

TWO DECADES OF «MULTIPLE INTELLIGENCES»: IMPLICATIONS FOR EDUCATIONAL PSYCHOLOGY

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This article presents a review of Gardner's Theory on multiple intelligences, twenty years after it first appeared. It consists of three parts. The first is introductory, and describes the nature, bases, criticism, and results of the theory. The second discusses the contributions of the theory to variables of Educational Psychology: student and teacher role, learning, and instructional model. Finally, there is a brief description of the theory's applications to counselling, technology and special education.

Key words: multiple intelligences, educational intervention, self-regulated learning.

En el artículo se hace una revisión de la teoría de Gardner sobre las inteligencias múltiples cuando han pasado más de veinte años de su publicación. Tiene una parte introductoria en la que se expone la naturaleza, bases, crítica y resultados de la teoría. La parte central está dedicada a comentar las aportaciones de la teoría a las variables de la Psicología de la Educación: papel del alumno y del profesor, aprendizaje y modelo instruccional. Por último, se hace una breve descripción de las aplicaciones de la teoría a la orientación, la tecnología y la educación especial.

Palabras clave: inteligencias múltiples, intervención educativa, aprendizaje autorregulado.

Four books played a prominent role in the way intelligence was conceived in the last two decades of the 20th century: *Frames of Mind*, Gardner (1983); *Beyond IQ*, Sternberg (1985); *The Bell Curve*, Herrnstein and Murray (1994); and *Emotional Intelligence*, Goleman (1995). Gardner's book, the first of them all, did not cause any particular stir on its publication, and remained discreetly in the background. That of Sternberg raised some dust due to its harsh criticism of the use of IQ tests. The work by Herrnstein and Murray, ironically the most classical of them all, following as it did the traditional psychometric line, provoked a lively scientific debate that brought considerable fame (and notoriety) to the book. It argued that intelligence was a unitary and largely hereditary capacity distributed among the population in the form of a bell curve; it claimed, moreover, that many of the ills of our society are due to the behaviour and shortcomings of people with relatively low intelligence. Goleman's book, which appeared the following year, went further insofar as it became the best-selling social science book (despite being the least scientific of the four) in history. Nevertheless, in the cold light of day, after all the press attention has died down, the book that has truly left a mark on society, and partic-

ularly on the Psychology of Education, is that of Gardner who, flying in the face of the traditional thesis of a single intelligence, declared the existence of multiple intelligences in human beings.

Gardner (1983, 1999) refused to accept the monolithic and stable conception of intelligence, and came to the conclusion that there were just two possible alternatives: to continue with the traditional ideas of intelligence and of how it should be measured, or to find a new way of interpreting and developing what we understand by this construct. He chose the second option. But the challenge for Gardner – and this is where, as so many times before, the shadow of humanity's past creeps onto the scene – is not only to discover the true nature of intelligence or how it can be developed, but to find how to combine intelligence and ethics to create a world in which we all wish to and are able to live. After all, a society run by intelligent people could quite easily end in disaster or finish the planet off altogether. Intelligence is valuable, but personality is more important (Gardner, 1999).

And dissatisfaction with the psychometric interpretation was not confined to psychologists; neuroscientists were sceptical about psychology's assumptions on intelligence, and thought it more reasonable to conceive of the brain as housing an indeterminate quantity of intellectual capacities whose relationship required clarification (Pinker, 1997) Likewise, professionals in information technology

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and artificial intelligence have rejected the notion of a single intelligence of a general nature. The development of a machine with a general intelligence today seems an impossible goal.

In any case, what can be stated is that Gardner's theory, which initially had a low profile, gathered considerable ground to become, today, the most influential in the field of education. The aim of the present article is to review this theory and describe the different applications deriving from it in this field.

THE THEORY OF MULTIPLE INTELLIGENCES

Gardner's theory of Multiple Intelligences (MI) (1983), among others, has contributed to changing the traditional perspectives on human intelligence, previously focused excessively on IQ, thereby opening up new areas of psychoeducational intervention, with the hope of providing better-quality education and, above all, of improving students' cognitive functioning. A more complete view of the theory can be obtained by consulting at least three of three of Gardner's published works: *Frames of Mind* (1983), *Intelligence Reframed* (1999) and *The Multiple Intelligences after Twenty Years* (2005b).

Gardner has repeatedly expressed his profound dissatisfaction with the definition of the power of the human mind reduced to the orthodox view of a unitary intelligence based on IQ, which seems to be revised every 25 years or so by American psychologists. Like other psychologists (Guilford, 1967; Thurstone, 1939), and especially Sternberg (1985) – who defends the triarchic nature of intelligence –, Gardner goes far beyond the monolithic conception of intelligence, adopting a pluralist view that describes cognitive ability in terms of a set of perfectly defined intelligences. Moreover, in contrast to those who see intelligence as stable and unmodifiable from birth (Herrnstein & Murray, 1994), Gardner conceives of intelligence as something that changes and develops in accordance with the experiences the individual may have throughout his or her life. In line with other researchers (Feuerstein, Rand, Hoffman & Miller 1980), he maintains that intelligence is the result of the interaction between biological and environmental factors, and can therefore be "taught". Like other personal attributes, intelligence depends in some way on context (Brown, Collins & Duguid, 1989; Resnick, 1976), hence the importance of contextual and educational elements for its development.

Gardner not only distances himself from the orthodoxy of a single intelligence, but also from the identification and measurement of intelligence through tests, and breaking with this orthodoxy he makes his most important proposal in asserting that humans are better defined by saying that they possess a series of relatively independent intelligences than by saying they have just a single intelligence defined by IQ. His, then, is a rational approach, resting not on empirical and quantitative research, but rather on subjective factor analysis. More specifically, Gardner (1983, 1999) argues that there are many forms of being intelligent, indeed, at least eight: Linguistic Intelligence, Logical-Mathematical Intelligence, Spatial Intelligence, Bodily-Kinesthetic Intelligence, Musical Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence and Naturalist Intelligence. He recently identified another (Existential Intelligence), and admitted that he is working on the conceptualization of more (Gardner 2005b). Likewise, he maintains that everybody has all eight intelligences and the majority of people can develop each intelligence to an adequate level of competence. Finally, he asserts that the intelligences usually work in conjunction in a complex fashion, always interacting with one another. All intelligent human activities demonstrate that all the intelligences are activated in their execution. The intelligences are independent of one another, but act in conjunction. For example, a dancer can only excel if she has good musical intelligence for working with the music and rhythm, interpersonal intelligence for understanding how to "reach" the audience with her movements, and bodily-kinesthetic intelligence to give the necessary agility and grace to her movements.

