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# Implications and applications of multiple intelligences theory in second language education: A review

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This article summarizes the implications and applications of multiple intelligences theory in second language education as a general landscape to develop in teachers and learners new modalities that were present but rarely considered in most of educational contexts. This is a bibliographical research based on the analysis of theorists in brain areas as well as educational fields. This paper is to describe and analyze the conclusions obtained by experts when presenting their hypotheses on the relationship between brain and language learning. It considers the communicative and eclectic approaches and the present tendencies used in the classrooms to create an environment where the learners can develop all the abilities to communicate accurately and fluently in other languages. The triune brain and the theories of Gardner and Beauport as well as the Twelve Principles of Mind/Brain of Caine and Caine represent the theoretical supports to organize the frame of this research.

**Key words:** Split brain, triune brain, multiple intelligences, second language education, and learning.

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## INTRODUCTION

Some scientists and educators think it is too soon to apply brain research to the classroom, because we do not know enough yet. The field is so new, they say, and the discoveries in many cases are so narrow in their focus, that we run the risk of making false assumptions and perhaps even dangerous applications (Wolf, 2001).

On second thoughts, it would be regretful to wait until all these hypotheses were demonstrated carefully to start applying them, in a coherent and logical way, based on some professional criteria and experience obtained through the years. However, it is very helpful to study how the brain works in order to know the implications for teaching and learning of the specific studies about how the brain is involved, specifically, in the process of learning a second language.

The late 80s was characterized by a considerable number of researches and the split brain theory was one

of the most important models. These researches allowed the interpretation and analysis as well as the relationship between the two brain hemispheres. In areas like education and psychology a proposal of systems of multiple intelligences has been derived that reaffirm the globality of the learning process. At the same time, many articles and materials were written and designed to develop the creativity in areas related to knowledge. This shows the influence of scientific studies on the field of education.

Beauport (1994) states that rational thought is going through big difficulties in modern societies and the answer to this is not retrospection to the past, on the contrary, it can be inferred that the new flowing paradigm in all the aspects of human life requires new and improved methods to make societies evolve, where, of course, education is not far from this landscape.

Science, specifically neurology, has given important contributions, such as studies about the brain, its functions and the multiple intelligences theory to improve the learning process. These contributions have opened

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possibilities to incorporate new teaching methods in second language education, based on the abilities everybody has and the importance of adaptation of activities and tasks in order to fulfill the objectives.

Taking into account the wholeness that is shown in the acquisition of a foreign language, the multiple intelligences theory represents an outlook towards the globalization of the learning process and the necessity of curricular changes based on individualities. Creativity, motivation, affection and intuition are some of the aspects to be reinforced in the students as well as in the teachers, by means of the expansion of activities that develop the skills that are not stimulated in other ways.

This paper is a general overview about the implications and applications of multiple intelligences theory in second language education. It will be helpful for teachers as well as students. Teachers can find out what ways of thinking are appropriate to study a particular subject; besides, they could detect the most used modalities by the learners and use materials and exercises that stimulate the least used techniques when studying. Learners can identify how they face a problem, how they react, how they can develop other techniques of study, so that the success will be guaranteed in determining the ability to switch from a system to another when necessary.

## MULTIPLE INTELLIGENCES THEORY

Roger Sperry in 1981 won the Nobel Prize in Medicine for his discoveries concerning the functional specialization of the cerebral hemispheres. He found that the human brain has specialized functions to human intelligence, and that the two sides can operate practically independently.

MacLean (in Beauport, 1996) goes beyond and proposes that the brain includes three different structures which fulfill three different structural functions: the neocortical system of thought and image, the limbic system located below the neocortex that enables us to desire and to feel, and under both of these, a third R-complex structure related to behavior (Beauport, 1996), this is what is known as Triune Brain. MacLean (1990) stated that each one of these systems owns a special intelligence, its own subjectivity, its own time and space sense, its own memory, its own motional function.

Regarding language, Reid (1987, quoted by Lightbown and Spada, 1993) studies the interaction among the different learning styles and the success in the acquisition of a second language, he concludes by saying that is convenient to cheer up students use all the available styles without telling them the one they use is inappropriate.

