THE EFFECTIVENESS OF INTEGRATING MULTIPLE INTELLIGENCES STRATEGIES IN A BILINGUAL EDUCATION PROGRAMME: A STUDY OF WRITING SKILLS.

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Abstract:
Neuroscience advances have led us to understand the principles that guide the intervention of the brain in learning and its application in teaching. This study aims to explore the effectiveness of multiple intelligences strategies and their influence on L2 writing skills in different education programmes which are currently being applied in Spain: Advanced Methods Corporation (AMCO), Content and Language Integrated Learning (CLIL) and the traditional method of foreign language teaching. Eclectic research combining a qualitative and quantitative methodology has been applied to control the writing variables. The findings indicate that the integration of multiple intelligences strategies which are well-structured and organised in the curriculum of a bilingual programme results in better performance in L2 writing tests for 4th year primary students. Use of these strategies stimulates knowledge in a deeper way by facilitating problem solving as well as the ability to synthesise concepts.

Keywords: AMCO**,** CLIL, L2 writing skills, multiple intelligences strategies, traditional method of foreign, language teaching, problem solving.

1. Introduction

Neuroscience is unquestionably one of the most interesting areas of scientific research nowadays (Sylwester, 1995). According to Geake (2009, p. 9), educational neuroscience which is a recently emerging sub-discipline of cognitive neuroscience "has a strong bias towards learning as a brain function, with the implicit assumption that if learning can be well understood, then good teaching will follow". In the same vein, Wolfe (2010) states that emergent advances of neuroscience have resulted in the latest discovery in education, improving our understanding of the learning process. A new field of research into learning based on new findings on brain laterality and its direct impact in the field of education opens up and lays the groundwork for future discoveries about human cognition and the formulation of intelligence. One of the strongest advocates of psychological research supporting the concept of intelligence not only being based on categorising cognitive aspects is Gardner (1983, 1994, 2011). He developed the theory of multiple intelligences in which he classifies human intellectual competencies with more criteria than the traditional linguistic and logical-mathematical intelligence that drives "academic testing and measurement of IQ" in educational and learning environments (Lunenburg & Lunerburg, 2014, p. 1). He identifies multiple intelligences located in different parts of the brain that can either work independently or together.

Maftoon, and Najafi, (2012, p. 1234) enhance Gardner´s remark that "educational methods should be created and adjusted to be more flexible for students who have different capacities".

Due to the importance of individual differences in L2 language acquisition, a great deal of research has been conducted on the effect of multiple intelligences on different aspects of second language learning (Amiriani, 2010; Botelho 2003, Diravidamani &Sundarsingh 2010; Ghamati, 2011; Hafez, 2010; Yi-an, 2010) and specifically on writing skills (Naseri & Nejad, 2014; Narges & Mohammad, 2013). The aim of the current research is to explore the relationship between multiple intelligences and L2 writing skills in the 4th year of primary education. The purpose of the study is to examine whether integrating multiple intelligences in the curriculum of a bilingual programme has positive repercussions on writing skills. On the basis of this analysis, a comparative study was carried out of different models for the acquisition of writing skills currently being applied in Spain in which the involvement of multiple intelligences strategies differs. One of the most noteworthy aspects of this work was incorporation of the bilingual education programme AMCO[1], based on the theory of multiple intelligences (Gardner, 1983, 2011). This study also analysed educational contexts corresponding to level A2.1 of the CEFR[2] in which the integration of multiple intelligences was not previously planned and organised. Specifically we have focused on the model of bilingual education through CLIL[3] and on the regular or traditional method of teaching English as a foreign language.

