

ISSN: 2386-3919

ISSN electrónico: 2386-3927

DOI: <http://dx.doi.org/10.14201/et201533279103>

## LEARNING STYLES AND MULTIPLE INTELLIGENCES IN THE TEACHING-LEARNING OF SPANISH AS A FOREIGN LANGUAGE

*Estilos de aprendizaje e inteligencias múltiples en  
la enseñanza-aprendizaje del español como lengua  
extranjera*

*Styles d'apprentissage et intelligences multiples dans les  
processus d'enseignement-apprentissage de l'espagnol  
comme langue étrangère*

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Recibido: 28-08-2014; Aceptado: 11-01-2015; Publicado: 30-10-2015

BIBLID [2386-3927 (2015) 33, 2; 79-103]

Ref. Bibl. ESPERANZA LUENGO-CERVERA. Learning styles and multiple intelligences in the teaching-learning of Spanish as a Foreign Language. *Enseñanza & Teaching*, 33, 2-2015, 79-103.

SUMMARY: This paper examines two theoretical constructs: Learning Styles and Multiple Intelligences as variables in the teaching-learning process of Spanish as a Foreign Language. The group learning profile has been analyzed through the use of the Questionnaire of Honey-Alonso of Learning Styles (CHAEA, 2007) and Silver and Strong Questionnaire for Multiple Intelligences (2000) while learning journals

have been utilized to triangulate the data obtained through the questionnaires. Three moderate correlations have been found among the variables of both constructs: Linguistic Intelligence-Reflexive Style; Linguistic Intelligence-Theoretical Style; and Musical Intelligence-Active Style. Both theories have been employed in a Spanish course which gives students options for the selection of activities and assignments. Using a quasi-experimental design, the implications of this intervention have been investigated, and the results have shown an improvement in the performance of the experimental group as against that of the control group. Conclusively, students with a high preference for the Reflective and Theoretical Style seem to have demonstrated a better overall performance.

*Key words:* learning styles; multiple intelligences; foreign language; teacher education.

**RESUMEN:** Este artículo examina dos teorías: Estilos de Aprendizaje e Inteligencias Múltiples como variables en el proceso de enseñanza-aprendizaje del español como lengua extranjera. Diagnosticamos el perfil de aprendizaje de la muestra a través del Cuestionario de Estilos de Aprendizaje, CHAEA (Alonso, 2007), y el Cuestionario de Inteligencias Múltiples de Silver y Strong (2000). Los datos obtenidos de los cuestionarios se triangulan con los diarios de aprendizaje. Se identifican tres correlaciones moderadas entre las variables de los dos constructos: Inteligencia Lingüística-Estilo Reflexivo; Inteligencia Lingüística-Estilo Teórico; e Inteligencia Musical-Estilo Activo. Ambas teorías se aplican de manera complementaria en un curso de español dando a los estudiantes opciones para actividades y pruebas de evaluación. En un diseño casi experimental, estudiamos las implicaciones de esta intervención y los resultados demuestran que el rendimiento del grupo experimental mejora en comparación con el grupo de control. Los estudiantes con preferencia alta en Estilo Reflexivo y Teórico obtienen el mejor rendimiento.

*Palabras clave:* estilos de aprendizaje; inteligencias múltiples; lengua extranjera; formación maestros.

**RÉSUMÉ:** Cet article examine deux théories: Styles d'apprentissage et Intelligences Multiples comme variables dans les processus d'enseignement-apprentissage de l'espagnol comme langue étrangère. Nous avons diagnostiqué le profil d'apprentissage de l'échantillon à travers le questionnaire des styles d'apprentissage, CHAEA (Alonso, 2007) et le Questionnaire d'Intelligences Multiples de Silver et Strong (2000). Les données obtenues de ces questionnaires se triangulent avec les journaux d'apprentissage. Il s'identifient trois corrélations modérées entre les variables des deux théories: Intelligence Linguistique-Style Réflexif, Intelligence Linguistique-Style Théorique et Intelligence Musical-Style Actif. Les deux théories s'appliquent de façon complémentaire dans un cours d'espagnol, en donnant aux étudiants des options pour les activités et les épreuves d'évaluation. Dans un design quasi-expérimental nous avons étudié les implications de cette intervention et les résultats montrent que le rendement

du groupe expérimental a amélioré comparé au groupe control. Les étudiants avec préférence haute en Style Réflexif et Théorique obtiennent meilleur rendement.

*Mots clés:* styles d'apprentissage; intelligences multiples; langue étrangère; professeur d'éducation.

## 1. INTRODUCTION

In modern society's attempt to make education accessible to a large population, the aim has been the establishment of a standard system which offers «a-size-to-fit-all approach to education» (Robinson, 2009: 14). This has resulted in some individuals being favoured by the system, while others have been marginalized since they could not take-naturally to learning this way. Generally, in most Western educational systems, students are not only forced to study subjects they would never have chosen if they were given the option, but are also prohibited from choosing their preferred method of assessment.

This study focuses on students whose mother tongue (L1) is English and who are required to pursue three mandatory courses in Spanish as a Foreign Language (FL), and one course on FL methodology in their Bachelors of Education Degree at the University of Trinidad and Tobago. In the continued effort to improve their performance in Spanish, an experimental course (Spanish 3) has been designed, following the framework of two learning theories: Learning Styles (LS) and Multiple Intelligences (MI). Students are given options for activities and assignments in the learning and assessment process. These choices, as will be seen later, have been designed to serve the different styles and intelligences. This empirical research has been born out of the zeal to facilitate the learning of all students and not that of a few.

