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FACULTAD DE EDUCACIÓN

# LANGUAGE APTITUDE INFLUENCE ON FOREIGN LANGUAGE ACQUISITION

Cecilia Calderón Poves

Director: Dr. D. Rafael Alejo González.

Departamento: Filología Inglesa.

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## ABSTRACT AND KEY WORDS

The present MA dissertation aims to analyse aptitude as a predictor of foreign language acquisition and successful performance, in settings where foreign languages are the means of instruction, i.e., CLIL contexts. A case study was developed with learners from different backgrounds and schools. These learners were asked to perform the activities of a series of materials, which can be used to analyse the main components of language aptitude. The results of the research were compiled from the answers given by the students in each task, and then compared to the students' marks in language-related areas. The results obtained were examined, focusing on each component separately. The outcomes suggest that, because the students completed the tasks successfully and have high marks in those subjects related to foreign languages, language aptitude can be a predictor of profitable execution in foreign language acquisition.



**Key words**: individual differences, aptitude, aptitude test, working memory, CLIL.

## RESUMEN Y PALABRAS CLAVES

El presente trabajo tiene como objetivo analizar la aptitud para los idiomas como posible predictor de rendimiento exitoso de los alumnos, en áreas donde las lenguas son el medio de instrucción de contenidos (programas ACILE). Se desarrolló un estudio de casos con estudiantes de escuelas diferentes y con características diversas. Se les pidió que completaran una serie de materiales dedicados a analizar los componentes principales de la aptitud. Los resultados obtenidos de las respuestas de cada actividad fueron comparados con las notas de estos alumnos en las asignaturas AICLE y en la asignatura de Inglés. Estos resultados sugieren que, debido a que los estudiantes completaron las tareas con éxito y tienen altas calificaciones en aquellas materias relacionadas con lenguas extranjeras, la aptitud para los idiomas puede pronosticar una ejecución favorable en la adquisición de lenguas diferentes a la nativa.



**Palabras claves**: diferencias individuales, aptitud, test de aptitud, memoria funcional, AICLE.

## ABREVIATION LIST

**CANAL-F**: Cognitive Ability for Novelty in Acquisition of Language (Foreign) Test (Grigorenko et al. 2000)

**CLIL**: Content and Language Integrated Learning.

**GPA:** Grade-Point Average

**ID(s):** Individual Difference(s).

**L2**: Second Language.

**LLAMA**: (Meara 2005)

**MLAT**: The Modern Language Aptitude Test (Carroll & Sapon, 1959)

**MLAT-E**: Modern Language Aptitude Test- Elementary Version

**MLAT-ES:** Modern Language Aptitude Test- Elementary Spanish Version

**PLAB**: Pimsleur Language Aptitude Battery (Pimsleur, 1966)

**SLA**: Second Language Acquisition.

**VAK/VARK model:** Visual, Aural, Reading and Kinesthetic learning.

**WM:** Working Memory.

# OUTLINE

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# 1. JUSTIFICATION

Even though the topic of individual differences (IDs) is an interesting issue concerning Second Language Acquisition (SLA), it has been overlooked in terms of research. The higher amount of investigation is mostly related to the factors of motivation and age. However, it has been recognized that aptitude is an individual difference that can affect any type of knowledge acquisition, and can even work as a predictor for learning success. This concept can be defined as an ability to learn something quickly and do it well. Therefore, it can also be relevant when referring to foreign language learning.

Thus, the motivation to write this thesis emerges from the interest to gather information and address aptitude as a possible determiner of successful performance in CLIL contexts. Moreover, the results collected and the conclusions gathered can be used in my future work as a teacher.

Firstly, the literature concerning IDs was analysed, focusing specially on aptitude. Regarding aptitude, there has been multiple studies and tests (such as the MLAT test by Carroll) which aim to show the link between aptitude and foreign language learning. The most important tests are presented, since they are the basis of the materials used in order to carry out the intervention proposal.

Secondly, using self-made materials, the main goal of this dissertation is dealt with: to research how students' language aptitude can be related to their performance in the CLIL subjects or in EFL. To do so, they were presented with several exercises, mainly based on the Spanish adapted version of the MLAT (MLAT-ES) and the LLAMA test. These activities also correlate to working memory (another notion that influences learning outcomes).

Finally, the results were compared with those acquired in the CLIL subjects or EFL, and conclusions were drawn.

# 2. OBJECTIVES

## 2.1.General objective

To analyse language aptitude as a predictor of Second Language Acquisition.