1.1. Brain research and its impact on education

Brain research (Caine & Caine, 1997; Jensen, 2004; Damasio, 1998; Zaidel, 1975) has significantly improved our knowledge of the learning process. The results of the first investigations that had a major impact on educational settings in general and on the bilingual educational context in particular were those in which some functions of the left and right cerebral hemispheres were described. Studies on hemispheric specialisation (Beaupot and Díaz, 1994; Sperry, 1974; Ortiz, 1985) thus opened up a new horizon for further studies on learning and its compatibility with the brain. The findings show that both hemispheres use modes of cognition of a high standard and that both involve reasoning, thinking and complex mental functioning. In a brain with an intact corpus callosum, communication between hemispheres fuses or reconciles both types of perception, thus maintaining our sense of being a person, a unitary being. The activity of the brain as a whole involves more than the sum of its individual parts. The brain perceives and processes the information through the interactivity of the two hemispheres. The interconnections between various parts of the brain allow all of the knowledge to be embedded and interact with other knowledge; the brain is, therefore, holographic, global and interconnected (Sperry, 1974).

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[1] Advanced Methods Corporation. https://library.iated.org/view/MARTORELL2012AMC.

[2] Common European Framework of Reference for Languages: Learning, teaching, assessment (Council of Europe, 2001).

[3] Content and Language Integrated Learning (The European Commission, 2002).

Scientists have also studied the different ways in which each hemisphere processes information in addition to studying the separation of internal mental experiences. Techniques for the transmission of knowledge that respond to brain functions corresponding to the left hemisphere are favoured in traditional classroom teaching, based on verbal and analytical processes. The left hemisphere is related to rational intelligence which is a quality that according to Beauport and Diaz (1994) leads us to analyse situations and to detect failures and difficulties. However, the discovery of the potential of the right hemisphere allows us to reflect on the enormous benefits that it can represent in order for the student to implement educational strategies that include the neural activation of both hemispheres. We must not forget that the two hemispheres are different and complementary and that effective thinking needs both. Teaching methods that take advantage of the abilities associated with the right hemisphere are less known because we have followed the approaches of traditional classroom teaching and it has had a direct impact on the acquisition of L2. Ortiz (1985, p. 1) stresses the importance of the lateralisation of the brain and its functions in the field of education providing an overview of the different functions assigned to each of the hemispheres:

The left hemisphere is generally in charge of the following functions: linguistic-verbal, analytical, logical, sequential, and planning. It is the part of the brain that is considered to be more digital, temporal, voluntary, rational, abstract, objective, realistic, deductive and convergent. The right hemisphere, on the other hand, is more dominant for spatial and visual-spatial abilities as well as music processing and face recognition. It is characteristically more holistic, synthetic, appositional, non-verbal, automated, intuitive, simultaneous, analogue, manipulative, subjective, impulsive, imaginative and divergent.

According to Pickering, Sherry and Lori, (2011, p. 110) a number of learning theorists such as Bogen (1969), Buzan (1991) and Gardner (1983), "consider structures in the brain the foundation of differences in thinking and learning". Gardner (1983) provides one of the most valuable contributions that has impacted education greatly and is one of the central issues that is covered and analysed in this research. In his reflection on intelligence, he defines it as the ability to solve problems or create products that are valued in one or more cultural contexts and proposes that the term be extended to encompass capabilities that until now were not covered in traditional methods, grouping them into categories or intelligences: verbal-linguistic, logical-mathematical, visual-spatial, bodily-kinesthetic, musical-rhythmic, interpersonal, intrapersonal, naturalist, and existential. He states that all human beings possess a broad range of abilities or intelligences that are fixed but educable and can be developed. These abilities are independent of each other, challenging the belief that "a human intellectual competence must entail a set of skills of problem solving enabling the individual to resolve genuine problems or difficulties" (Gardner, 2011, p. 64).

The theory of multiple intelligences (MI) provides a framework for addressing the differences in the acquisition of writing skills.

1.2. The Relationship between Writing Skills and MI strategies

The acquisition of L2 writing skills is a complex process that requires the mastery of linguistic, cognitive, and sociocultural competencies (Barkaoui, 2007, p. 35). According to Chastain (1988, p. 244) writing is a "basic communication skill and a unique asset in the process of learning a second language". It involves the acquisition of both macro strategies such as planning, drafting and revising, and micro strategies such as attending to content and form concurrently and carrying out automatic searches for words and syntax (Cumming, 2001).

