determine both what is good and how best to realize it.

13. MI theory and other relevant issues

It is well known that there are quite different between China and US in education. What do we think of these two different education systems? And which will be better for cultivating students with innovative spirits?

Gardner has written a whole book on this topic called TO OPEN MINDS: CHINESE CLUES TO THE DILEMMA OF AMERICAN EDUCATION. Briefly, China has traditionally been stronger on the development of skills in traditional fields, while Western societies have been stronger on innovation. But that may well be changing.

Now many Chinese universities plan to build first-rate universities in the worldwide. Several years ago, a resident of China said to Gardner, "We are going to develop 40 MITs (Massachusetts Institute of Technology)—the most successful science and engineering school in the United States." Gardner said "Why don't you develop one first?" It's like saying "We are going to develop 40 Yo-Yo Mas, or 40

Lang Langs." Develop one first....and see what you can learn and whether it can be extended to other cases.

Gardner's colleagues, from 2012-2020. Wendy Fischman and Gardner carried out a major study of higher education in the United States. We have written numerous blogs and articles that are posted on the Lifelong Learning section of howardgardner.com They also have just drafted a book about our findings, with the tentative title "The Real World of Colleges".   Perhaps by the time that you read these words, this book will have been published!

   Prof.Gardner has every expectation that China will become a leader in many fields. But that is only if individuals are allowed to explore freely what they are interested in and then to publish their results in an objective manner. Both in the US and China, there are many forces that do not want to allow free exploration, especially in certain sensitive areas.

   Concerning the fact that, In 2015 a Chinese female scientist won the Nobel Prize in medicine and biology, but she is the one without PhD degree and not the member of CAS. Gardner was surprised to learn this. But people should win rewards and recognition for what they have accomplished and not for the number of degrees that they have accumulated

14. Contribution that Existential Intelligence can do during COVID-19 crisis

   An undergraduate student from Long Island, New York, recently wrote asking the following question: "I was hoping you would be able to provide some insight on the "Frame of Mind" of people in quarantine from Coronavirus. Since there has been a dynamic shift in our perception of reality due to fear, do you believe that while people are isolated in quarantine Existential Intelligence is ever more present in children?

   Schools aren't exactly teaching existentialism but the classroom that exists beyond a physical space is now as prominent as ever. Kierkegaard's notion of angst may have relevance here. Children desire structure and routine in school to reduce anxiety in the classroom, now only to be uprooted by the unknown. Children are left to ask, "Why?"

   Gardner thought that's a very reasonable assumption. A lot depends on two factors:

1. How the adults (and the media) deal with COVID-19. When children get a clear and unambiguous signal from their parents and other respected adults, they are likely to accept the situation. On the other hand, when they sense that their parents are not on the same page, watch out!

2. Whether the children listen carefully to the answers to their questions and wrestle with them. Gardner often quipped that all children that he know like to ask questions—but children differ in whether the asking is the point, or whether they also deal with and follow up on the responses that they receive.

15. Conclusion

It's said there are still about 70% of the world that are unknown to human beings in the world. Whether it means it may need a revolution in both natural science and social sciences? Regarding this topic, Gardner think that the challenge is in figuring out what it means to be known or not to be known. Also, when they think that they have known something—for example, the genetic code—scores of new questions arise.   He didn't know of any metric for figuring this out and so—as phrased-- the statement is meaningless.

As there are so many fans of MI theory in China. And many Chinese friends invited Gardner to make a trip to China in the near future. Gardner hopes so, but he don't know…however, as we have learned in the coronavirus epidemic,   it's also possible to visit by a communication site like ZOOM or SKYPE.   In fact, an excellent student of ours, Xin Xiang, recently had her dissertation defense via ZOOM. The committee was in Cambridge at 1 PM in the afternoon: Xin Xiang was in Guangzhou, where the time was 1 AM.   Human beings are adaptable!

We can see that in human history, both wars and diseases always exist since human history began. Can human beings solve these problems, especially wars depended on abilities of human beings themselves? Can human learn some lessons from this coronovirus epidemic? Concerning this issue, we think that, Of course, human beings are capable of solving challenges like that of COVID19.   But it is essential that we have leaders and experts who tell the truth and who are trustworthy-- that is, worthy of the trust of their own populations and, indeed,. of the rest of the world.

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