On speaking about his theory, Gardner says he does not actually know when the idea arose. He merely refers to what he considers remote and immediate memories. Among the remote memories he mentions his love of the piano and his surprise, during his time as a student of psychology, that there was no room in that discipline for the arts. But what really fascinated him was the description by the neurologist Geschwind of what happened when normal or gifted individuals were unfortunate enough to develop a tumour or suffer a brain haemorrhage. This fascination led him to work in a neurological unit trying to understand the organization of human abilities in the brain; indeed, he spent twenty years there. The theory as we know it began coming to fruition in a draft manuscript for a book,

Kinds of Mind, which was never published, but laid down the bases for the fully-developed theory that appeared in *Frames of Mind*.

As for his direct memories, those linked explicitly to his theory, the most important, according to Gardner, concerns his work on the Human Potential project thanks to a grant from the Bernard Van Leer Foundation in 1979. His task within the Project was to write a book about the discoveries made throughout history in relation to human cognition. Out of this came the research programme that would lead to the MI theory. In his work within the programme, Gardner made a close examination of studies from psychology, anthropology, genetics and brain science in an attempt to identify and define human capacities. Though he is not sure exactly when, at some point he conceived the idea of calling the abilities or faculties identified “multiple intelligences”. Indeed, he admits that his book *Frames of Mind* would never have met with the same success if instead of talking about multiple intelligences he had talked about talents.

Likewise, Gardner reflects on another crucial moment, that of his definition of intelligence and the establishment of the criteria underlying that definition. According to the author himself, this is the most original part of all his work. Gardner (1983) defines intelligence as the human capacity to solve problems or to fashion products that are valued in one or more cultural setting. Nearly two decades later (Gardner, 1999) offered a more refined definition, as a biopsychological potential for information processing that can be activated in a cultural setting to solve problems or fashion products valued by a culture. The modification means that intelligences are not something that can be seen or counted, but rather neural potentials that may be activated or not depending on the values of a particular culture and the decisions made by each person, their family, their teachers and others.

Although Gardner began writing about his research and his ideas as a psychologist, he realized he should say something about the educational implications of his theory. This he does in the final chapters. By 1981 he had prepared the first draft of his book; he had also fully developed his position in relation to the definition of human beings as endowed with multiple intelligences and of the distinguishing profile of these intelligences in each person. He never expected he would have such success with *Frames of Mind*, but this was indeed the work that (with a nod to Warhol) gave him his “15 minutes of

fame”, and sealed his place in history as the father of multiple intelligences.

In the first ten years after the publication of the book, Gardner watched amazed at the numbers of teachers who set out to revise their approach in the light of his MI theory, and, while remaining a psychologist, he spent time working with them. Subsequently, though, he agreed to work on research projects arising from his theory. The most tangible result was Project Spectrum, whose objective was to create a battery of measures for determining the intellectual profile of primary school pupils. Also of note was his collaboration with Sternberg – author of the triarchic theory and, like Gardner, critical of the idea of a single intelligence based on IQ – on the study of applied intelligences in the school.

Three main activities have occupied Gardner’s time in recent years. First, he produced an important triad of books: *Creative Minds* (1993), *Leading Minds* (1995) and *Extraordinary Minds* (1997), taking advantage of the marketing potential of the word “mind”. At the same time he continued to develop his definition of intelligence. But in the 1990s he had to deal with some wrong interpretations of his theory, taking special pains to distinguish his own interpretation from that of some people who were applying it. This situation led him to become involved in educational reform, especially from his position as Co-Director of Project Zero at Harvard University, focusing on teaching for understanding. Through this work he became convinced that MI should not be an educational objective in themselves, but rather a support for a better quality of education.

Gardner has indicated three objectives for the future: a broader view of human intelligence; the elimination of standardized instruments with short questions and their replacement by real-life demonstrations or virtual simulations; and utilization of the multiple intelligences concept to permit more effective teaching and assessment. And he suggests three topics as examples for this utilization: the theory of evolution, the music of Mozart and the Holocaust.

BASIS AND IMPLICATIONS OF THE THEORY OF MULTIPLE INTELLIGENCES

Gardner maintains that the basis of intelligence is twofold: on the one hand, biological, and on the other, cultural. According to neurological research, different types of learning crystallize in synaptic connections in

different parts of the brain, so that a lesion in Broca's area leads to loss of the capacity for verbal communication, but does not eliminate the capacity for syntactic comprehension. But culture also plays an important role in the development of intelligence (Gardner 1983). Indeed, all societies value different types of intelligence. Thus, while certain intelligences may be developed to a high degree in certain people within a culture, these same intelligences may not be so well developed in individuals from another culture.

Despite being accused of doing so, Gardner did not base his theory on pure intuition. It was based on a series of criteria for the rigorous determination of what is and what is not an intelligence. Eight of them passed the tests set. Table 1 shows the determining criteria.

After twenty years of the theory's development, Gardner (2005b) expressed some ideas, desires and motivations in relation to it. First of all, the desire to promote new intelligences. Secondly, his fascination with a certain phenomenon: the way in which areas of knowledge emerge, and how they become configured periodically – that is, how the human mind deals with interdisciplinary studies. And finally, the continually confirmed biological evidence of multiple intelligences. Human minds and brains are highly differentiated entities that do not fit comfortably with the

notion of an intelligence defined by IQ. Gardner confesses that if he were given another life he would be happy studying the nature of intelligence with regard to our biological knowledge, on the one hand, and our social knowledge and practice on the other.

CRITICISMS

Controversy was not slow to appear, stemming above all, in Gardner's view, from psychologists' nervousness about the proposal of doing away with tests, and widespread reservations about calling intelligences what could simply continue to be called talents.

Gardner himself discusses the criticisms (1999), which have emerged from all political, psychological and pedagogical points of view. His theory is discredited for its multicultural (open) nature and for being elitist (coming from Harvard); it is considered too flexible (because it accepts artistic activities) or too rigid (because it maintains that everything should be taught in various ways); it is accused of going against norms or of imposing too many. In response, Gardner tries to avoid defensive reactions, listen to what is reasonable in the criticisms and take on the challenge calmly, learning from his critics.

One of the most serious criticisms received by Gardner is that his identification of intelligences has been based

TABLE 1
CRITERIA FOR DETERMINING AN INTELLIGENCE

CRITERION	RECOGNITION
1. Potential withdrawal due to brain damage.	For example, language skills may or may not be affected by brain strokes.
2. Existence of prodigies or gifted individuals.	These individuals permit the intelligence to be observed in a relatively isolated way.
3. An identifiable nuclear operation, or a set of identifiable operations.	Musical intelligence, for example, consists in people's sensitivity to melody, harmony, rhythm, timbre and musical structure.
4. A characteristic developmental history within an individual, together with a definable nature of expert performance.	The abilities are examined of, for example, an expert athlete, salesperson or naturalist, together with the steps to achievement of such expertise.
5. A developmental history and developmental credibility.	One can examine forms of spatial intelligence in mammals or musical intelligence in birds.
6. Support from experimental psychological tests.	Researchers have designed tasks that indicate specifically which abilities are related to one another and which are discrete.
7. Support from psychometric findings.	Batteries of tests reveal which tasks reflect the same underlying factor and which do not.
8. Possibility to be coded in a symbolic system.	Codes such as language, arithmetic, maps and logical expression (among others) reveal the important components of the respective intelligences.



more on intuition than on comprehensive and rigorous empirical research. Moreover, critics point out that there is still no battery of tests for identifying and measuring the different intelligences. Even some of Sternberg's (1985, 1996) comments appear to echo this dissatisfaction with Gardner's theory. For researchers and teachers who have identified intelligence as "that which is measured by tests", Gardner's work will always be problematic. These can invoke a lengthy and substantial research tradition that demonstrates a correlation between different capacities and supports the existence of a general factor of intelligence. John White (1998), confessing his doubts over the theory, remarks that he has not found a satisfactory response to those doubts in any of Gardner's writings.