In an attempt to enquire how effective the application of the MI[4] theory is in the acquisition of writing skills, various studies have been undertaken in recent decades. Shah and Thomas (2002) conducted research on how the spelling of high frequency words in daily writing improved through the use of MI strategies. The findings indicated an improvement in the capacity to spell high frequency words conventionally within students' daily writing, offering a new understanding of how MI strategies can heighten the students' learning in all areas of the curriculum. Marefat (2007) carried out a study to investigate the participants' scores on their writing exam and the relationship with MI strategies. The results revealed that kinaesthetic, existential, and interpersonal intelligences made the greatest contribution in predicting writing scores.

Diravidamani &Sundarsingh (2010) worked on the application of the multiple intelligence method in second language teaching. The results showed that students' involvement in the process of language acquisition improved when applying the MI method of teaching. In elementary education, writing in a second language requires practice for composing, developing, analysing and synthesising ideas. Furthermore in structuring information, students employ discourse knowledge, the audience´s understanding, and sociolinguistic rules (O'Malley & Chamot, 1990). MI theory is an excellent tool to enable teachers to build different frames for working on processes such as generating ideas, planning, drafting, and revising. The capacity to recall objects mentally or to produce images and work with them is of particular interest in foreign language teaching (Ávila 2002). The visual-spatial frame is the ability students have to perceive all elements, such as form, shape and color, necessary for creating mental images of something. According to Arnold (1999), these images are present in thought and have a strong influence on reasoning. Visualisation is thus a strategy that can help students transform what they are writing into images and place these images that guide learning on what Armstrong (2009, p. 80) called an "inner blackboard" which will then be very useful for generating ideas and planning. Students may deposit onto this kind of mental blackboard the information they need, such as formulas, historical facts, phonics, irregular verbs, which they will recall when they need it. Similarly the strategy of idea-sketching helps students to articulate understanding of the subject and to explore the concepts further. For the introduction of any topic in class, linguistic, spatial and kinaesthetic frames are recommended: "During brainstorming, students produce a torrent of verbal thoughts that can be collected and put on the board or an overhead projector or entered into computer software such as Inspiration or Kidspiration" (Armstrong, 2009, p. 74). The body-kinaesthetic intelligence favours the perception of meaning and facilitates learning. The use of strategies for the implementation of this intelligence

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[4] Multiple intelligences.

implies classroom sensory experiences of movement, activities in which physical coordination and motor skills are used predominately and group dynamics in which the students prepare written debates on specific issues. Students can also be engaged in numerous physical, tactile and interpretative strategies such as creating their own scripts that they can then perform: the "dramatization" strategy recommended by Arcos (2002, p. 56).

Armstrong (2009) proposes kinaesthetic strategies involving the introduction of written texts with illustrations or prompts. Regarding the resolution of problems, repeated physical movement that represents an idea or a specific process helps students to internalise it; manipulating objects that represent concepts or the design of a mural containing paragraphs helps with memorisation. For the quality of the writing task and effective communication of meaning, the organization at both sentence and text level is important (Bereiter & Scarmalia, 1987). When structuring information for writing, a logical mathematical frame is required. According to O'Malley & Chamot (1990) the writer uses different types of knowledge such as discourse knowledge, the audience's understanding, and sociolinguistic rules in this process. Different tactics can be applied at different phases of problem solving such as the heuristic approach: "Examples of heuristic principles include finding analogies to the problem you wish to solve, separating the various parts of the problem, proposing a possible solution to the problem and then working backward, and finding a problem related to yours and then solving it" (Armstrong, 2009, p. 78). Regarding classifications and categorisations, logical intelligence can be stimulated using diagrams and mind maps: *"The value of this approach is that disparate fragments of information can be organised around central ideas or themes"* (Armstrong, 2009, p. 78).

As previously mentioned, revision is also part of the writing process that involves task definition, strategy selection, modification of text in the writing plan and evaluation (Grabe & Kaplan, 1996). In addition, second language students are expected to analyse and evaluate the feedback they receive on their writing. Social strategies, which involve cooperating with peers are effective learning strategies that students can develop for writing revision (O'Malley & Chamot, 1990).