## 2.2. Specific objectives

- To explore the association between language aptitude, working memory and successful language acquisition.
- To correlate language aptitude and working memory to the CLIL context.
- To create tools which may be used to measure language aptitude and working memory in the school context.

# 3. BACKGROUND. CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL)

This piece of research was initially thought to be developed inside the framework of the Content and Language Integrated Learning approach (from now on, CLIL). It is an investigation that aims to help CLIL teachers in their task, as one of the objectives is to identify weaknesses and strengths in language through language aptitude. In the CLIL approach, students learn the language in an implicit way, as they are presented with materials in a foreign language in which there is no explicit attention to the language form. This way, a lot of responsibility falls on the student, therefore teachers should be prepared to detect problems that may arise, as well as areas of strengths and weaknesses in the language. Now, a brief introduction of the approach will be made, placing emphasis on how it works in our country.

The concept of CLIL was coined in 1994 in Europe. It has been highlighted by multiple researchers that CLIL is an umbrella term which encompasses different methodologies, educational approaches and activities. What makes it special is that it flexibly synthesizes these approaches and methodologies. Even though the term does not have a fixed definition, the one which is more commonly recognised would be Coyle et al.' (2010, p.1): "CLIL is a dual-focus educational approach in which an additional language is used for the learning and teaching of both content and language". Nonetheless, there is neither just one CLIL approach nor just one CLIL theory. There are multiple conceptualizations since the term is very broad.

If CLIL is scrutinised, it is easy to discover that it is balanced between three main foundation pieces: content, language and language skills (Mehisto et al. 2008). While content is acquired through a foreign or second language, learning skills are developed. For this reason, CLIL can be seen as an innovative educational approach that blends these elements.

## 3.1. History of CLIL

Even though the concept of CLIL was created in 1994, "CLIL practice has a much longer history" (Mehisto et al., 2008, p. 9). Its history travels back 5000 years, when the Akkadians defeated the Sumerians and desired to learn the local language. This way,

Sumerian was used as a medium of instruction to teach subjects to the Akkadians. Thus, content was learnt through language. This has been estimated the starting point of CLIL, and one of the best models of what CLIL practice is.

In Europe, in more recent centuries, the concept of bilingualism began to be developed. However, it was seen as a privilege which belonged to those who were wealthier, as not everyone was able to learn foreign languages. Along these centuries, there has been evidence of population living in multilingual territories. Therefore, "these groups - especially rich people in more developed regions - used their bilingualism, or even plurilingualism as a survival method" (Pokrivčáková et al., 2013, p.8)

However, in the 20th century, immersion programmes were articulated. It was a way of spreading bilingualism, which was no longer considered to be privilege for a minority. Particularly, in 1965, a determination to learn both French and English in Quebec (French-speaking Canadian province) gave a boost to these programmes (Mehisto et al., 2008). Nevertheless, immersion programmes are considered to be more language-driven, while CLIL programmes are usually content-driven. There is a lot of controversy surrounding this issue, since multiple authors have diverse points of view. In the 1970s, and because of the enlargement of language-immersion programmes, bilingual education becomes more available.

In the 1990s, plurilingualism began to be seen as an important asset in Europe. In this decade, linguistic barriers were identified by European countries, and other obstacles that prevented the growth of plurilingualism in Europe were tackled. It was in 1994 when the concept of CLIL was coined. Since then, it has been adopted in the majority of the European countries, becoming one of the most used teaching approaches.

According to Marsh (2012), the last decade has pushed the research on CLIL (even though the main focus was placed on the linguistic than the non-linguistic elements of CLIL). However, because of the increase in this type of research, greater emphasis has been placed on student's learning strategies and thinking skills.

### 3.2. CLIL in Spain

In Spain, even though most students have experienced foreign language instruction, more than half only master their mother tongue (Fernández, 2009). Unlike the majority of European citizens, most Spaniards cannot speak a foreign language at the level of being able to have a conversation.

To tackle this shortcoming of language knowledge, Spanish education is starting to adapt and be sensitive to European initiatives: CLIL or bilingual education is growing in importance among Spanish schools, research on bilingual education is increasing and multiple initiatives have been designed in order to expand bilingual education (especially in monolingual communities).