The significance of this paper lies in the fact that there are not many empirical studies that combine these two theories (Denig, 2004; Wu and Alrabah, 2009). The ingenuity of the study is seen in the use of mixed methods, questionnaires and journals, to diagnose learning profiles. The study targets students within a specific Anglophone Caribbean context, and its implications with respect to their performance in Spanish as a Foreign Language. The population's L1 is English and their FL is Spanish however this methodological design could be applied to other linguistic contexts. The use of the specific questionnaires to define the learning profile of students of a Foreign Language has been widely extended (Reid, 1998). The cultural variable should be taken into account before applying the questionnaires, and each item should be analyzed as culturally relevant. On the other hand the application of both learning theories, Learning Styles and Multiple Intelligences in the design of a FL course is a common practice around the world as Chen *et al.* (2009) report. Although this study focuses on tertiary level students, it could be applied to secondary level population since the FL methodology approach utilized is alike and the questionnaires are also applicable for that age.

The purpose of this research is to garner new knowledge, apply it and thereby attain improvement in the specified learning context, which is the case for most types of research in the area of education (Sabariego and Bisquerra, 2009). Specifically, this is an attempt to show the correlations among learning preferences, the course design and the academic performance of students in Spanish as a Foreign Language, and ultimately to utilize the findings in the other Spanish courses in the Bachelor of Education Programme.

This is an exploratory descriptive study and although it lacks prescriptive value due to the sample size, it adds information to the academic discourse on learner's individual differences in FL Learning and Teaching. The following are the main objectives:

1. To identify the learning profile of the experimental group according to LS and MI paradigms, through the use of the Questionnaire of Honey-Alonso of Learning Styles (CHAEA, 2007) and Silver and Strong Questionnaire for Multiple Intelligences (2000).
2. To look for correlations between the two constructs as well as the correlations among the variables of each construct, using the Pearson test. The hypothesis is that in the construct of LS, Reflective and Theoretical may be correlated. In the construct of MI, there may be a connection between Kinesthetic and Spatial. Between both constructs, Active Style may correlate with Kinesthetic Intelligence, and Reflective Style with Intrapersonal Intelligence.
3. To design an experimental course (Spanish 3) embracing the LS and the MI Theories, and study their impact on student performance. Paired samples T-test is applied. The hypothesis is that the performance will improve in the experimental group since more students will be reached.
4. To look for correlations between performance in the Spanish course and the preferences in LS or MI, employing the Pearson test.
5. To study the relationship between the students' reflections in their learning journals and the learning profiles obtained through the questionnaires.
6. In the next section Foreign Language individual learning differences are introduced in order to contextualize the theories of Learning Styles and Multiple Intelligences, which will be revised to further explain their application in the experimental course of Spanish as a Foreign Language. In the empirical study section, the experimental course is detailed; and the participants and data collection instruments (questionnaires, journals and evaluation assignments) are described. Finally the data is analyzed and results are discussed.

## 2. THEORETICAL FRAMEWORK

This study is based on learning-teaching FL theories which in turn stem from four areas of knowledge: Psychology, Linguistics, Sociology, and Education. Towards the end of the last century there occurred a shift in the educational axis.

In the field of FL, the focus on method and the teacher moved towards that of the student who became the centre of the praxis.

In the past three decades, due to the ascent of Differential Psychology, many empirical studies centered on the learner's individual differences as variables that affect the FL learning-teaching process.

Individual Differences have been found to be the most consistent predictors of L2 learning success, yielding multiple correlations with language attainment in instructed settings within the range of .50 and above. No other phenomena investigated within Second Language Acquisition have come even close to this level of impact (Dörnyei, 2005: 2).

In the lapse of thirty years the three individual variables (aptitude, motivation and context) suggested by Rubin (1975) have been increased to some twenty three variables identified by Griffiths (2008): eleven individual learner's variables (motivation, age, learning style, personality, gender, learning strategies, meta-cognition, autonomy, beliefs, culture and aptitude); and twelve external learning variables (vocabulary, grammar, language functions, pronunciation, listening comprehension, oral production, reading, writing, learning-teaching method, learning strategies training, error correction, and tasks). Although the classifications vary, all authors agree that these variables overlap and interrelate, and they suggest cognitive style (Cook, 1991; Larsen-Freeman, 2001) or learning style (Dörnyei, 2005; Griffiths, 2008; Lightbrown and Spada, 2006) as one of the variables. LS is identified as a changeable variable along with motivation and anxiety, versus other unchangeable variables such as age, gender, personality and culture. The premise is that for each learner certain kinds of content knowledge seem to be easier than other types, and that different persons apply diverse strategies to learn the same content, and this is due to individual learning preferences: multiple intelligence and learning style preferences.

FL learning-teaching approaches evolved rapidly during the second half of the 20<sup>th</sup> century. In choosing one approach certain styles or intelligences may be prioritized, as shown in the following simplified table:

TABLE 1  
 Foreign Language methodological approaches related to LS and MI

FOREIGN LANGUAGE APPROACH	PRIORITIZED LEARNING STYLE	PRIORITIZED MULTIPLE INTELLIGENCE
Grammar-Translation	Theoretical	Verbal-Linguistic, Intrapersonal
Audio-Lingual	Reflective	Spatial, Intrapersonal
Total Physical Response	Active	Kinesthetic
Communicative	Active, Pragmatic	Interpersonal
Task-Based	Pragmatic	Interpersonal

Teaching style has been related to the different methodological approaches in FL (Cook, 1991), however it may be further posited that the methodological approach should be the meeting point between teaching style and learning style.