In the process of producing written language, social and cognitive factors are present. The challenge that can arise in the language classroom according to Kramsch (1990) is not a consequence of the complexity involved in the study of a foreign language exclusively, it is also due to other factors that arise within the learning group: insecurity, lack of experience, lack of memory and emotional issues that may arise among students. Sometimes these factors are invisible, like attitudes of attraction or rejection, or even complex feelings of dependency. In this sense, social skills in the classroom are factors that determine linguistic production either orally or within writing. Gardner (1994) emphasizes the importance of "interpersonal intelligence" of future learning and social relations, while Diaz-Barriga (2002) ensures that learning is more effective because empathy among students is enhanced and this improves relationships between them. In order to improve classroom interaction, a necessary requirement for the acquisition of the foreign language according to Long (1985), it is important to build an environment of cooperation among equals. Johnson and Johnson (1994) proposed five phases in preparing a cooperative activity: planning of activities, class organisation, presentation tasks, role of the teacher (observation, data collection and support for students) and evaluation.

Intrapersonal intelligence provides insight into the subconscious and enables us to identify our emotions and thoughts, reflect on our personality, become aware of our innermost feelings, and understand the role that we play with respect to other human beings (Bogod, 1998). In the school environment, we are aware that students spend a lot of time in the classroom; this fact, according to Armstrong (2009), creates an intense social atmosphere that can be claustrophobic and students may develop intrapersonal intelligence and may become introverts. This intelligence includes the ability to adapt the way we act from the knowledge of our strengths and weaknesses, our moods, our feelings and intentions. Giving students one-minute periods of reflection is a strategy by which they can create mind maps on what to write in L2. Silence is certainly the most favourable atmosphere for this reflection, although music can also be used in this educational setting. Moreover, students that develop this intelligence tend to analyse problems by themselves (Gallagher & Morilla, 2009).

The main objective of this study is to explore the relationship between MI strategies and the acquisition of L2 writing skills in primary students in Spain. Through the analysis of different methodological approaches for the acquisition of L2 writing skills that have direct or indirect integration of MI strategies we aimed at elucidating the effectiveness of integrating these strategies in the language curriculum of a bilingual programme in Spain. In order to fulfil these general and specific objectives the following research questions were established:

a) Does the application of multiple intelligences strategies in the methodology used in the classroom improve writing in a foreign language?
b) How does the methodology affect the level of writing?
c) Is there any improvement in the comprehension and reasoning of the students exposed to the methodology that integrates multiple intelligences strategies?

2. Method

2.1. Settings and participants

This research involves three groups in primary schools, which have implemented different methodologies for the acquisition of L2 writing skills in Spain. All the participants had Spanish as L1 and were in the process of learning English. The sample consisted of students from the fourth year of primary education corresponding to the initial beginner level. Considering that we had focussed on an educational context, the groups in this study were natural groups, composed of 17 to 26 students, formed according to the criteria of the centre. In this quasi-experimental design the profile of the subject of study had been delineated with the intention that the internal and external validity was not seriously affected.

The first school involved was the school "Ramiro de Maeztu" in Madrid and the sample comprises 26 students. This school was selected for the research for being one of the pioneering centres in the implementation of the bilingual methodology AMCO in 2007, headquartered in San Diego (CA, USA). It had previously spread to several countries in Central and South America, such as Mexico, Chile, Colombia, El Salvador and Nicaragua. Students exposed to this programme

follow an integrated bilingual system that emphasizes the acquisition of communicative competence in English. It integrates the learning of language and contents in order to "renew and enrich perspectives in both subject matters and motivate students at the same time" (Martorell *et al.*). One of its main innovative characteristics is that it is "created and adjusted to be more flexible for students that have different intellectual capacities" based on the assumption that all human beings possess all the intelligences and these are not set in stone but educable (Gardner, 1983). This is the first methodology in Spain that integrates the MI strategies in the curriculum of the academic areas, favouring the intellectual and social development of each student. The students of the sample acquired writing skills through total immersion in L2 which was reinforced by a sequenced and coordinated use of MI strategies, discarding translanguaging.