Gardner (1993) contests this supposed traditional evidence on the subject, and argues that it is not yet possible to know the extent to which intelligences correlate. It is true that he considered at one point creating a battery of tests, with a view to determining the correlation between scores in different tests. But he never really wanted to rely on tests, since, in practice, they lead to stigmatization and labelling.

In spite of the criticisms, the criteria mentioned above offer sufficient basis for categorizing the possible intelligences. On many occasions Gardner has acknowledged that there is an element of subjective judgement in his conception of intelligence. But it is reasoned judgement with an empirical basis. In fact, research on the functioning of the brain continues to support the idea of multiple intelligences (though not exactly those specified by Gardner).

A further criticism frequently associated with the previous one, but even more vehemently delivered, is that Gardner calls intelligences what in psychological language have always been called skills or talents. This criticism is levelled particularly at the intelligences identified as musical and kinesthetic because they are more generally considered as talents. Skills are the result of abilities, and hence should not be confused with them, nor, consequently, with intelligence. In this context, then, the majority of Gardner's intelligences would be skills or talents, rather than abilities, and in the opinion of his critics it is reckless to start relabelling peoples' talents as intelligences.

But Gardner was not intimidated by this criticism (Gardner, 2005b). He stated, indeed, that he would

have no objection to continuing calling these intelligences talents as long as logical or linguistic reasoning were also referred to as talents. Gardner and advocates of his theory point out that intelligence has never been rigorously defined, thus inviting new efforts to do so, though Gardner (1983) claims to accept that certain human capacities are intelligence and others are not.

Throughout the history of science, no author has escaped criticism. Indeed, the greater the relevance of the topic in question, the more vehement the criticism. Gardner (2005b), has spent more than two decades thinking about multiple intelligences, and is aware, more than anyone, of the deficiencies of his own theory, but he states that he in no way considers it to have been refuted, or to have been subsumed into a new holistic, unitary or genetically determined view of human intelligence.

Thus, alongside the criticisms, the downside of Gardner's theory, we should consider its value, the points in its favour. One of these, and perhaps the most significant from the point of view of the Psychology of Education, is that it highlights inter-individual variability in the classroom. Theoretically, individual differences are universally accepted; they are even respected. But few focus on them and develop them. Gardner's merit in having acknowledged and confirmed this variability is to have underlined the fact that there are many ways of learning – at least as many as there are forms of human intelligence (Bransford, Brown, & Cocking, 2000). And by the same token, there are many different ways of teaching. With so many different forms of learning and teaching, the possibility of improving academic performance is obviously multiplied. Furthermore, if as Gardner argues each pupil, in the course of his development, builds and makes combinations to fashion his own intelligent form of learning, he becomes unique, and this opens up new pathways for educational innovation of enormous significance in relation to the demand for individualized teaching designs. In this regard, the intelligences would be the most appropriate categories for identifying differences of mental representation.

Another advantage of Gardner's theory is that it has many direct applications to educational practice. The first of these is that while traditional education focused almost exclusively on the development of the two classic intelligences, verbal and logical-mathematical, Gardner's highlights the fact that education should develop the whole person, and should therefore activate all the exist-



ing intelligences. Thus, the task of educational psychologists is broadened and enriched, discarding the narrowness of purely logical and verbal considerations to extend their field of attention to the rest of the intelligences, previously marginalized. Concentrating exclusively on linguistic and logical abilities during schooling may mean that those pupils with capacity in other intelligences are cheated (Gardner, 1995). But this does not necessarily imply indefinitely increasing the content of the curriculum. On the contrary, what is required is the selection of those elements of the curriculum that are truly significant in the classroom context so that they can be approached from many different points of view. It should be borne in mind that Gardner has always favoured depth, as opposed to breadth, and understanding over the mechanical memorization of information. Consequently, educators should change their traditional model of presenting teaching material. If, as the theory proposes, each pupil has an idiosyncratic intelligence profile, the product of the unique combination of all the different types of intelligence throughout her life, then the way in which classes and, especially, content are structured cannot continue to be based on the intelligence model of traditional teaching; rather, it will have to attend to all the intelligences so as to reach the maximum number of pupils.

Furthermore, Gardner's theory has succeeded in connecting with the educational *zeitgeist* and the new paradigm focused on learners and their learning rather than on teaching and the teacher (Banathy, 1984; Beltrán, 1993), and on its most immediate derivations, such as situated knowledge (Brown, Collins & Duguid, 1989), learning styles and approaches (Biggs, 1987), learning to learn programmes (Nickerson, Perkins & Smith, 1985) and self-regulated learning (Zimmerman, & Martínez Pons, 1988; González Pienda & Núñez, 1998, 2002), among others. The theory has gained ground, moreover, at a time of generalized demoralization among teachers, in desperation over how to assimilate the enormous individual differences they encounter in educational practice. This has made it easier for them to understand Gardner's criticisms of the single intelligence model and IQ tests. Within this new framework, teaching and helping learners can take place in a more promising and stimulating educational scenario. As Gardner stresses in one of his numerous forewords (Gardner, 1994), the essence of the theory is to respect the many differences between individ-

uals: the multiple variations in their manner of learning, the different forms in which they can be assessed and the near-infinite number of ways in which they can make their mark on the world. The theory has also provided educators with new assessment criteria, models and instruments that permit them to identify with a high degree of accuracy what constitutes a developed, educated person, in a constant state of growth.

Finally, the theory offers sufficient resources for pupils to discover their true intellectual profile and, consequently, go on with hope and anticipation to sketch out their career project, since, with the help of their teachers, they will be able to identify the strengths they should capitalize on and the weaknesses they must compensate for if they are to achieve personal satisfaction and professional success. In sum, the plus side of the Gardner's theory gives grounds for optimism about improvements in educational practice: individualized designs, diversified and enriched teaching, clarification of the teacher's role, instruments for authentic assessment and adequate intellectual profiles for personal growth.