FIGURE 1  
Meeting point between Teaching and Learning Styles



There seems to be a general dissension among educators, with respect to LS and MI theories. On many occasions these two theories have been interchanged and viewed as synonymous. What authors clearly acknowledge, however, is that both theories discuss the relationship between individual differences and personal learning preferences. The analysis of their definitions should be helpful in distinguishing between both theories.

Learning styles have been defined «as characteristic cognitive, affective, and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment» (Keefe, 1979: 11). Although this concept incorporates many constructs the author has employed Honey and Alonso's model (Alonso *et al.*, 2006) which follows Honey and Mumford's conceptualization of learning as a circular process of four stages: active > reflective > theoretical > pragmatic. Below, there is a summary of the characteristics associated with those stages adapted from Alonso *et al.* (2006).

TABLE 2  
Learning Styles Characteristics

ACTIVE	REFLECTIVE	THEORETICAL	PRAGMATIC
Spontaneous	Analytic	Critical	Practical
Risky	Prefer listening	Objective	Experimenting
Entertainer	Thinker	Logical	Realistic
Discoverer	Precise	Structured	Direct
Group oriented	Observant	Perfectionist	Impatient

According to Gardner (1999: 33) «Intelligence is a bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture». His work with brain-damaged patients has led him to think that these intelligences work separately, and after filtering all intelligence candidates through eight qualifying criteria, they have been categorized into the following eight intelligences:

TABLE 3  
Multiple Intelligences Characteristics

Verbal-Linguistic	Ability to use words. Speak, listen, read, write.
Logical-Mathematical	Ability to use numbers. Rational; cause-effect; experimentation.
Spatial	Ability to present ideas visually: images, pictures, patterns, shapes, colors.
Musical	Ability to identify music, tempo, rhythm. No verbal sounds.
Body-Kinesthetic	Ability to use body to express ideas and feelings. Movement, manipulative resources, drama.
Interpersonal	Ability to respond to others' needs. Conflict solvers.
Intrapersonal	Ability to know oneself and work individually.
Naturalist	Ability to recognize patterns in nature.

Both theories have been debated but it is not the author's objective to enter into that discussion. The focus of this article is to show how the two theories complement each other during the teaching-learning process and to discover the existence of any overlap.

The characteristics shared by both Styles and Intelligences are: (1) They refer to individual differences regarding personal learning preferences; (2) They are possessed by all, though in different proportions; (3) They are not innate, and can be stretched; (4) The values are neutral; neither positive nor negative; (5) They are stimulated within a specific environment or cultural setting.

Looking carefully at the definitions of LS and MI, it is clear that they refer to different preferences in our learning process. A style is a cognitive, affective and physiological behaviour while an intelligence is a bio-psychological potential. A style is the manner in which a learner perceives, interacts and responds in the learning context, while an intelligence is the potential to solve problems or create products. Gardner (2009) has tried to clarify this confusion in his statement:

an intelligence is not the same as a sensory system [...]; intelligence is not a learning style. Styles are ways in which individuals putatively approach a wide range of tasks. An intelligence is a computational capacity whose strength varies across individuals. An intelligence is not the same as a domain or discipline [...] (Gardner, 2009: 7).

Silver, Strong and Perini (2000), in their attempt to integrate these two theories, state that the MI theory focuses on *what* we prefer to learn, that is, the preferred learning content; while LS emphasizes *how* we learn better, the process of how we perceive that content.

Most recently Claxton and Lucas (2013) have presented the idea of composite intelligence and explained how it has found its way into many schools through

the attempt to establish the use of both Gardner's MI framework and the concept of LS. This theory of composite intelligence comprises eight dimensions: learnable, expandable, practical, intuitive, distributed, social strategic and ethical.

One may conclude that LS relates to the way in which new information is approached, whereas MI highlights the potential to process different types of information. In this study both theories have been integrated in the attempt to provide students with the benefits of both: the flexibility of approach and the freedom of exploring their potential to process diverse information within the learning context. In the following section it is explained how these theories are specifically applied in the experimental course of Spanish as a foreign language.

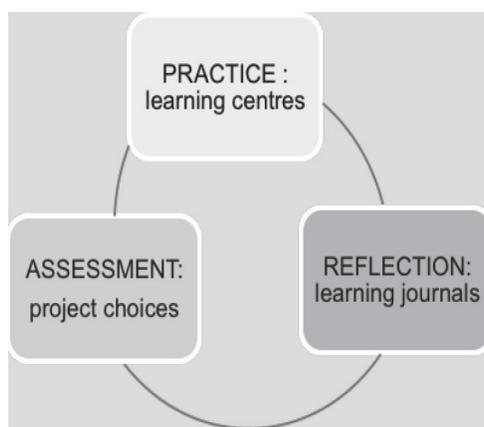
### 3. EMPIRICAL STUDY: METHODOLOGY

#### 3.1. *Experimental Course*

This empirical work is based on the design of an experimental course which constitutes the intervention in the group that is being investigated. Spanish-3 is a 36 hour course that has been structured to last twelve weeks. The course with its traditional 'no choice' approach has been used for the control group; all students do same practice activities and assessment assignments as it is shown in Table 4.

In the experimental course, learning strategies and assessment choices have been organized, in keeping with the theoretical framework of LS (Alonso et al. 2006) and MI (Gardner, 1983). The course is supported by three pillars: (1) the learning centres where students choose learning activities; (2) project choices for assessment; (3) the use of journals as instruments for reflection on their learning choices.

FIGURE 2  
 Experimental Course Design



In a 3-hour session, the first hour and a half is devoted to teaching the students in a large group while in the second half each student chooses one of the five learning centres offered in the class to practice Spanish. Afterwards, they write reflections about their learning choices in their journals, and this information is used later to triangulate the data obtained from the questionnaires in order to determine their learning profile. This setting generates a democratic class where students take responsibility for their learning. This autonomy of choice is a motivating factor which enhances their freedom to apply their learning preferences.