The second school involved in our research was the school "Colon" in Córdoba (Andalusia) where the sample comprises 25 students. The educational proposal CLIL of the European Commission follows the principles defined in the Common European Framework of Reference for Languages (Council of Europe, 2001) and came into effect in Andalusia in 2005. CLIL has become an umbrella term that covers a wide variety of education programmes and initiatives based on the transmission of academic content by using a foreign language in the classroom (Mendez, C; Pavón, 2012, p. 573). According to Coyle, Hood and Marsh (2010, p. 1) it is a "dual-focused educational approach" in which there is not "fusion" in the learning of contents of non-linguistic and linguistic subjects, there is an "integration" in which academic knowledge is transmitted in a foreign language. With respect to the interactions in the class, CLIL "makes available opportunities for interaction that are not typical in traditional foreign language teaching" (Dalton-Puffer, Nikula & Smit, 2010, p. 279). This bilingual programme benefits the learning process making it more meaningful and less stressful due to much greater exposure to L2 (Heras & Lasagabaster, 2015). The students of the sample following CLIL benefit from the use of strategies that entail this methodology to facilitate the production of the written structures. However, this method differs from AMCO in the sense that MI strategies are used randomly in the class and are not integrated or sequenced in the language curriculum. Another difference with students following AMCO is that in this group the exceptional use of L1 is allowed in the process of acquisition of writing skills. According to Mehisto, Marsh and Frigols (2008, p. 105) it includes "code-switching, translanguaging and the clarification of concepts; the acceptance of L1 equivalents as a way to reinforce understanding."

The third school involved was Salesian school in Montilla (Córdoba) which implemented the traditional method of foreign language teaching. The sample comprises 17 students and they follow a deductive method based on the knowledge of the words and grammatical rules of the target language, guided by formal criteria where the memorisation of rules and vocabulary is essential. It is fundamentally based on the written form of the language, practising writing exercises, basically of translation, both direct and inverse. The teaching of the second language in this group is uni-directional and instruction is facilitated in the mother tongue, hence there is little or no interaction among students. This approach is traditionally inspired by the linguistic and the logical-mathematical intelligences disregarding the different intelligences or capacities of students.

2.2. Methodological/Analytical approach

Educational research addresses issues concerning nature, epistemology, methodology and objectives of knowledge in education (Arnal *et al*., 1992, p. 37). In an attempt to determine the effectiveness of the use of MI strategies among the three groups of participants instructed through different methodologies, an eclectic approach was used. We applied the two paradigms that according to Madrid (2001, p. 16) exist in educational research: "quantitative and qualitative". Data collection took place in the second term of the academic year. To carry out the planning it was necessary to take into account several factors to ensure that intensive treatment was applied. The first factor was the number of hours of English practised in the groups per week in the schools, and, secondly, it was guaranteed that the number of sessions in which the students were being tested did not disrupt the normal development of the academic programming. The process was developed in two phases. The first phase of the experimental treatment consisted of the collection of test data based on a writing test equivalent to A2.1 in the Common European Framework Reference for languages of the Council of Europe (CEFR). In order to interpret quantitative data, we proceeded to collect qualitative data through observation in five sessions per group, in which special attention was paid to the methodology used in the classroom. The instruments used in this phase were field notes, diaries, and reports taken in the classroom under the indispensable authorisation of the centres. The writing variable analysed in this research refers to the ability that students have to write words, phrases and short, simple texts: stories, descriptions or presentations with a coherent structure.

3. Results

Quantitative data were collected in different education centres to find out the answers to the research questions and these data were analysed by specialists at the Department of Statistics of Cordoba University. Additionally, the findings were interpreted within the qualitative framework of the researchers' observations. Figures 1, 2 and 3 feature the results of the writing variable in the different schools in which the different methodologies were implemented.