RESULTS

Advocates of the theory, groups led by Gardner himself within Project Spectrum (Gardner, Feldman, & Krechevsky, 1998), report that the results of the most rigorous assessment so far are promising: excellent documentation of materials has been achieved, along with high levels of quality in the development of innovative measurement instruments for assessing strengths and weaknesses related to intelligence; a natural, stimulating environment has been constructed so that children's performance is optimum; and great investments of time and money have been made. There are few precedents of the development of scoring systems that go beyond the traditional linguistic and logical criteria and with these conditions.

The results obtained are, moreover, reasonably consistent with the proposals of the multiple intelligences concept. For young children, performances in the Spectrum activities were broadly independent and revealed relative strengths and weaknesses; there was a significant correlation between performance of pre-school children in the Spectrum activities and in the Stanford Binet test. These results lend some degree of support to the main proposals of the theory, since children aged 3 to 7 show profiles of relative weaknesses and strengths. But the data also

indicate that the MI notion may be more complex than predicted, with three foci of attention emerging for future research: developmental adequacy of materials, level of social class and precise deployment of the Spectrum materials in the classroom.

Some observations have suggested that the theory cannot be disconfirmed. But the results discussed here indicate some of the ways in which the central objectives can be challenged. Gardner himself (1993) has admitted that if future evaluations do not reveal strengths and weaknesses within a population, if performance in different activities prove to be systematically correlated, and if constructs (and instruments) such as IQ explain the preponderance of the variance in activities designed to register specific intelligences, then the theory will have to be reformulated. Even so, the objective of detecting different human strengths and using them as the basis for commitment and learning may be worthy and relevant, regardless of the scientific fate of the theory.

Furthermore, Gardner's theory has been warmly received by those working in education. Soon after its publication, professionals in this field began testing its effectiveness in schools. The research projects, studies, masters theses and doctoral dissertations that have tried to put Gardner's ideas into practice all over the world are far too numerous to mention, though the first studies carried out in American schools (Christison, 1996; Fogarty & Stoehr, 1996; Gahala & Lange, 1997 & Haley, 2001) would serve as examples. In Spain, the theory has also been tested in practical situations. Those interested can consult the findings from two universities that have spent some years applying Gardner's model, in Murcia and Madrid, under the respective directions of Professors Prieto and Pérez. In either case the results highlight more points in favour of the theory than against it (Prieto & Ferrándiz, 2001; Prieto & Ballester, 2003; Ferrándiz, Prieto, Bermejo & Ferrando, 2006; Pérez, 2000, 2005; Pérez & Domínguez, 2000, 2005).

SOME PSYCHOLOGICAL KEYS FOR EDUCATIONAL CHANGE

In order to understand all the innovatory implications of Gardner's work for the world of educational psychology, it is useful to take into account three factors that explain Gardner's interpretation of education and help us to understand how he sees educational problems from the psychological perspective. The first of these is that he

considers himself a psychologist, but within an educational context. Psychology was possibly what changed his life, when he was intending to become a lawyer, and instrumental in this was his mentor Bruner, with whom he worked at Harvard University on the MACOS Project. Within psychology, and more specifically cognitive and learning psychology, Gardner was attracted by the subject of child development. He wanted to know how the mind of a child worked. This led him to Piaget, whose ideas he readily accepted at first, but later refuted on finding what he considered to be shortcomings in his research. The second factor is Project Zero (Arts in Education), in which Gardner worked with a group of distinguished psychologists, including Perkins, with whom he has since co-directed the project at Harvard for many years. This provided him with extensive pedagogical knowledge that has been superimposed on his original psychological background. And the third factor is his work at the Boston University Medical School, where he has been able to accumulate sufficient empirical support for his intuitions on the functioning of intelligence.

Although Gardner has not formulated a specific pedagogical theory, it is worth considering some of the most lucid analyses he has made as contributions to the Psychology of Education.

a) The dilemmas of education

Gardner (2001) sees education from the perspective of the psychologist and the student of mind and brain, and raises two dilemmas affecting the *what* and the *how* of education. The *what* dilemma clearly refers to content. Gardner argues that if we have to teach everything: facts, material, processes, and so on, we would break the backs of our students and our teachers. Moreover, the body of knowledge currently doubles every two years, so that it would be necessary to increase classroom hours, and even then it would be difficult to cover the programmes.

With regard to this first dilemma, Gardner is in favour of a limited number of truly important subjects – for example, the theory of evolution in biology, the concept of political revolution in history, or mastery of an art or trade. But the problem continues to concern *how* to teach so that the pupil understands. To favour understanding, Gardner (1999) proposes a comprehensive differentiated pedagogical strategy with four paradigmatic approaches: observation, confrontation, systemic approach and

approach derived from MI. The clearest example of observation is that of crafts or trades, where the relationship between teacher and learner permits the learner to observe the teacher closely and gradually participate in workshop practice. Children's museums or science museums would constitute other examples. The confrontation approach involves facing up to obstacles to understanding – stereotypes, memorization, and so on. For example, if a pupil tends to think in a stereotyped way, she can be encouraged to consider each historical event from different perspectives. The systemic approach is characterized by focusing explicitly on the exercise of comprehension, and involves teachers setting clear comprehension objectives – tasks that indicate to students their achievement – and sharing the perspectives of their students. This is the approach employed successfully for some years by a group of researchers within the Harvard Project Zero. This model has three parts:

- *Access routes.* There are seven routes of access to understanding a topic, largely corresponding to the multiple intelligences. These routes offer students seven ways of understanding the material so that they can choose the most attractive, familiar or productive one: narrative, quantitative, logical, existential, aesthetic, practical or social.
- *Instructive analogies.* The access routes place students "inside" the topic, arousing their interest and desire to explore, without offering specific forms of comprehension. For this there are instructive analogies based on material already understood. For example, in the case of evolution one can find analogies in history (social processes can be likened to biological processes).
- *Dealing with the essence.* The access routes open the way, motivate students; the analogies transmit revealing aspects of the concept, but comprehension still has to be dealt with. And here Gardner refers to two styles characterizing teachers: either they have provided explicit instruction and assessed understanding according to linguistic mastery of the material (evolution is...), or they have provided abundant information in the hope that students will in some way make their own synthesis (based on what you have read, what would you do if...). Some teachers indeed use the two styles, simultaneously or successively.

However, the fundamental step is to recognize that a person can only properly understand a concept and demonstrate it if he can develop multiple representations

of its essential aspects. The ultimate objective is to synthesize the diverse representations as exhaustively as possible. But this involves devoting sufficient time to each topic, describing each unit in different ways and explicitly directing the tasks towards a spectrum of different intelligences, aptitudes and interests.

The theory of multiple intelligences provides the opportunity to examine a topic in depth to determine which intelligences, which analogies and which examples have most probabilities of transmitting the essential aspects of a topic to the greatest possible number of pupils. Gardner (1999, 2005a) acknowledges the "artisanal" aspect of education, as opposed to the rigidity of the algorithmic approach. The pleasure of teaching resides in this artisanal approach because it offers the opportunity to re-examine a topic and find new ways of transmitting its essential aspects to different minds.

b) Role of the student

For many decades, throughout most of the 20th century, educational research was based on the assumption that a child's mind was a kind of *tabula rasa* that absorbed experiences which in turn shaped the child's development. Dissatisfaction with this view led some psychologists to explore other perspectives and theories of development. For example, Piaget (1946) focused on the intellectual and cognitive development of the child, whilst Gibson (1959) concentrated on the development of perception in the child. Although these two theories were different, they modelled a new perspective on children as active beings, capable of setting goals, planning and reviewing.