FIGURE 3  
Learning Centres in the experimental group



Traditionally the intelligences prioritized in our Western educational systems are Verbal-linguistic and Logical-mathematic and the favoured styles are Theoretical and Pragmatic (Silver *et al.*, 2000). The following are the options given for assessment in this experimental course and a more traditional approach for the control group. Rubrics were created for each assignment in order to rationalize and standardize the marks distribution.

TABLE 4  
Assessment activities for Spanish 3 Course

	Coursework Assignments (55%)	Final Exam (45%)
Experimental Group	<ul style="list-style-type: none"> <li>- Project 1 (25%), 4 options: drama presentation, storytelling, video creation, food recipe demonstration.</li> <li>- Project 2 (20%), 6 options: creation of a video, a game, or a song; nature based presentation, dance demonstration, grammar activity presentation</li> <li>- Journal (10%)</li> </ul>	Reading comprehension +Writing+ Grammar 30% Listening comprehension 15%
Control Group	<ul style="list-style-type: none"> <li>- Project 1 (25%): drama</li> <li>- Mid-term test (15%): listening comprehension, reading comprehension, grammar, and writing Journal (15%)</li> </ul>	Reading comprehension +Writing+Grammar 30% Listening comprehension 15%

At this point it is necessary to reflect on the activities suggested for in the experimental course in order to reassure that all styles and intelligences are included. Following the general preferences and challenges of each LS indicated by Alonso *et al.* (2006), the author has created a classification of the FL class activities, according to styles.

TABLE 5  
Foreign Language class activities according to Learning Styles

	ACTIVE	REFLECTIVE	THEORETICAL	PRAGMATIC
ACTIVITIES for the FL CLASS	<p><b>INTERACTIVE</b></p> <ul style="list-style-type: none"> <li>- Speaking/writing for fluency.</li> <li>- Role-plays</li> <li>- Communicative tasks</li> <li>- Drama, riddles</li> <li>- Discovering culture</li> <li>- Meeting people</li> <li>- Creating audios/videos</li> <li>- Dance, play</li> </ul>	<p><b>LONG TERM TASKS</b></p> <ul style="list-style-type: none"> <li>- Preparation activities</li> <li>- Reading</li> <li>- Listening</li> <li>- Grammar accuracy</li> <li>- Journal writing</li> <li>- Research</li> <li>- Revise, edit and repeat for improvement</li> </ul>	<p><b>INTELECTUAL CHALLENGE</b></p> <ul style="list-style-type: none"> <li>- Reading</li> <li>- Listening</li> <li>- Grammar practice</li> <li>- Summarize</li> <li>- Compare</li> </ul>	<p><b>EXPERIMENTING</b></p> <ul style="list-style-type: none"> <li>- Content related to self interest</li> <li>- Meeting native people</li> <li>- Role-play</li> <li>- Following practical instructions: cooking, dancing</li> <li>- Videos about real facts</li> </ul>
Preferences	<p><b>CHANGE / CHOICE</b></p> <ul style="list-style-type: none"> <li>- Interaction, speak</li> <li>- Challenge, improvise</li> <li>- Problem solving</li> <li>- Group competition</li> <li>- Being focus of attention</li> <li>- Produce, create</li> <li>- Try new things</li> </ul>	<p><b>RECEPTIVE</b></p> <ul style="list-style-type: none"> <li>- Preparation time</li> <li>- Compilation</li> <li>- Observe, meditate</li> <li>- Videos watching</li> <li>- Reproduce</li> </ul>	<p><b>STRUCTURE</b></p> <ul style="list-style-type: none"> <li>- Analyze</li> <li>- Relate</li> <li>- Look for patterns and connections</li> <li>- Understand the rational</li> </ul>	<p><b>MODEL IMITATION</b></p> <ul style="list-style-type: none"> <li>- Apply new content</li> <li>- See applicability</li> <li>- Plan practical tasks</li> </ul>
Challenges	<p><b>REPETITION</b></p> <ul style="list-style-type: none"> <li>- Drills</li> <li>- Individual task; journal writing</li> <li>- Details, grammar accuracy</li> <li>- Long term projects</li> <li>- Listening/reading for long in a passive way</li> </ul>	<p><b>IMPROVISE</b></p> <ul style="list-style-type: none"> <li>- To be focus of attention or leader</li> <li>- Time pressure</li> <li>- Superficial work</li> </ul>	<p><b>EMOTION DISPLAY</b></p> <ul style="list-style-type: none"> <li>- Trivialities</li> <li>- Work without criteria</li> <li>- Not to see logic or connections</li> </ul>	<p><b>THEORY</b></p> <ul style="list-style-type: none"> <li>- Formalities</li> <li>- Slowness</li> <li>- No practical purpose or unrealistic</li> <li>- No reward for the task</li> </ul>

The same process is followed in the classification of activities according to MI.