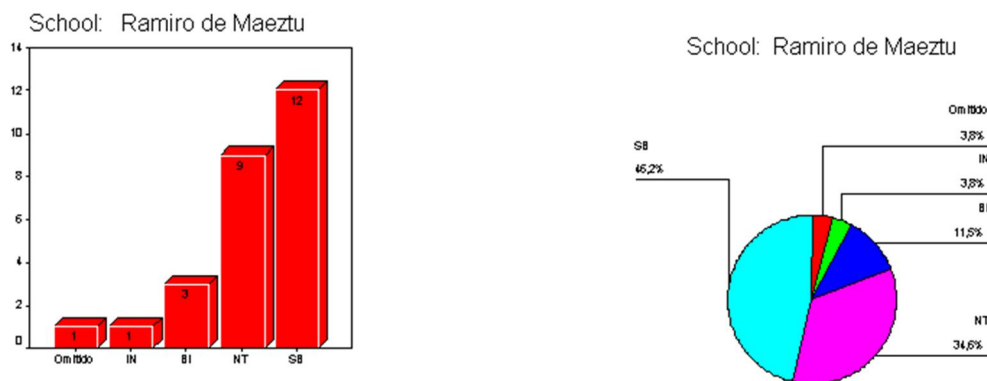Figure 1: *Variable writing skills in Ramiro de Maeztu school*

Figure 1 shows the writing test results in an independent study in Ramiro de Maeztu centre where the AMCO bilingual programme was implemented. As shown in figure 1, the ratings obtained were favourable considering that 46.2% of students obtained SB (excellent), 34.6% NT (very good), 11.5% BI (good), 3.8% IN (fail) and 3.8% were missing value. The scores of the sample that followed a bilingual programme in which MI strategies were integrated in the language curriculum were very high. These participants successfully produced meaningful phrases in everyday situations with a coherent structure, applying the rules of grammar and syntax cohesion in the test. This finding suggests that there is a significant effect of the type of teaching and that the integration of MI strategies in the curriculum benefitted these students in the development of their L2 writing skills. There was a constant flow of thinking skills in the lessons and students used mind maps to generate ideas for their writing and to connect them. Personal intelligences (intrapersonal and interpersonal) had an important influence on the acquisition of writing skills and numerous strategies were applied in the lessons through group interaction strategies and cooperative work.

Figure 2: *Variable writing skills in Colon school.*
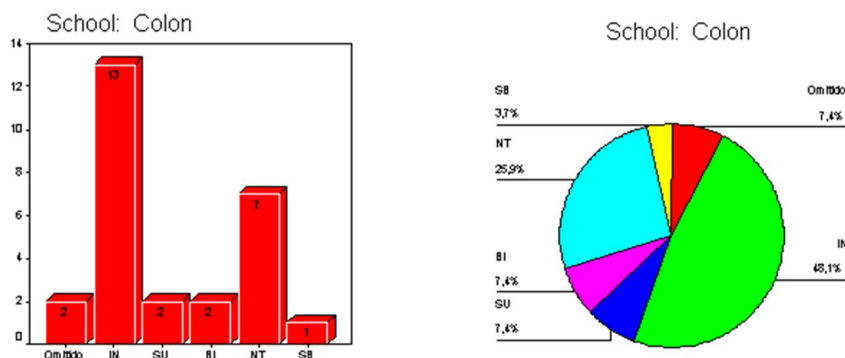
Concerning the results of the writing test obtained by students in the CEIP Columbus, figure 2 suggests that they are lower than the results obtained in the centre where the MI strategies were integrated in the curriculum. Results indicate that 3.7% obtained SB (excellent), 25.9% NT (very

good), 7.4% BI (good), 7.4% SF (pass), 48.1% IN (fail) and a total of 7.4% were missing value. The students exposed to CLIL methodology that failed the test were not able to construct meaningful sentences and expressions related to areas of most immediate relevance, such as personal and family information, shopping or employment, despite being instructed in the classes with basic vocabulary and coherent structures to develop writing skills and practice strategies to apply grammatical and syntactical rules of cohesion.