Gardner's image of the child, and of the student in general, derives largely from Piaget's theory that sees intelligence as a process of construction of ever more powerful cognitive structures. What interested Piaget, more than individual differences, were the principles governing the mental development of all human beings, that is, intelligence as a universal property that develops in qualitatively different stages through which all children pass: sensory-motor, pre-operational, concrete operations and formal operations. According to Piaget's theory, which destroyed traditional myths about the child, children are not adults in miniature, but rather subject to the mental processes peculiar to their age.

But Gardner, influenced by Bruner (1960), soon became convinced that intelligence did not develop automatically,



as Piaget had thought. There was something more that drove and directed development. And this factor was none other than culture, which selected and reinforced children's natural capacities. In this, both were influenced by Vygotsky (1978), who demonstrated that the availability of tools and techniques transformed human development, thus broadening the perspective of human intelligence.

Moreover, Piaget had overlooked things, focused as he was on logical-mathematical intelligence. He had forgotten about the Arts, as well as the mechanism through which developmental change occurs, the reasons for diversity between individuals and, perhaps most importantly, how education can influence development. Likewise, he proposed that development took place in all intellectual areas in the same way and in the same proportion – a notion firmly refuted by Gardner.

But what truly motivated Gardner's research on pupils' learning was the failure of attempts to apply the different behaviourist and psychometric psychological models to the field of education, on conceiving the student as passive, reactive and dependent. With his theory, Gardner (1983, 1999) sketches a different type of student, active, propositive and independent, who possesses, in different quantities, each and every one of the existing human intelligences, though the way in which he combines them and utilizes them generates an idiosyncratic and original pattern of intelligence that defines him as unique and different from others. This fits in with the actual school context, in which, despite teachers' attempts to impose uniformity, pupils resist directive instruction, clearly displaying their individuality.

According to Gardner's theory, everyone is born with all the intelligences, but the pupils in a teacher's class have all arrived there with different sets of intelligences developed. The significance of this is crucial for teaching design, since each child will have to learn with a unique set of intellectual strengths and weaknesses that determine whether it will be difficult for her to learn classroom material in a particular way, that is, according to a specific learning style. It is true that teachers cannot adjust to all the different learning styles, but they can show each of their pupils how to use their most developed intelligences to better understand material for which they would normally employ their weakest intelligences.

Gardner has argued vehemently that the purpose of education is to enhance pupils' understanding, not just their

memories. But this development of understanding must occur taking into account the strengths and weaknesses of each pupil in the complex mental network of the multiple intelligences. Understanding thus attained will permit pupils to apply it to new situations different from the original educational one, and even to new situations in their lives. That is, they will be able to transfer what they have learned because it has previously been understood and assimilated, and not just acquired in a mechanical way. This new view of the pupil who understands and transfers knowledge in accordance with his personally constructed set of mental representations or intelligences may lead to radical changes in education (Gardner, & Hatch, 1989).

c) Role of the teacher

If the image of the pupil changes, so should that of the teacher. And if the pupil, far from being interpreted in the classroom as a passive, reactive and dependent being, is seen as active, propositive and independent, the role of teachers should change in the same line because they are at the service of the pupil and her learning.

And this is indeed what happens in the educational context configured by MI. The teacher's role in this kind of classroom differs markedly from that of the teacher in the traditional classroom. In the traditional context, the teacher sits or stands facing the class, gives the lesson, writes on the board, asks the pupils questions and waits for them to finish their work. In the MI classroom, teachers, far from following a linear expositional script, are constantly changing their method of presentation, moving from the linguistic field to the musical one, from there to the logical-mathematical one, and so on successively with all the intelligences, combining them imaginatively. And more importantly, the teacher in MI offers her pupils direct experiences, which oblige them to get up and move around the classroom or to pass around some object so that the material in question comes to life; she might also ask her pupils to construct something tangible so as to reveal their understanding of the topic. The teacher favours cooperative learning by encouraging her pupils to interact in different ways (in pairs, in small groups, in large groups). But she does not forget the rhythm, the pace and the personal conditions of each pupil. With this in mind she plans to allow sufficient time for pupils to reflect, to do tasks at their own pace or to relate their experiences to the material being studied (Armstrong, 1994).



Teachers have traditionally been interested in assessing *what* children learn, and not *how* they learn. Focusing on how they learn gives the child a comprehension-based approach to teaching and learning. Children are actively involved in their learning, and work closely with their peers and their teachers to make decisions and solve problems. Thus, according to Gardner (1999), teachers' tasks would be dual, and present a dual challenge. The first is to make pupils understand the great monument to humanity constituted by the traditional disciplines and the forms of learning that have emerged throughout the years. And the second is to help pupils take an active role in deciding how to attain this understanding given their intellectual strengths and weaknesses and their own role at this point in history.

The new role of the teacher, and his power, for good or ill, are represented by what Gardner (1993) calls a "crystallizing experience", consisting in a strong affective reaction by the child to a pleasant situation that makes a profound impact on her, as was the case of the musician Yehudi Menuhin when, as a child, he heard the first violinist in a concert. His reaction was to want to be like him someday. But there is also the "paralyzing experience", when children observe unpleasant, unfair or upsetting behaviours and attitudes.

d) Learning mechanisms

Three fundamental ideas, among others, appear to pervade Gardner's theory in relation to learning. First, Gardner (1999) believes children have a propensity for learning and problem-solving in particular ways, in accordance with their specific intelligences. And this fits in with the natural motivation or inclination they display towards specific or preferred types of learning. But secondly, he stressed the importance of culture and environment, and how both educate the manner of learning in a predisposed child. This aspect of Gardner's model is in line with the proposals of Vygotsky (1978) that the child develops in the social context in which he lives. And thirdly, if the child is allowed to concentrate on the strengths and abilities corresponding to his intellectual make-up, he is being provided with the motivation and opportunity to learn most suitable and favourable for children's learning. Gardner thus views learning through his multiple intelligences model. His is a pluralist view of learning because it recognizes that each person has different cognitive strengths and weaknesses.

How does this set of transformations involved in learning in the context of multiple intelligences occur? To answer this question it is necessary to consider a series of terms current in the field of education and psychology that explain this learning process from the inside and highlight the complementariness of two theories, that of Vygotsky (1978) and that of Gardner (1983), which are mutually enriching.