On the contrary, the whole group will take advantage of this recognition since the teacher will identify how to focus a particular topic and teach it better and at the same time the predominant styles in the classroom will

be easily identifiable to prepare the materials, adapt them according to the level of the students and their needs and try to make exercises to stimulate the less used styles. When the students come into the classroom with different sets of developed intelligences it will be determined how easy or difficult it is for a student to learn information when it is presented in a particular manner. Therefore, it is impossible, as well as impractical, for a teacher to accommodate every class to all of the learning styles found in the classroom.

## THE INTELLIGENCES ACCORDING TO GARDNER

Gardner in 1983 proposed a theory about multiple intelligences. He has questioned the idea that intelligence is a single entity, that it results from a single factor, and that it can be measured simply via IQ tests. He viewed intelligence as 'the capacity to solve problems or to fashion products that are valued in one or more cultural setting' (Gardner and Hatch, 1989:43). Using biological as well as cultural research, he formulated a list of seven intelligences and subsequently added an eighth one.

**1. Linguistic intelligence** involves sensitivity to spoken and written language, the ability to learn languages, and the capacity to use language to accomplish certain goals. This intelligence includes the ability to effectively use language to express oneself rhetorically or poetically; and language as a means to remember information. Writers, poets, lawyers and speakers are among those that Howard Gardner sees as having high linguistic intelligence. To develop this ability, Christison (1998) proposes the creation of a rich environment; by providing things to look at, listen to, and write about, and the creation of many opportunities for interaction among students and between the teacher and the students.

**2. Logical-mathematical intelligence** consists of the capacity to analyze problems logically, carry out mathematical operations, and investigate issues scientifically. Gardner (1993) says it entails the ability to detect patterns, reason deductively and think logically. This intelligence is most often associated with scientific and mathematical thinking. To develop this ability, Christison (1998) proposes the use of manipulative for experimentation with numbers and the use of simple machines or computer programs to help children think about cause and effect.

**3. Musical intelligence** involves skill in the performance, composition, and appreciation of musical patterns. It encompasses the capacity to recognize and compose musical pitches, tones, and rhythms. According to Gardner (1993), musical intelligence runs in an almost structural parallel to linguistic intelligence. To develop this ability, Christison (1998) proposes the use of tape recorders for listening, singing along, and learning new

songs.

**4. Bodily-kinesthetic intelligence** entails the potential of using one's whole body or parts of the body to solve problems. It is the ability to use mental abilities to coordinate bodily movements. Gardner (1993) sees mental and physical activity as related. To develop this ability, Christison (1998) proposes to give opportunities for physical challenges during second/foreign language lesson.

**5. Spatial intelligence** involves the potential to recognize and use the patterns of wide space and more confined areas. It is the ability to sense form, space, color, line, and shape. Christison (1998) proposes the use of visual mapping activities and the encouragement of students to vary the arrangements of materials in space, such as by creating charts and bulletin boards.

**6. Interpersonal intelligence** is concerned with the capacity to understand the intentions, motivations and desires of other people. It allows people to work effectively with others. Educators, salespeople, religious and political leaders and counselors all need a well-developed interpersonal intelligence. Christison (1998) suggests the use of some activities that involve students in solving problems and resolving conflict.

**7. Intrapersonal intelligence** entails the capacity to understand oneself, to appreciate one's feelings, fears and motivations. In Howard Gardner's view (1993), it involves having an effective working model of ourselves, and to be able to use such information to regulate our lives. To develop this ability, Christison (1998) proposes teachers to let students express their own preferences and help them understand their own styles of learning.

**8. Naturalist intelligence** enables human beings to recognize, categorize and draw upon certain features of the environment. It combines a description of the core ability with a characterization of the role that many cultures value (Gardner, 1993). It is the ability to recognize and classify plants, minerals and animals including rocks and grass, and all variety of flora and fauna (Christison, 1998). To develop this ability, Christison (1998) proposes to focus students' attention on the world outside the classroom.

Later on, in 1999 Howard Gardner added, after a great deal of discussion, other possible candidates in the intelligence inventory. Some particular possibilities are: a spiritual intelligence, an existential intelligence and a moral intelligence.