Figure 3: *Variable writing skills in Salesian school.*
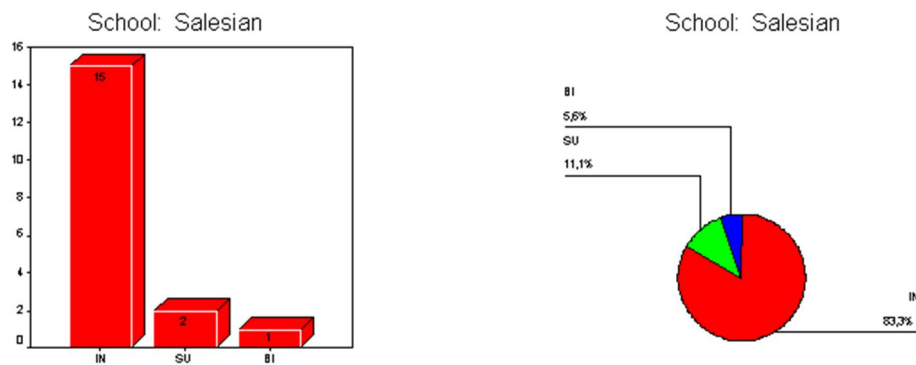
In Salesian school where English was taught following traditional methodology, 11%, obtained the highest results, 5.6% of the group had a score of BI (good), 11,1 students obtained SU (pass), 83% of students were not able to pass the writing tests and there was not any missing value. These results indicate that students who are exposed to the traditional method of instruction have more difficulty in developing L2 writing skills. These results are in line with the findings of Elgün and Dogan (2016, p. 1695) who investigated whether there was a significant effect of the instructional types (MI-based activities and the traditional method) on the development of writing skills of sixth grade students in Turkey. They conclude that "the experimental group instructed through multiple intelligences activities showed more improvement from their pre-test to their post-test scores than the control group instructed through traditional method".

Table 1. Valid percentage of writing skills in the selected centres

	Schools			Statistics	Error type.
Writing skills	**Salesian School**	Average		3,6667	0,26813
		Interval for the average 95%	Lower Limit	3,101	
			Upper Limit	4,2324	
		Median		4	
		Typical Deviation		1,13759	
		Minimum		2	
		Maximum		6	
		Rank		4	
		Interquartile		1,25	
	Colon School	Average		4,88	0,51501
		Confidence interval 95%	Lower Limit	3,8171	
			Upper Limit	5,9429	
		Median		4	
		Typical Deviation		2,57504	
		Minimum		1	
		Maximum		9	
		Rank		8	
		Interquartile		5,5	
	Ramiro de Maeztu School	Average		8,08	0,29394
		Interval for the average 95%	Lower Limit	7,4733	
			Upper Limit	8,6867	
		Median		8	
		Typical Deviation		1,46969	
		Minimum		4	
		Maximum		10	
		Rank		6	
		Interquartile		2	

Table 1 illustrates a descriptive analysis of the written output variable of the educational centres involved in this study. These results show an overall score of the valid data collection obtained by students exposed to different methodologies in order to provide a better interpretation. Students following a bilingual AMCO programme based on MI strategies obtained an average of 8, followed by those exposed to the CLIL methodology whose average score was 4.8 and finally students exposed to traditional methods of language teaching who achieved an average of 3.6.

4. Discussion

On the basis of the data collection, some significant aspects emerge. Specifically concerning the first research question, results corroborate that there is a positive relationship between MI strategies and writing skills. In the teaching of foreign languages, children do not master the language to which they are constantly exposed and they have different learning abilities. *"Because of these individual differences among students, teachers are best advised to use a broad range of teaching strategies with their students"* (Armstrong, 2009, p. 73) and it is for this reason that the integration of the application of MI strategies is a very valid tool to enhance foreign language writing skills. The integration of MI strategies in an organised way in the language curriculum allows the teacher to design classes effectively for the acquisition of writing skills. Additionally, the

fact that MI strategies are systematically involved in language lessons leads students to make connections with other areas, which is a very important factor in bilingual education.