TABLE 6  
Foreign Language class activities according to Multiple Intelligences

Verbal-Linguistic	Listen to: lectures, CDs, stories Speak: debates, dialogues, word games, story-telling Read/Write: cards, stories, journals, magazines
Logical-Mathematic	Order the sequences of a story; logical and story problems. Puzzles, computer problems. Predict: look for cause and effect in a reading. Calculate, classify, categorize.
Spatial	Use or create images, pictures, maps, posters, videos. Use colours. Relate images and meaning. Look for differences in pictures. Organize information visually: graphic organizers, schemes, diagrams.
Musical	Listen/sing/play music, rhythm and verbal/non verbal sounds. Look for pattern in intonation and sound. Create instruments (individual/group).
Body-Kinesthetic	Total Physical Response games. Movement, hands on, handicrafts. Sport, physical games, drama, mime, role-plays, cooking, dancing.
Interpersonal	Cooperative work, pair teaching, games (pair/group). Dialogues, interviews, games, projects, drama.
Intrapersonal	Independent work: journal, reflective writing, inventories, grammar.
Naturalist	Observe, describe, and classify: animals, environment, plants, weather, natural medicine. Watch natural life videos. Field trips.

These taxonomies are crucial to the interpretation of students' journals in which preferences for certain activities have been expressed. However the author has expanded on these concepts with the innovation of a classified table which simultaneously integrates FL class activities with styles and intelligences. Many activities pertain to several styles and intelligences which means that they are eclectic (Lago, Colvin and Cacheiro, 2008). This classification reveals that by offering those activities that fall into various categories more styles and intelligences are being facilitated and by extension more learners actually benefit which has been the purpose when introducing assignment options for students.

TABLE 7  
Foreign Language class activities according to LS and MI

	ACTIVE/CHANGE	REFLECTIVE/COMPILE	THEORETICAL/ ANALYZE	PRAGMATIC/APPLY
VERBAL	<b>Speak:</b> debates Write in group Word games <b>Story telling</b>	<b>Read</b> Creative writing: poem, <b>journal</b> Editing grammar accuracy	<b>Read</b> <b>Listen to stories</b> and conference, Summarize <b>Grammar</b> accuracy	Speak: interviews, debates Read, write, listen for a purpose: news, announcements, current personalities
LOGIC	Riddles, puzzles	Research Predict, look for cause and effect	Look for patterns Logical problems Computer games	Order instructions / recipe sequences Calculate, classify
SPATIAL	Create images, drawing, maps to summarize content <b>Create a video</b>	Observe images, maps, <b>videos.</b> Look for differences in images Relate images and content	Organize visually by diagrams, or schemes.	Use colours for coding Watch videos for a purpose: cooking.
MUSIC	Listen to or sing in group, <b>Create song</b> Compete	Listening for info, Repeating	Listen and look for patterns in content and rhythm	Play /create an instrument Sing for a purpose (Christmas )
BODY	<b>Drama</b> <b>Dance</b> <b>Playing games</b>			<b>Cooking</b> Handicrafts <b>Physical games</b>
INTERPERS	<b>Group work</b>			Meet native people
INTRAPSE		<b>Individual work</b> <b>Journal writing</b>	Individual work <b>Grammar</b>	
NATUR	Nature discovery	Observe, research, <b>describe nature</b>	Compare	<b>Nature application:</b> health, beauty, weather

### 3.2. *Sample and context*

The population consists of all year 3 part-time students of Primary Specialization taking the Spanish 3 course during first semester of the academic year 2010-2011. They are pursuing a four year-Bachelor of Education Degree at the University of Trinidad and Tobago. During the first semester this course happens to be offered only part-time, consequently the two part-time groups constituting the sample of this study are the whole population studying Spanish 3 at that time period. This was an intentional decision since the results of this research would inform of the convenience of adopting the experimental course for the full time students in the following semester. All participants are in-service teachers with analogous socio-academic characteristics and both groups are similar as shown below: an experimental group (N=26) and a control group (N=23). Students were explained the research project and accepted to participate.

TABLE 8  
Socio-academic data of sample

	GENDER	AGE	SPANISH BACKGROUND	TEACHING EXPERIENCE YEARS
Experimental Group (N=26)	21 females 5 males	Mean 38.5 Largest 55 Smallest 28	CXC-15 Form 3-9 Form 2-2	Mean 15.4 Largest 38 Smallest 1
Control Group (N=23)	20 females 3 males	Mean 37.8 Largest 55 Smallest 29	CXC-14 Form 3-7 Form 2-2	Mean 15.1 Largest 33 Smallest 1

It is not a probabilistic sample since individuals constitute natural groups created randomly for academic purposes. This can be called accessible sampling according to Sabariego (2009) or it may be described as a convenience sampling according to Dörnyei (2007), who states that this is the least desirable but most common sampling strategy; the researcher uses those who are available. The researcher was also the class instructor and had easy access to the students. The control group has only been used in order to compare performance with the experimental group that had the intervention of a course designed to give students choices following LS and MI theories as it is explained in section 3.1. The bigger group has been selected as the experimental group to have the intervention and to apply all the other objectives of this study: define the learning profile, triangulate journals with questionnaire data. A major limitation of the research can also be attributed to the sampling. In spite of the internal validity of the research as a descriptive and exploratory study, it lacks statistical value because of its small size (Dörnyei, 2007).

### 3.3. *Data collection instruments*

The combination of contrasting instruments in the data collection has led to the creation of a mixed paradigm: on the one hand quantitative tools such as questionnaires and grades from assignments and tests, and on the other hand, learning journals. This complementary use of quantitative and qualitative methods has added strength to the study (Dörnyei, 2007).

There are many instruments to measure LS and MI, however most criticism to both LS and MI theories fall on the low reliability of the instruments (Griffiths, 2012). The author has thus exercised caution in the selection of the following: the questionnaire of Learning Styles CHAEA in its English version and the *Multiple Intelligence Indicator for Adults* (Silver *et al.*, 2000). Both are standardized and are in the public domain. The CHAEA, a popular investigative tool, was originally used in a sample of 1,371 Spanish university students. Its reliability has been proven by the successful application of the Cronbach Alfa test, and content and factor analyses have been carried out to ascertain validity (Alonso *et al.*, 2006). The Multiple Intelligence test by Silver and Strong (2000) has also been widely used and validated.