Zone of proximal development. Vygotsky's conceptualization of learning in social situations is reflected in his well known model of zone of proximal development (ZPD). He defines the ZPD as the distance between current level of development – as determined by the independent solution of problems – and the potential level of development – as determined by the solution of problems under adult guidance or in collaboration with more capable peers (Lloyd & Fernyhough, 1999). Gardner has stressed the relevance of having knowledge of the initial spectrum of intelligences and abilities of each child before learning, and above all, the potential strengths for her future development. Likewise, he has acknowledged the power of the educational context as a catalyst and consolidator of the child's natural tendencies and the shaping role played by classmates.

Scaffolding. This idea of Bruner's has been extended and developed by many other authors. Tharp and Galimore (1988) define scaffolding not as a simplification of the task, but as the *simplification of the child's role* in the task through the assistance of an expert or adult. Some examples of scaffolding are the classic *shaping* or dividing the task into smaller units. Through the process of shaping, the child is at first able to carry out the task with help, and then to do it alone. Gardner believes that teachers tend to teach children in the way they best learn themselves. This can also be applied to children. Working together, children will have the opportunity to gain more skills and will learn new ways of understanding our world.

Intersubjectivity. An important learning concept related to that of the ZPD is intersubjectivity: shared understanding, based on a common focus of attention and common goal between a child and a more competent person. Intersubjectivity can occur between two children when they understand the process in their work and the goal to which they are working. When there is such a focus of attention, children are able to expand their existing knowledge and apply it to new situations or activities.



Children learn not only from previous experiences but also from one another. When there is subjectivity between a child and an adult, learning is reciprocal: the child can affect the adult's behaviour just as the adult's behaviour can affect the child's.

Process of internalization. Vygotsky proposes that a process of internalization begins when an operation, which initially represents an external activity, is reconstructed internally. Thus, each function in the child's development occurs twice: first at the social level (intermental) and second at the psychological level (intra-mental). When a child is learning something for the first time she is at the social level (intermental). As the child has more and more experiences she will begin to understand the social significance of the culturally mediated action. The process of internalization in a child is the result of a long series of developmental events. This may affect the way children learn. But one of the ways of explaining these events that favour the internalization process is that offered by Gardner through the concept of multiple intelligences.

e) Instructional model

There has always been – though more so in the last few years – a generalized concern about the quality of education, and hence the proliferation of proposals for reform of the system that range from the most moderate to the most radical. But underlying such calls for educational reform are two different philosophies. One, classical, is based on the belief that intelligence is an innate, general and relatively unchangeable feature that can be precisely quantified (even though modern psychometricists do accept the existence of a set of capacities strongly related among themselves). On the basis of this view it is attempted to attain academic excellence through the establishment of uniform norms, and recommended that all children learn the same material in an identical way. The other philosophy, based on the developmental cognitive theory advocated by Gardner, seeks to achieve academic excellence by adapting the programme to the pupils' different abilities and ways of learning. But if education focuses on the few abilities revealed in pencil-and-paper tests, many children will be condemned to years of frustration and disillusionment, if not indeed to resounding failure.

But Gardner has never wanted to associate his theory with a particular teaching system. His point of view is

psychological, though he is aware that many educators have accepted his postulates and attempted to apply them in their classrooms. When asked how to put his theory into practice he has confined himself to indicating that the most important aspects of the teacher's work are to take individual differences seriously, focus his interest on the pupils and ensure that they use their mind well.

Gardner, moreover, has absorbed influences from prestigious educators and experts such as Montessori and Decroly, which have contributed to shaping his views on education. With Decroly (1906) he coincides, for example, in the value he attributes to discipline and the maintenance of norms, self-help systems and the capacity for personal and collective self-government, the observation of nature and the responsibility of parents. Many of the instruments developed for the evaluation and training of cognitive abilities in Project Spectrum have their antecedents in the methodology of Decroly; Gardner also coincides with Montessori (1932) in defending pupils' spontaneity, in the belief that development is idiosyncratic for each one, and in giving great importance to the classroom environment and to the creation of rich and evocative learning materials, with a view to cultivating and perfecting the activity of the senses.

Since teachers need more specific guidelines, their imagination, stimulated by some of Gardner's ideas, has produced different criteria, models and formats with the aim of translating into action the spirit of this new educational movement. As classic authors, sometimes endorsed with a foreword by Gardner, we might cite Lazear (2003) and Armstrong (1994). Gardner's conception of the school takes its inspiration from two main models of reference:

1. Science museums, in which there is an adequate manual context, a marked interdisciplinary character and a systematic basis of enquiry.
2. Artisanal social learning, which guarantees learning based on shaping, motivational and with high possibilities of success.

The school day in this type of school is divided in two halves. In the morning pupils work on traditional subjects, not in the traditional way, but in the form of projects, and with focus on the eight intelligences. In the afternoon the pupils go out into the community, where they broaden and strengthen their understanding, working with experts in schools, museums and educational institutions created by the community for this purpose.



Three types of professionals work in the school:

1. The *psychologist*, whose tasks include diagnosing the intellectual strengths and weaknesses of each pupil and their priority interests in each field, with a view to helping teachers and pupils in their teaching-learning tasks. In order to do their work properly the psychologists should keep detailed records of the school experience of each pupil, with observations, periodic assessments and systematic gathering of information.
2. The *expert in curriculum* serves as a bridge between the pupil's abilities in the multiple intelligences and the resources of the school. The task of these professionals consists in allocating pupils to the appropriate courses and informing teachers about how to approach each pupil so as to capitalize on their strengths and maximize their learning potential.
3. The *expert in social resources* is the link between the school and the community. Her work involves relating the pupils' intellectual tendencies with the resources created by the corresponding community or region. For this purpose she should be well acquainted with both the personal conditions of the pupils and the learning resources outside the school, be they other schools, courses, workshops, or educational and cultural meetings or experiences.

The multiple intelligences school also includes other innovative educational features and initiatives, such as school extension projects, learning groups organized by preferences or "enrichment classrooms" that pupils can visit several times a week.

f) Assessment

Gardner's (1999) theory proposes, among other things, a fundamental restructuring of the way in which educational psychologists assess pupils' learning progress. It suggests a system that depends less on standardized, formal or norm-based tests and much more on authentic assessment or assessment in context. It is called authentic assessment because its tasks are similar to real-life tasks; it is called assessment in context because intelligence cannot be conceptualized out of context, since intelligence is always an interaction between a biological potential and a learning opportunity in a given cultural environment. This assessment serves, above all, to compare the pupil's performance with his own previous performances.

This conceptualization is coherent with Gardner's (1993) notion of distributed intelligence, whereby humans do not work intellectually using only the head (this recalls all too well the myth of Athena, goddess of wisdom, emerging from the head of Zeus), but rather use other corporal or technological media that help them to think, calculate or discern, and constitute their own intellectual architecture. All of this implies a new approach to assessment whose essential features are as follows: emphasis on assessment more than on examinations, use of neutral instruments with regard to intelligence, use of multiple measures, sensitivity towards individual differences and developmental levels, and use of motivational material.