**9. Spiritual intelligence** is related to any discussion of the spirit-whether cast as spiritual life, spiritual capacity, spiritual feeling, or a gift for religion, mysticism or the transcended - is controversial within the sciences, if not throughout the academic world.

**10. Existential intelligence** is the capacity to locate oneself with respect to the furthest reaches of the cosmos and the related capacity to locate oneself with respect to such existential features of the human

condition as the significance of life, the meaning of death, the ultimate fate of the physical and the psychological worlds. It can also be defined as the ability to be sensitive to, or have the capacity for, conceptualizing or tackling deeper or larger questions about human existence, such as the meaning of life, why we are born, why we die, what is consciousness, or how we got here.

**11.** The final, and obvious, candidate for inclusion in Howard Gardner's list is **moral intelligence**. In his exploration, he begins by asking whether it is possible to delineate the 'moral domain'. He suggests that it is difficult to come to any consensual definition, but argues that it is possible to come to an understanding that takes exploration forward. Central to a moral domain, Gardner suggests, 'is a concern with those rules, behaviors and attitudes that govern the sanctity of life - in particular, the sanctity of human life and, in many cases, the sanctity of any other living creatures and the world they inhabit' (Gardner, 1999:70). If we accept the existence of a moral realm is it then possible to speak of moral intelligence? If it 'connotes the adoption of any specific moral code' then Howard Gardner does not find the term moral intelligence acceptable (Gardner, 1999:75). Furthermore, he argues, researchers and writers have not as yet 'captured the essence of the moral domain as an instance of human intelligence' (Gardner, 1999:76).

## THE INTELLIGENCES ACCORDING TO BEAUPORT

Beauport (1994) became interested in the emerging scientific work on how the right and left hemispheres of the brain give rise to different modes of learning. With further study, she became aware that there was more to the brain than the left and right hemispheres, that it was full of structures an extraordinary complex of systems and she reasoned these systems must have deep effects on the way humans learn and the way they behave.

MacLean (1990) and his research about the triune brain as well as Sperry's studies (in Beauport, 1996) made her propose a multiple intelligences model. In Beauport's view, MacLean's physiological model of the brain has provided at least part of a psychological model by which we can better understand our behavior.

Beauport (1996) goes beyond Gardner's theory and proposes a model of intelligences based on Sperry's and MacLean's studies as well as Einstein's conception of energy. Her model proposes ten intelligences without closing the possibility to develop other intelligences.

To Beauport (1994), intelligence is defined as a series of frequencies that let us express thoughts, images, associations, intuitions, feeling affects moods and motivations and act patterns, parameters, values. Having the possibility of knowing, feeling and acting these vibrations, we could easily swift from an intelligence to

another to obtain positive results.

#### **a) The mental intelligences of the neocortex**

**i) Rational intelligence:** The process by which we perceive information through sequential connections, involving primarily the use of reason, logic, cause and effect.

**ii) Associate intelligence:** The process that allows us to perceive information through multiple connections, involving primarily the use of juxtaposition, association, and relationship.

**iii) Spatial intelligence:** The process of perceiving information at a deeper level, synthesized sometimes into images, sometimes into sounds, or other combinations received from the senses and deeper brain systems.

**iv) Intuitive intelligence:** Direct knowledge without the use of reason; knowing from within.

#### **b) The emotional intelligences of the limbic brain**

**i) Affectional intelligence:** The process of being affected by something or someone; developing the ability of closeness with a person, place, object, idea or situation.

**ii) Mood intelligence:** The ability to enter into, hold with, and shift from any mood, whether the experience feels painful or pleasurable.

**iii) Motivational intelligence:** being aware of our desires and knowing what excites us moves us the most; the ability to guide our life in relation to what we love.

#### **c) The behavioral intelligences of the basic brain**

**i) Basic intelligence:** The ability to move ourselves toward or away from; being able to imitate or inhibit anything or anyone on behalf of our own life or the lives of the others.

**ii) Pattern intelligence:** the ability to know the patterns governing our behavior and being able to alter them when necessary.