Questionnaires based on self-analysis have their limitations since they are influenced by self-perceptions, and may not always be accurate. Therefore, the information obtained from the journals is to be used to validate the data derived from the questionnaires.

Over a twelve week course, diaries were used by informants who chose to write in English or Spanish. A small notepad was given to each student and time for writing was slotted at the end of the class. Students were given up to ten marks for the potential twelve reflections based on their thoughts and feelings about the different class strategies, and their assignment choices. It became an active and even cathartic process when some students vented their frustrations or fears. The researcher collected journals weekly and dialogued with participants via the journals following Dörnyei's recommendation (2007) of the maximization of journal use. There was no word limit, and the quality varied from superficial to very introspective. Journals became more of a data generator than a data collector (Massot *et al.*, 2009) with the advantage of being a non-intrusive way of obtaining information.

The academic performance data was easily collected since the researcher and instructor was the same person. The marks were divided into categories: different projects, listening comprehension, reading comprehension and writing which later have been correlated to the different variables of style and intelligence.

#### 4. RESULTS AND DISCUSSION

The quantitative data has been analyzed using statistical package SPSS 16.0.

##### 4.1. *Learning profile of the experimental group*

The first objective has been to determine the learning profile of the experimental group. Regarding the LS profile of the experimental group, a descriptive analysis shows the following means:

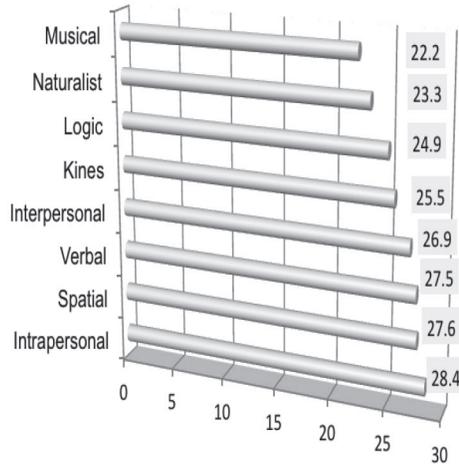
Active =	11.3	Moderate Preference
Reflective =	16.6	Moderate Preference
Theoretical =	15.1	High Preference
Pragmatic =	14.2	High Preference

The mean in each category seems to be quite high in relation to the general scale of Alonso *et al.* (2006). This scale serves as a reference since the interpretative meaning of the obtained values is relative: for example, 16 in the Reflective category is considered to be moderate while 14 in Pragmatic is high.

In comparison to other studies (Alonso *et al.*, 2006), this group has demonstrated a high preference for Theoretical and Pragmatic styles. However, the application of Pearson's correlation test shows a negative coefficient between 'Pragmatic style' and 'years of teaching experience'; notably, a lesser Pragmatic preference has been manifested by respondents with more years of experience. On the other hand, the mean is higher in all styles except Active and this leads one to speculate whether it may have some relation with the age variable since the average age is high (38). The negative coefficient of the correlation (-.211) has proven that the higher the age, the lower the Active style.

A descriptive analysis of the MI learning profile has been conducted, and it must be noted that the mean obtained in each one is only relevant in relation to the others (Sauer, 1998). The results reveal that the highest preference is Intrapersonal intelligence followed by Spatial and Linguistic, and the lowest preference corresponds to Musical and Naturalist intelligence.

FIGURE 4  
 Multiple Intelligence Means in experimental group



4.2. *Correlations in the constructs*

The second objective has been to establish correlations, not only between both constructs but among the variables of each construct. In the search for correlations among the four styles, a high correlation (.727) between Reflective and Theoretical as it was the hypothesis; and a moderate correlation (.529) between Active and Pragmatic have been found. In contrast, a negative correlation (-.278) has been discovered between Active and Reflective styles; meaning that the higher the Active, the lower the Reflective. This may be described as a logical result which supports validity of the data.

TABLE 9  
 Correlations among the four styles of LS construct

	ACTIVE	REFLECTIVE	THEORETICAL	PRAGMATIC
Active	1	-.278	-.053	.529*
Reflective	-.278	1	.727*	.137
Theoretical	-.053	.727*	1	.226
Pragmatic	.529*	.137	.226	1

The Pearson Test has been applied in the quest for correlations among the intelligences. Six moderate correlations have been identified: Kine-Spatial (.629\*\*) as it was the hypothesis; Kine-Musical (.570\*\*); Kine-Interpersonal (.569\*\*);

Logic-Verbal (.457\*); Logic-Spatial (.422\*); and Musical-Interpersonal (.414\*). These correlations also help to corroborate the data.

TABLE 10  
Correlations among eight intelligences in MI construct

	VERBAL	LOGIC	SPATIAL	MUSICAL	KINES	INTER-	INTRA-	NATURAL
Verbal	1	.457*	.233	.078	-.013	-.193	.278	.353
Logic	.457*	1	.422*	.235	.200	-.020	.108	.067
Spatial	.233	.422*	1	.394*	.629**	.139	.242	.181
Musical	.078	.235	.394*	1	.570**	.414*	-.042	-.101
Kines	-.013	.200	.629**	.570**	1	.569**	.145	.260
Inter-	-.193	-.020	.139	.414*	.569**	1	.080	.080
Intra	.278	.108	.242	-.042	.145	.080	1	.218
Natural	.353	.067	.181	-.101	.260	.080	.218	1

\* $p < .05$  \*\* $p < .01$ .