Authentic assessment covers a wide range of instruments, measures and methods. The most important requirement is observation. Gardner (1983, 1999) has suggested that we can better evaluate students' multiple intelligences by observing them manipulating the symbolic systems of each intelligence. Observing pupils as they solve problems, for example, in natural contexts provides the best image of their competencies in the sphere of the topics taught in school. The second necessary component in the application of authentic assessment is the keeping of records on the student's productions and on the processes used in problem-solving. These records can be taken using some or all of various methods, including: the noting down of daily occurrences, interactions, samples of work, files or audio-cassettes.

The principle that should govern the chosen assessment system is that if children have different intelligences or forms of mental representation, then they have different ways of learning, and should therefore be assessed in accordance with them. Consequently, professionals should create a profile of intelligences for each one. If we know how they learn we shall be able to make informed decisions about what and how to teach each pupil and how best to assess their progress (Lazear, 2002).

Gardner (1999) reveals the shortcomings of some conventional forms of assessment and the dangers of the thinking habits rooted in them. Many of these forms are inadequate for measuring certain kinds of intelligence. Therefore, in collaboration with Feldman and Krechevsky (Gardner, Feldman & Krechevsky, 1998), he conceived a different assessment method, called Spectrum. There are also other, similar approaches, such as KEY School, Pifs Units, (practical intelligence in the school) or Arts PROPEL.

Gardner has warned of some risks, and even abuse, that can occur in relation to assessment. First of all, interest in an intelligence should not be confused with manifest ability in that intelligence. Another potential risk concerns the tendency to label children as “linguists”, “spatials”, etc. Labels can be stimulating, but equally they can be restrictive. Also to be avoided is the belief that everyone should receive the same treatment, that is, should study the same subjects, with the same methods and the same assessment system. At first sight this seems fair, but the injustice it involves soon becomes apparent – related to the mistaken idea that all of us are the same and that teaching reaches us all equally and in an equitable way. The reality is quite different, since we have different mentalities, different characters, and above all, different intelligences and ways of learning. We have to know each individual. And it is here that multiple intelligences function as a first-order organizing principle, as they represent the interests, strengths, weaknesses, preferences, learning styles and experiences of each student. Gardner even proposes going beyond MI, because it is necessary to continually

MULTIPLE INTELLIGENCES AND COUNSELLING

The theory of multiple intelligences may be of enormous help for educational counselling. First of all, it is extremely useful for drawing up a complete profile of the pupils’ intelligences, making possible the achievement of an ed-

ucational utopia, which is individualized teaching designs. Secondly, it offers psychologists a comprehensive map of each pupil’s strong and weak points that serves as a frame of reference in their direct contact with them. Thirdly, it provides children with a mirror that shows them their approximate image as students and the way in which, both at school and in general life, they can develop and exploit their strengths and compensate for their weaknesses. And finally, the profile of intelligences is a sufficiently objective instrument for considering pupils’ vocational and professional impulses, at least in the early stages of their decision process.

However, there is no “megatest” that can provide a diagnosis of students’ intelligences. The best way of diagnosing the intelligences is observation. This observation may be complemented by a type of questionnaire that serves as a guide for observation, or can even be completed by the students themselves.

A practical way of diagnosing students’ intelligences is to observe their “deviant behaviours” in class. For example, the strongly linguistic pupil will normally be talking without permission, the spatial child will be daydreaming, the interpersonal one will be socializing, the kinesthetic one moving around, and so on. These pupils are expressing metaphorically their way of learning through their deviant behaviours, and asking for these channels to be used if they are to achieve their potential in the most appropriate way.

TABLE 2
DIFFERENCES BETWEEN ASSESSMENT THROUGH STANDARDIZED TESTS AND AUTHENTIC ASSESSMENT

STANDARDIZED TESTS	AUTHENTIC ASSESSMENT
Reduce the child’s life to data and scores	Offers an image of the child as a student
Create norms that require failure by some	Offers settings in which the student can triumph
Emphasize tests with measurement based on scores	Offers an accurate and global framework of performance
Focus on errors and low grades	Highlights the strengths and weaknesses of each student
Emphasize data when making decisions	Offers multiple sources of assessment to observe progress
Treat students in a uniform way	Treats each student as a unique being
Judge the child without offering suggestions for improvement	Provides information useful for learning
Focus on the correct answer	Considers processes and products
Place students in artificial settings	Places students in natural settings
Generally prohibit student interaction	Favours cooperative learning

Another good way of assessing pupils' inclinations is to observe what they do in free time during classes, what they do when nobody tells them what they have to do. And what do pupils do when they are given a choice between different activities? The linguists might tend towards books, spatialists towards drawing, interpersonalists towards games in a group, and so on. It would be advantageous for psychologists to keep some kind of records of these choices in order to adjust their support to the intelligence styles of each student.

The most rigorous way, up to now, of assessing the multiple intelligences is that carried out within Project Spectrum, by a team headed by Gardner himself. Project Spectrum had two basic objectives: to broaden conceptions of the intellectual potential of small children and to provide practical techniques for assessing as many areas of potential as possible. It is true that the assessments were never intended to completely substitute standardized tests, but they can provide a complementary picture that reveals the most outstanding capacities of each child. The Spectrum assessments were designed to detect notable abilities and, to a lesser extent, dormant abilities, in a way that was comprehensible for parents, teachers and children, and to act on them. The idea was to help educators get to know their pupils better, acknowledging the great diversity of capacities present in the youngest ones, and to redesign curricula and teaching approaches. To this end, the project constructed 15 instruments related to the corresponding domains or classes of intelligence.

MULTIPLE INTELLIGENCES AND TECHNOLOGY

We live in a society in which technology has transformed all dimensions of human life – social, sporting, economic, scientific, and of course educational. But technology, despite its immense power, is not everything. Moreover, its power is merely instrumental, so that it should be at the service of educational objectives. But how? Gardner's theory invites us, indeed challenges us, to go beyond the available technologies and focus on the fact that it is a question of teaching children rather than of providing information. Teachers today have more choice than ever, but how can they identify the most appropriate media for a given learning task?

As with any teaching design, the starting point is the student (basic knowledge she brings to the class; technological skills she possesses; intelligences developed and

for developing, etc.) All this information helps teachers to adjust the lesson so as to place students at the level in which they are prepared for learning. The second consideration in the selection of media is the objective of the lesson (whether or not it is appropriate; what the teacher expects them to learn; way of structuring the lesson; form of measuring success). It is then necessary to consider the intelligences deemed important to develop in order to achieve this objective, that is, the intelligences to plan for with this aim in mind. Finally, teachers should consider which technologies are suited to these intelligences. In this way they will achieve the most suitable technologies for each lesson.

The psychoeducational approach can be improved considerably if in addition to the traditional media (paper, pencil, books and documents) we introduce new technologies. Today there are sufficient technological media to offer individualized services to teachers and to learners. We can design computer programs aimed at specific intelligences that provide access routes, permit students to demonstrate their own comprehension using different mental representations (linguistic, numerical, musical, etc.) and help teachers to assess students' work in a rapid and flexible way.