**iii) Parameter intelligence:** The ability to recognize, extend, or transform the rhythms, routines, and rituals of our life.

### **APPLYING MULTIPLE INTELLIGENCES THEORY**

Accepting Gardner's theory of Multiple Intelligences, it has several implications for teachers in terms of classroom instruction; the theory states that all the intelligences are needed to productively function in society (Brunaldi, 1996). Teachers, therefore, should think of all intelligences as equally important. This is in great contrast to traditional second language education systems which typically place a strong emphasis on the

development and use of verbal and rational. Thus, the theory implies that educators should recognize and teach to a broader range of talents and skills.

Another implication is that the teachers should structure the presentation of material in a style which engages most of all of the intelligences. For instance, when teaching about any specific language, maps could be easily used, as well as songs, organizing role plays of some typical situations in any country in that way the teacher can have the students read a short novel of a famous author in that country. This kind of presentation not only excites students about learning, but it also allows a teacher to reinforce the same material in a variety of ways. By activating a wide assortment of intelligences, teaching in this manner can facilitate a deeper understanding of the subject material.

Rather than functioning as a prescribed teaching method, curriculum, or technique, multiple intelligences theory provides a way of understanding intelligence, which teachers can use as a guide for developing classroom activities that address multiple ways of learning and knowing (Christison, 1999).

Teaching strategies informed by multiple intelligences theory can transfer some control from teacher to learners by giving students choices in the way they will learn and demonstrate their learning. By focusing on problem-solving activities that draw on multiple intelligences, these teaching strategies encourage learners to build on existing strengths and knowledge to learn content and skills (Kallenbach, 1999).

It may also mean that second language learners who have had little success in traditional classrooms where only linguistic and mathematics skills are valued may experience more success when other intelligences are tapped. Broadly speaking, teachers have developed four ways of using multiple intelligences theory in the classroom:

**i)** As a tool to help students develop a better understanding and appreciation of their own strengths and learning preferences (Christison, 1999).

Teachers may adapt the language and accompanying activities to suit the needs of the language learners in their classes. Word finds, pair dictations, dictionary and spelling work, focused listening, and grammar activities can help learners become comfortable with the inventory language even while they are engaged in skills work.

**ii)** As a tool to develop a better understanding of learners' intelligences. An understanding of multiple intelligences theory broadens teachers' awareness of their students' knowledge and skills and enables them to look at each student from the perspective of strengths and potential (Christison, 1999).

Teachers also become aware of the different ways in which students may demonstrate their understanding of material. Multiple intelligence theory provides a structured

way of understanding and addressing the diversity that English as Second Language (ESL) instructors often encounter in the classroom (Christison, 1996). On a given topic or skill, teachers can brainstorm with learners a list of activities to practice.

**iii)** As a guide to provide a greater variety of ways for students to learn and to demonstrate their learning. Identification of personal strengths can make students more receptive to nontraditional learning activities and can give students a successful experience that builds their confidence as learners. As learners and teachers work together, intelligences can emerge naturally through partner interviews, preference grids, and needs assessments (Christison, 1999). However, some teachers have encountered at least initial resistance to this process of describing intelligences among students whose cultural or educational backgrounds emphasize more traditional modes of teaching and learning (Costanzo and Paxton, 1999). In this case, teachers may choose to focus learners' attention on the language they are practicing through these activities rather than on the theory.

Teachers have noted other positive effects of applying multiple intelligences theory. A curriculum informed by multiple intelligences theory provides a way of handling differing language skill levels within one class—a very common situation in adult ESL classes (Costanzo and Paxton, 1999). When multiple activities are available, more students can find ways to participate and take advantage of language acquisition opportunities.

With a multiple intelligences curriculum, students become aware that different people have different strengths and that each person has a substantive contribution to make (Kallenbach, 1999). This fits in well with project-based learning where students in a group can divide tasks based on individual strengths. For example, one learner might feel confident about planning, another might prefer to do the writing, and a third might feel able to present the project to the whole class.