Concerning the second research question, which refers to the repercussions that the methodology used has on the level of writing skills, it can be stated that there are significant differences. With regard to classroom instruction, the AMCO and CLIL bilingual programmes have educational, psychological and methodological factors that improve students' writing level compared to teaching English following a traditional methodology. The group instructed through the traditional method was required to memorise grammar rules and vocabulary, disregarding the differences among students who had great difficulty transferring their required knowledge into writing. The results in this study support the findings of Elgün & Dogan (2008, p. 1695) who found "MI based activities more effective than the traditional way of instruction in enabling the students to write in a more effective way". One of the premises to be emphasized is that both methods (AMCO and CLIL) are based on a communicative approach, which aims to use L2 in real situations, provides students with fluidity and spontaneity, and prepares them to face a globalised world. Another issue to assess is that both methodologies introduce a learning alternative in which language and content are integrated in the foreign language. Moreover AMCO and CLIL methodological strategies focus on a context where learning and cooperative tasks prevail. As far as multiple intelligences are concerned, both programmes consider the use of strategies, although the treatment is different. The findings suggest that proper application of MI strategies in a bilingual programme benefit the students in accomplishing a writing task.

The third research question enquires whether there is an improvement in the understanding of concepts and reasoning of the students exposed to the methodology that integrates MI strategies. According to Chalstain (1988, p. 244), writing is a basic communication skill that involves thinking during the process of its acquisition. In this sense Armstrong states that:

> The emergence of the critical-thinking movement certainly suggests one broad way in which logical-mathematical intelligence has affected the social sciences and humanities". Similarly, the call for "numeracy" (the logical-mathematical equivalent of "literacy") in our schools and, in particular, the recommendation that mathematics be applied to an interdisciplinary curriculum point to the wide application of this form of thinking to every part of school day (Armstrong, 2009, pp. 76-77).

In the observation phase of the class we could discuss that in implementing MI strategies in the classroom to develop writing skills, students think and act flexibly in various contexts from the knowledge previously acquired. The issues are addressed through different ways of learning through a wide variety of MI strategies, new questions arise about what is learnt and students are able to synthesise the knowledge gained and in turn expand their achievements and mistakes.

They are rewarded continuously in situations that enhance innovation. The students are put into groups to write short sentences adapted to the level of fourth year students on different points of view concerning the same topic, making them think about these issues. Furthermore the ethical dimension is implemented in class and improves responsibility and professionalism which implies reflection and commitment to developing writing skills effectively. According to Gardner (1994, p. 88), a school where instruction is given through MI strategies stimulates students' knowledge in

various disciplines in a profound way to be able "to solve problems and perform tasks" that will be required in the future.

5. Conclusions

In the last two decades there has been considerable interest in implementing innovative educational methods in Spain in the field of foreign language teaching. There is general awareness that we should focus on education based on the needs of the learner. The tendency during recent years of foreign language research has shifted towards more "learner-centered methods" and in this sense learners' characteristics and differences are taken more into consideration (Elgün and Doğan, 2016, p. 1688). This research aimed to investigate the effect of the integration of MI strategies in the language curriculum in the acquisition of L2 writing skills through a comparative methodological analysis. Data collection was reinforced by the observation phase of the different L2 learning settings. The findings bring to light several issues regarding the relationship between MI strategies and writing skills. We estimate that the methodology used in the classroom has great repercussions on the learning process, affecting considerably the students' proficiency with writing skills. The study provides evidence that a bilingual programme that integrates MI strategies in a curriculum contributes to the educational procedures, enabling students to acquire a higher level of proficiency in the acquisition of L2 writing skills.

However, it shows unsatisfactory results for the teaching of a foreign language in a traditional way and provides further evidence of the need for a change in the traditional linguistic and logical techniques in educational contexts. With these considerations we conclude that students exposed to a variety of ways of teaching develop a level of proficiency in their writing and are more flexible and open to discovering their interests and abilities enabling them to perform to their highest potential. Furthermore a proper application of MI strategies in the classroom increases participation, motivation and creativity when developing L2 writing skills. This process results in the improvement of student comprehension and problem-solving. It is important to note that with a methodology in which MI strategies are integrated students feel more motivated. This is acquired from successful engagement with the actual language learning and it accentuates students' creativity, activating the thinking process (Dörnyei, 2005).

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