Finally, in the pursuit of possible correlations between the variables of both constructs, the Pearson test has been again utilized. Three moderate correlations have been identified: Verbal-Reflective (.502); Verbal-Theoretical (.431); and Musical-Active (.440). These correlations seem plausible since Verbal and Theoretical are high preferences in their respective constructs; likewise, Active and Musical are the lowest preferences in their constructs. The negative correlation coefficients that have been discovered are Verbal-Active (-.347), and Reflective-Interpersonal (-.418). They may be deemed to be consistent, thereby adding credibility to the data. The hypotheses of correlation between Reflective-Intrapersonal, and Active and Kinesthetic was not confirmed.

TABLE 11  
Correlations between variables of both constructs LS and MI

	VERBAL	LOGIC.	SPATIAL	MUSICAL	KINES	INTER	INTRA	NATURAL
Active	-.347	.210	.095	<b>.440*</b>	.304	.315	-.156	-.181
Reflect.	<b>.502**</b>	.095	.058	-.161	-.167	-.418*	.252	.158
Theoreti.	<b>.431*</b>	.307	.225	.050	.019	-.179	.219	.007
Pragmat.	-.149	.317	.262	.140	.292	-.188	.057	-.129

### 4.3. *Performance experimental versus control group*

Third objective has been to create a Spanish course according to LS and MI theories, and use it as the intervention in the experimental group in order to investigate the hypothesis of its improved performance compared to the control group. A quasi-experimental deductive method has been followed, and according to Sans (2009) it can be summed up like this:

Group	Assignment	Pretest	Treatment	Posttest
Experimental	noR	O	X	O
Control	noR	O		O

The performance scores of the previous course (Spanish 2), that had been obtained through the same assessment procedure, are used as the pretest reference. Then the 12 week experimental course intervention takes place in the experimental group, while the control group follows the traditional course without modifications. Lastly the final scores of Spanish 3 obtained in each group are used as posttest performance.

Application of the Kolmogorov-Smirnov normality test shows that the data follows a normal distribution except for that of the posttest academic performance of the experimental group. However, although the significant coefficient is lower than .05 ( $p = 035$ ), the author believes that the research has still remained unhampered because of its exploratory nature and the smallness of its sample size.

The paired samples t-test has been employed with each group, control and experimental, to compare their performance scores before and after the course Spanish 3. Since the size of both groups is less than 30 participants, it is considered to be small; therefore the student-t distribution is considered to be a useful approximation to the normal distribution under central limit theorem.

The paired samples t-test compares the pretest and post test means and calculates a t value. In the case of the experimental group,  $t = -4.825$ ; it falls outside the critical region (-2.78 and +2.78) therefore the alternative hypothesis is confirmed: a meaningful improvement in the performance has been noted. On the other hand in the control group  $t = -2.240$ ; it falls inside the critical region (-2.82 and +2.82) therefore the null hypothesis is confirmed: there has been no significant improvement. The improvement in the performance of the experimental group has thus been proven to be statistically significant. However the author notes that this outcome is still inconclusive since there are external variables that can influence the results.

### 4.4. *Correlation between performance and LS and MI preferences*

The fourth objective has been to investigate the correlation between students' performance and their preferences in LS/MI, in order to verify if a preference in a

style or intelligence favours a better performance. Two moderate correlations have been discovered in the Reflective and Theoretical styles: higher preference in these styles corresponds to higher overall academic performance in the FL.

TABLE 12  
Correlation between performance and LS preference

	Total (100%)	Projects (55%)	Listening (15%)	Written (30%)
Active	-.080	.037	-.129	-.158
Reflective	.418*	.254	.326	.440*
Theoretical	.592**	.351	.400*	.668**
Pragmatic	.323	.387	.288	.019

These same conclusions have been drawn by authors (Aceve and Rocha, 2011; Ossa and Lagos, 2013), while other empirical research has found meaningful correlation between performance and Theoretical style (Carmen *et al.*, 2011; Yao and Iriarte, 2013). There is need for caution in the utilization of performance data, and it is necessary to analyze the kinds of assignments through which the data was obtained, in order to understand the correlations. In the table above the marks have been divided into three categories and it can be observed that the correlation values in the 'projects category' are closer than those in the other two groups. This indicates that Pragmatic and Active preferences have been more easily facilitated by the 'projects option'. However, this has not occurred in the written and listening tests. This is a positive finding because the projects were introduced as part of the intervention in order to give options to learners. It is also important to note that there is still a high percentage of the course that favours Theoretical and Reflective preferences who overall perform better.

The Pearson correlation test has also been employed in the search for parallels between performance and Multiple Intelligence preferences. Nevertheless no meaningful correlations have been found, results that are supported by Griffiths (2012) who argues that there is no special intelligence preference that leads to success, although one would think that students with a linguistic preference would obtain better results.

TABLE 13  
Correlations between performance and MI preferences

	VERB.	LOG.	SPATIAL	MUSICAL	KINES.	INTER	INTRA	NATURAL.
Perform	.211	.067	.083	-.048	.126	-.255	.285	.197

Gallego and Alonso (2008) insist that it is crucial to consider performance in a complex context of variables. External variables such as previous knowledge of Spanish or age have an impact on performance. A correlation test with age has been done, and two negative correlation coefficients have been found: the older the learner, the lower the grades obtained; the older the learner, the lower the preference in all styles except for the Theoretical category.

TABLE 14  
Correlation: age and performance and preference of LS

	PERFORMANCE	ACTIVE	REFLECTIVE	THEORETICAL	PRAGMATIC
Age	-.265	-.211	-.166	.023	-.389*

#### 4.5. *Triangulation of journal and questionnaire data*

The fifth and last objective has been to analyze the learning journals and relate to questionnaire data. Journals offer contextualized data since respondents have referred to authentic situations in comparison to the questionnaire generated data which has dealt with hypothetical scenarios.