**iv)** As a guide to develop lesson plans that address the full range of learner needs. Multiple intelligences informed reading lesson, for instance, may begin with typical pre-reading activities followed by silent reading or reading aloud with discussion of vocabulary and text meaning (Christison, 1999). Learners can then complete a project, individually or in groups, to demonstrate their understanding of the text. The teacher offers a choice of projects, such as descriptive writing, map drawing, illustration, dialogue or skit, making a timeline, song writing, and retelling. The objective is not to teach to specific intelligences or to correlate intelligences with specific activities, but rather to allow learners to employ their preferred ways of processing and communicating new information (Coustan and Rocka, 1999).

Teachers using this type of lesson report that students become more engaged in and enthusiastic about reading;

the students gain greater understanding of material when they express what they have read in ways that are comfortable for them; and their reading strategies improve as reading becomes a tool for completion of projects they are interested in (Coustan and Rocka, 1999).

## **TWELVE PRINCIPLES OF BRAIN/MIND LEARNING**

Caine and Caine (1994) discussed how all learning is social and emotional, evidenced in the implications of scientific brain research. Today the Caines work to understand how young adults learn. To do this, they have synthesized brain research; they have studied, explored, summarized and reviewed new breakthroughs in this research and distilled it into a set of twelve principles that apply to every child.

The learner is part of a self-organizing whole that constantly interacts on multiple levels with his or her environment. More and more studies of the brain reveal that the emotional caliber of a classroom in a school is a critical theme. If we want the children to improve their grades and scores, we have to get at the culture of the schools and shift away from holding individual students or teachers' responsible (Caine and Caine, 1994).

Through this approach, it is important to take into account rich experience motivating to the learners. Teachers need to make sure that the process of these experiences will be done in such a way that the meaningfulness will be extracted to fulfill learning, in this way, the information will be relevant and interesting to the learners. Caine and Caine (1994) suggested twelve principles that encompass multiple intelligences theory and its use in the classroom.

### **i) Principle one: The brain is a complex adaptive system**

Perhaps the most potent feature of the brain is its capacity to function on many levels and in many ways simultaneously. That is one reason why we have here subsumed two former principles. Thoughts, emotions, imagination, predispositions and physiology operate concurrently and interactively as the entire system interacts with and exchanges information with its environment. Moreover, there are emergent properties of the brain as a whole system that cannot be recognized nor understood when the parts alone are explored. Education must come to terms with the complex, multifaceted nature of the human learner. (Caine and Caine 1994).

### **ii) Principle two: The brain/mind is social**

We begin to be shaped as our immensely receptive

brain/minds interact with our early environment and interpersonal relationships. Vygotsky (quoted by Caine and Caine, 1994) was partially responsible for bringing the social construction of knowledge to our awareness. It is through this dynamic interaction with others that therapy works, for instance. It is now clear that throughout our lives, our brain/minds change in response to their engagement with others - so much so that individuals must always be seen to be integral parts of larger social systems. Indeed, part of our identity depends on establishing community and finding ways to belong. Learning, therefore, is profoundly influenced by the nature of the social relationships within which people find themselves (Caine and Caine, 1994).

### **iii) Principle three: The search for meaning is innate**

In general terms, the search for meaning refers to making sense of our experiences. This is survival-oriented and basic to the human brain/mind. While the ways in which we make sense of our experience change over time, the central drive to do so is lifelong. At its core the search for meaning is purpose and value driven. Included are such basic questions as "who am I?" and "why am I here?" Thus, the search for meaning ranges from the need to eat and find safety, through the development of relationships and a sense of identity, to an exploration of our potential and the quest for transcendence (Caine and Caine, 1994).

In a second language education classroom this principle has been reinforced through the communicative approach. The teacher doesn't give the information directly. The learners have the possibility to infer, deduce, and give meaning. The teacher always wants the learners to look for the relationship between the new knowledge with the knowledge they already have. Reading and vocabulary learning are two important aspects where this principle occurs mostly.