The history of teaching designs is linked, in part, to the use of technology (projectors, conference rooms, films, telephone, television and computers). Gardner (1999) notes that the technologies appear to be made to measure for MI. But this is by no means guaranteed. Many technologies have disappeared, and others have been wrongly employed, such as in the Holocaust. And no educational approach should be based on purely instrumental aspects: the purpose of education is to improve comprehension. However, this comprehension can be employed in many different ways. Physics can be used to build bridges or to produce bombs – and this applies to all types of knowledge. The goal is for students to understand the world better, not to satisfy their curiosity, but to contribute to making it a better place.

The only way of determining which intelligences are stimulated by a technology is to observe the task that the technology is being employed to complete. The technology itself is not a teaching goal; it is merely an instrument to help achieve the goal. It is the process of instruction corresponding to the learning objective that reveals the true nature of any technology and its relationship to the intelligences.



MULTIPLE INTELLIGENCES AND PSYCHOLOGICAL INTERVENTION

Gardner's theory also has numerous implications in the field of special education. First of all, it contributes to contextualizing this education within a much broader area than that opened up by classical intelligence: that of multiple intelligences, which identifies the strengths and weaknesses of all human beings. According to this theory, we all have some deficiencies and some strengths within our intellectual repertoire. Therefore, children with some deficiencies are no longer marginalized, labelled, but rather, like the rest, have strengths and weaknesses distributed across the whole intellectual spectrum.

Secondly, if we all have strengths and weaknesses, Gardner's theory makes it possible to change the traditional educational paradigm focused on deficit for one focused on growth or development. It is educationally much more advantageous for all students if attention at school is concentrated not on what each one lacks, but rather on that which is valuable in each one, since this highlights the possibilities of each child for the future.

This new paradigm does not conceal the reality; it acknowledges weaknesses or deficiencies, but it does so within a context that considers pupils with special needs as basically healthy people. Indeed, on diagnosing all the pupils in a school, learning difficulties can appear in any of the seven intelligences. And these deficits are often present in a relatively independent way in the midst of other dimensions of the individual's learning profile which are more or less intact and healthy.

An interesting strategy for intervention in special education in this context is to study the biography of eminent persons from history who have struggled against difficulties of one kind or another. Such study can provide examples of people with all kinds of special needs who are also exceptionally gifted in one or more of the eight intelligences. The MI theory is an excellent context in which to talk about such persons and apply an understanding of their situation to the lives of pupils who have to deal with similar problems.

The theory suggests many strategies for planning the special education of children with difficulties or deficiencies. First of all, it is convenient to have a diagnosis of the eight intelligences with a detailed description of strengths and weaknesses distributed across the intelligences spectrum.

Once the diagnosis has been made it is necessary to

design an individualized plan that takes into account the specific characteristics of the pupil and permits maximum development of her abilities. This is the openness of possibilities provided by the theory of seeking positive channels through which pupils can learn to handle their difficulties. Educators who see the difficulties within the framework of the seven intelligences will observe that they occur only in a part of pupils' lives. Thus, they can concentrate their attention on the strong points of special needs pupils as a prerequisite for developing appropriate helping strategies. The Pygmalion effect is well known as an illustration of the influence on a person's success of the way she is seen by her educators.

Educators should also keep a watchful eye on the strengths of MI in the lives of pupils with difficulties in school. This is a highly effective strategy because it can reveal positive solutions to their special needs. That is, pupils who due to one type of difficulty or another are not having much success in certain fields of intelligence can get around the obstacles in their way. This they can do by using alternative routes that take advantage of their more developed intelligences (Gardner 1983). The best examples are Braille for people with visual problems and sign language for those with hearing difficulties; in either case people have taken advantage of alternative symbolic systems of intelligence.

But the implications of Gardner's theory go well beyond mere corrective strategies and interventions. If the theory is appropriately applied many positive effects will be achieved, including improved performance and self-concept in students, greater work satisfaction in teachers and better understanding and appreciation from classmates.

FINAL COMMENTS

Gardner's theory contributes a series of original and interesting analyses that help to clarify some important variables in the Psychology of Education. For example, it offers valid solutions to the two great dilemmas of education today, the *what* and the *how*, proposing two strategies of undoubted practical value, thematic selection and in-depth comprehension, with the use of multiple intelligences as an appropriate categorization tool. The student's image has been thrown into the spotlight more than by any previous theory: students are active, independent, propositive, and endowed with eight important potentials, thanks to which they can comprehend reality



in many and different idiosyncratic ways. Teachers' role has been enhanced – and not before time –, on their being understood not so much as mere routine presenters of information but rather as what they really are: discoverers of intelligences, facilitators of learning and catalysts of crystallizing experiences throughout the process of the student's growth and maturation.

Within the learning process, the perspective of the theory of multiple intelligences clearly and practically reveals the mechanisms of scaffolding and the interiorization and negotiation of meaning that permit the student's understanding and the acquisition of the mentality corresponding to a biologist, historian, poet or mathematician. Gardner presents no specific educational model, but the central shafts of the approach he endorses are individualized teaching design, contact with life and the solutions our ancestors have found to their problems, and collaborative learning. For Gardner, assessment only makes sense within a context, with material that is familiar to and motivating for the student, and with authentic tasks close to those of real life. Finally, Gardner stresses as crucial: the diagnosis of the intelligences from an early age with instruments that permit identification of the personalized profile of each student with its corresponding map of strengths and weaknesses; the use of new technologies as cognitive instruments that contribute to the development of multiple intelligences; and the demand for a radical change in the model of special education, which should shift from focusing on deficits to focusing on growth.

Talking about a theory after twenty years means that the theory in question has managed to resist the sternest judge of all, which is time. And if this occurs in the field of psychology, and in a 21st century in which ideas are changing at an unprecedented pace, such resistance has even greater value. Clearly, as shown in the present article, Gardner's theory has some less attractive aspects or weak points. But it must also be acknowledged as one of the psychological theories that has had most influence on education in recent years. Its message has had a profound impact on the world of teaching, and has led to changes in many of the psychological principles applied there. It suffices to glance at all the editorials, journals or archives of doctoral theses on it to realize just how clearly Gardner's message has been received.

Gardner has been harshly criticized by many psychologists, but he has received the applause of many others

and of the majority of educators. Doubters would do well to attend one of the summer courses on Thinking, organized for the last 15 years or more by psychologists from the top US universities, including Harvard and Yale, and watch Gardner address more than 20,000 psychologists and educators, explaining his theory and how to improve education through it.

Rarely has a psychological theory penetrated so deeply into the very architecture of education as this one. In any case, and whatever the fate of this approach in the future, maybe one day many students, psychologists and teachers will thank Gardner for his intelligent psychological insight into education.

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