Firstly journals have been coded to identify respondents and entries (#1:7 means respondent 1, entry 7). Secondly journals have been analyzed with the aim of triangulating individual profiles to validate the data obtained through questionnaires. This 'vertical analysis' examines the reflections of each student, in the quest for evidence of style and intelligence preferences; some reflections may connect with two or more preferences. These comments have been recorded in a LS-MI crossed table in which colours have been used to indicate low or high preference. Some conclusions that have resulted from this individual analysis are:

- Questionnaire data is validated by journal comments.
- There seems to be a correlation between students who express a partiality for listening activities and Musical Intelligence preference.
- Students who express fear when presenting projects for the group fall into the category of high preference in Intrapersonal Intelligence.
- Comments showing interest in grammar accuracy have come from students with a high Theoretical style preference.

Finally a 'horizontal analysis' has been performed to investigate comparable responses given by students in order to find common categories. From the twenty six analyzed journals, about twenty different categories have been considered, but the five most recurrent categories have been the following:

1. Methodological approach: Individual attention and choice of options have been the most appreciated aspects of the course: «In such a large group, a

- lot of personal attention» (#1:11); «I was intrigued by the options presented, they allowed for freedom of choice» (#3:1); «One good thing is the multiple opportunities to practice» (#24:9).
2. Projects: As an innovative assessment mode, projects have been positively valued as giving space for creativity: «Today was one of the most enjoyable Spanish classes I have ever had. We had to make presentations... truly inspiring» (#8:5); «This course was different to others because it made me develop as an individual in different areas: music, art, singing, games...». (#10:11).
  3. Journals: These have been perceived as a useful tool to generate interpersonal relationships: «The diary helped us to reflect... for you to understand our concerns» (#2:11).
  4. Primary school transfer: Students' reflections based on the desire to implement strategies, modeled by their instructor, into their primary classroom. Significantly, many of them have come from students with a high Pragmatic preference: «I am surely going to try this activity with my class... Relaxing before class, warm up activities etc.» (#13:3).
  5. Cathartic expression: The journals have revealed themselves to be instruments for venting emotions and this has given evidence of the relaxed atmosphere of the class: «My colleagues said I was real brave... imagine that» (#13:6); «Conjugations frustrate the hell out of me» (#17:3).

## 5. CONCLUSIONS

First, in the learning profile of the experimental group Theoretical and Pragmatic Styles have emerged as high preference modes while Intrapersonal, Spatial and Verbal Intelligences have been observed to be the preferred ones. On the other hand, Active Style and Musical Intelligence have revealed a low preference. These results describe the general tendency within the group, and they serve as an indicator of what kind of learning activities may better facilitate the learning process. It is critical to address all styles and intelligences in a class in order to release the greatest potential of all students, because best overall performance is obtained by students with preferences in several styles and intelligences (Reid, 1987). Instructors need, therefore, to create courses where all these partialities have been accommodated so that students would have the opportunity to build on their preferences.

Second, moderate correlations between Verbal intelligence-Reflective style, Verbal intelligence-Theoretical style and Musical intelligence-Active style have been identified. The study needs to be repeated with a bigger sample in order to have a statistical value.

Third, it has been statistically proven that with the LS+MI-designed course as intervention, the experimental group has manifested a significant improvement in performance in comparison to the control group.

Fourth, regarding performance, students with high preference for Reflective and Theoretical style obtain better results. In this study, however, no correlations have been found between multiple intelligences and performance. Pragmatic and Active preferences have been more easily facilitated by the 'projects option' in the experimental group.

Fifth, journals have validated the data obtained from the questionnaires, thereby adding value to the learning profile diagnosis. Journals have been used by Rebecca Oxford (1999) but her aim has been to study the conflict of learning style between instructor and student, therefore this has been an innovative use.

The dual conclusions which have impacted upon the Bachelor of Education Primary Specialization at the University of Trinidad and Tobago are:

(1) Motivation level for learning Spanish has clearly increased in the experimental group. As mentioned in other studies, the teaching approach through LS and IM has improved the students' attitude for learning (Kornhaber *et al.*, 2004; Hall-Haley, 2004). Silver, Strong and Perini (2000) summarize it as follows.

By putting diversity to work with learning styles and multiple intelligences, teachers create a classroom environment in which students are engaged in finding their own talents and interests. Through personal exploration and the ability to choose, students remain interested, participate actively, build self-confidence, and develop the self-motivation needed to become good learners (p. 45).

(2) This experimental course has steered the Spanish section towards acceptance and practice of its design, as well as its use as a model for the other two language courses.

The limitations identified in this study have been: (1) The sampling is small and not representative of the population. The study may therefore be described as exploratory and descriptive, and cannot be used as conclusive evidence. (2) Values in both constructs LS and MI are not static but complex and dynamic. They are thus difficult to isolate for scientific measurement; a fact which discourages research in this area.

The author believes that «no action without research; no research without action» and has set out:

- To deepen into the relationship between these two constructs, and to establish how they complement each other in the learning-teaching process.
- To look for a better alignment between objectives, practice, and evaluation; with the view that different styles and intelligences should be present in the three levels of a course design. The final aim is to prepare learners not only for the academic context, but also for work, life (Alonso and Gallego, 2010), and the real and diverse world (Lucas, Spencer and Claxton, 2013).
- To explore the cultural difference variable in relation to Multiple Intelligences and Learning Styles (Gallego and Alonso, 2008; Oxford, 2011).

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