### **iv) Principle four: The search for meaning occurs through "patterning"**

In patterning we include schematic maps and categories, both acquired and innate. The brain/mind needs and automatically registers the familiar while simultaneously searching for and responding to novel stimuli. In a way, therefore, the brain/mind is both scientist and artist, attempting to discern and understand patterns as they occur and giving expression to unique and creative patterns of its own. It resists having meaninglessness imposed on it. By meaninglessness we mean isolated pieces of information unrelated to what makes sense to a particular learner. Really effective education must give learners an opportunity to formulate their own patterns of understanding (Caine and Caine, 1994). The learner is helped to organize grammatical structures,

remember information to find and classify by categories, groups. The language teachers should use this principle to help students create - search their own organization patterns or give them pathways to help them integrate the new knowledge. The learners can transfer reading strategies or develop them.

### **v) Principle five: Emotions are critical to patterning.**

What we learn is influenced and organized by emotions and mindsets involving expectancy, personal biases and prejudices, self-esteem and the need for social interaction. Emotions and thoughts literally shape each other and cannot be separated. Emotions color meaning. Moreover, the emotional impact of any lesson or life experience may continue to reverberate long after the specific event that triggers it. Hence an appropriate emotional climate is indispensable to sound education (Caine and Caine, 1994).

It is not convenient to force students participate when they feel they are not ready. This principle supports the silent period proposed by Krashen (1983) in his language acquisition theory as an aspect to respect students' emotions.

### **vi) Principle six: Every brain simultaneously perceives and creates parts and wholes**

Although there is some truth to the "left-brain right-brain" distinction, that is not the whole story. In a healthy person, both hemispheres interact in every activity, from art and computing to sales and accounting. The "two brain" doctrine is most useful for reminding us that the brain reduces information into parts and perceives holistically at the same time. Good training and education recognize this, for instance, by introducing natural "global" projects and ideas from the very beginning (Caine and Caine 1994).

Language is located in the left hemisphere; however, aspects such as rhythm, intonations and other supra-segmental structures are located in the right hemisphere. A sentence can have one or more meanings, so learning isolated vocabulary is even harder to learn than a contextualized one. The communicative activities aim at the search of information (information gap), what implies that the suggested activities include various senses (limbic brain), as well as visual – spatial associate, intuitive and rational intelligences (neocortex), besides, the learner decides when to participate and how to move with the information he/she owns (reptile)

### **vii) Principle seven: Learning involves both focused attention and peripheral perception**

The brain absorbs information of which it is directly

aware, but it also directly absorbs information that lies beyond the immediate focus of attention. In fact it responds to the larger sensory context in which teaching and communication occur. "Peripheral signals" are extremely potent. Even the unconscious signals that reveal our own inner attitudes and beliefs have a powerful impact on students. Educators, therefore, can and should pay extensive attention to all facets of the educational environment. (Caine and Caine, 1994)

The brain responds simultaneously to the use of diagrams, charts, illustrations, pictures as well as music, the classroom's temperature, the teacher's gestures or the learners'. It is recommendable to decorate the classroom for language learning using realia, maps when possible.

#### **viii) Principle eight: Learning always involves conscious and unconscious processes**

One aspect of consciousness is awareness. Much of our learning is unconscious in that experience and sensory input is processed below the level of awareness. That means that much understanding may not occur during a class, but may occur hours, weeks or months later. It also means that educators must organize what they do so as to facilitate that subsequent unconscious processing of experience by students. In practice this includes proper design of the context, the incorporation of reflection and metacognitive activities and ways to help learners creatively elaborate on the ideas, skills and experiences. Teaching largely becomes a matter of helping learners make visible what is invisible (Caine and Caine, 1994)

This principle is seen in second language education in Krashen's theory (1983) about language acquisition and language learning. The former is an unconscious process and the latter, a conscious process. Knowing the intelligences let students increase their conscious learning. They might practice the weak ones.

#### **ix) Principle nine: Memory is organized in at least two ways**

Although there are many models of memory, one that provides an excellent platform for educators is the distinction made by O'Keefe and Nadel between taxon and locale memories. They suggest that we have a set of systems for recalling relatively unrelated information (taxon systems, from "taxonomies"). These systems are motivated by reward and punishment. O'Keefe and Nadel also suggest that we have a spatial/ autobiographical memory which does not need rehearsal and allows for "instant" recall of experiences. This is the system that registers the details of your meal last night. It is always engaged, is inexhaustible and is motivated by novelty. Thus we are biologically supplied with the capacity to register complete experiences. It is through a

combination of both approaches to memory that meaningful learning occurs. Thus meaningful and meaningless information are organized and stored differently. (Caine and Caine, 1994)

In language learning through the communicative approach spatial memory is crucial. Learning by translation, memorizing grammar rules and vocabulary is based on the second type of memory. For a long term learning the spatial memory is central since it involves emotions, an important variable in learning.

#### **x) Principle ten: Learning is developmental**

Development occurs in several ways. In part, the brain is "plastic". That means that much of its hard wiring is shaped by the experiences that people have. In part, there are predetermined sequences of development in childhood, including windows of opportunity for laying down the basic hardware necessary for later learning. That is why new languages as well as the arts ought to be introduced to children very early in life. And finally, in many respects there is no limit to growth and to the capacities of humans to learn more. Neurons continue to be capable of making new connections throughout life (Caine and Caine, 1994).

#### **xi) Principle eleven: Complex learning is enhanced by challenge and inhibited by threat**

The brain/mind learns optimally - it makes maximum connections - when appropriately challenged in an environment which encourages taking risks. However, the brain/mind "downshifts" under perceived threat. It then becomes less flexible, and reverts to primitive attitudes and procedures. That is why we must create and maintain an atmosphere of relaxed alertness, involving low threat and high challenge. However, low threat is not synonymous with simply "feeling good". The essential element of perceived threat is a feeling of helplessness or fatigue. Occasional stress and anxiety are inevitable and are to be expected in genuine learning. The reason is that genuine learning involves changes that lead to a reorganization of the self. Such learning can be intrinsically stressful, irrespective of the skill of, and support offered by, a teacher. (Caine and Caine 1994)

Being in danger and threat some parts of the brain do not work in optimal conditions. When it is threatened, the neocortex, brain in charge of learning new things, stops working. The neocortex is stimulated to find new answers. This principle is equally related to emotions.

#### **xii) Principle twelve: Every brain is uniquely organized**

We all have the same set of systems, and yet they are all

different. Some of this difference is a consequence of our genetic endowment. Some of it is a consequence of differing experiences and differing environments. The differences express themselves in terms of learning styles, differing talents and intelligences and so on. An important corollary is both to appreciate that learners are different and need choice, while ensuring that they are exposed to a multiplicity of inputs. Multiple intelligences and vast ranges in diversity are, therefore, characteristic of what it means to be human. (Caine and Caine, 1994)

Through this analysis, it can be concluded that these principles have been part of second language education through the communicative approach, which means a brain approach has applied to second language education many aspects already proposed in applied linguistics. It is also important to consider Numan's (1991) proposition, which states that in language education it is necessary to consider linguistic and non-linguistic objectives related to learning skills, for instance, give students a vast range of learning strategies, help them identify their ways of learning, help them adopt real objectives which establish the development of abilities for meaningful and continuous learning.

## Conclusions

Considering the wholeness that learning a language presupposes it is important to see what multiple intelligences represents in second language education. On the one hand, it stands for a globalization of the learning process and on the other, the need in curricula changes based on the learners. Motivation, creativity, intuition are some aspects that teachers have to reinforce in learners to develop less stimulated abilities.

Through the use of this theory, teachers now will not be bored when designing materials and the preparation of the classes will be interesting, since it will be a challenge to incorporate different styles taking into account all the learning modalities in the classroom. Students will be encouraged to learn because the diversity of activities attempts to get their attention. They will feel that they are really participating since the activities are devoted to all of them.

Trying to change a traditional class into a multiple intelligences class is not an easy task. The main responsible part is the teacher which has to know the theory carefully, then, feels motivated to change. There is not a model to copy, it has to be created, it requires a group work when designing the material or adapting it to each intelligence. Once this material is organized it will be used over and over again because it will be addressed to different public.

Learners will be able to identify their personal strengths and can reinforce their confidence. They can decide which intelligence should be used in a specific class and

recognize that learning using the whole brain will be easier and it will take less time. The outcome will be seen in the grades and the acquired knowledge that will be meaningful, will be stored in the long term memory.

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