If the language situation is addressed, it is important to bear in mind that the educational organization is divided into autonomous communities. In these communities, there is a clear difference between those regions which are bilingual and those which are monolingual. It could be said that most of the research on bilingualism and multilingualism has been conducted in the former. Particularly, Catalonia and the Basque Country are the communities which bear the brunt of language examination in the country (Lasagabaster, 2010). These regions comprise multiple research groups, such as the BCN-SLA Research Team and the AICLE-CLIL BCN in Catalonia and the REAL Group in the Basque Country. Nonetheless, monolingual communities develop far less research on bilingual education. It is safe to admit that there is a scarcity of materials and research in these regions and that "further research is needed to determine more precisely the long-run effect of CLIL instruction in these settings" (Fernández, 2009, p. 9).

In order to manage and improve the situation in Spain, multiple initiatives have been generated. Some of them appear in the educational laws, others were designed by the Ministry of Education and others are specifically devised for particular autonomous communities. These initiatives are presented in the following table, according to data displayed by Fernández (2009).

Table 1

*Initiatives implemented to promote bilingual education.*

| NAME OF THE PROJECT | CONSISTS OF |
|---|---|
| **The Spanish Ministry of Education and the British Council Project** | Shared bilingual project to present children from ages 3 to 16 with a bilingual and bicultural education through the combination of the Spanish and English curricula. |
| **Programa de Inmersión Lingüística (Language Immersion Programme)** | Offers two types of scholarships: two-week summer camps with exercises carried out in English and economic assistance for attending immersion centres. |
| **PALE (Foreign Language Learning and Teaching Support Programme)** | 200 training hours in foreign language teaching to obtain a greater language competence level and a two-week study stay abroad. |
| **Aulas Europeas (European Classrooms)** | Language and culture immersion programme in France and the United Kingdom. |
| **PILC (School Language Innovation Projects)** | Project offered in La Rioja which approaches university teachers who are compliant to implement CLIL-like model in their classroom. The teacher can use L2 to interact with the students or to teach sections of the curricular contents. |
| **ETC (English Through Content)** | CLIL approach to language learning built around various topic units dealt with from the different viewpoints in different school contexts. |
| **Secciones Bilingües/Europeas (European/Bilingual Sections)** | This programme encourages foreign language teaching by utilizing a CLIL approach and by enabling an increase in the instructional hours in the L2. It is carried out in primary and secondary schools and in monolingual communities. |
| **Proyecto bilingüe (Bilingual Project)** | CLIL model in which any subject, except for mathematics and Spanish language, can be taught in English, French or German. |
| **Plan de Fomento del Plurilingüismo (Plurilingualism Promotion Plan)** | It aims to nurture the European language policy by adjusting other bilingual programmes in Andalusia. |

# 4. THEORETICAL FRAMEWORK

## 4.1. INDIVIDUAL DIFFERENCES

According to Skehan (1991), there are several approaches to Psychology. Particularly, in the study of human functioning, two contrasting approaches can be found: the experimental and the differential approach. Specifically, the differential approach "emphasizes differences between people, seeking to identify the most relevant major ways that people vary" (Skehan, 1991, p. 275). This is the approach which identifies different attributes people may have while performing a particular activity, therefore, identifies the individual differences (from now on as IDs) learners present when acquiring a second language.

However, most research in applied linguistics and second language acquisition has been of the former type. For instance, the study of language features or language system will correspond to the experimental approach, as well as the methodologies used when teaching-learning a language. Contrarily, less research has been conducted into the differences between language learners.

Nevertheless, there are multiple areas where IDs have been shown to be important in language acquisition. According to Dörnyei (2005), the concept of Individual Differences is quite broad. He addressed individual differences from an educational perspective, selecting therefore personality, aptitude, and motivation as principal learner variables. Notwithstanding, "in the L2 field two further factors have traditionally been treated as key IDs, learning styles and language learning strategies" (Dörnyei, 2005, p. 7).

Therefore, following Dörnyei's classification, personality, motivation, learning strategies, learning styles and language aptitude, will be analysed in this thesis. The former four will be briefly discussed, describing the main characteristics of each one. However, the focus will be on language aptitude, since this is the ID related to the study conducted here.

### 4.1.1. Personality

According to Pervin and John (2001, p.4), "personality represents those characteristics of the person that account for consistent patterns of feeling, thinking, and behaving". But, because it is such a broad term and a crucial aspect in psychological research, there are plenty of approaches and models aiming to classify its main components. However, according to Dörnyei (2005, p. 13), "the leading role of the Big Five model in research publications is undeniable", so is this is the model which is going to be discussed in this paper.

This classification groups personality traits, using adjectives and descriptors of common language, suggesting five dimensions (Costa & McCrae, 2012):

- **Openness to experience**: high scorers relate with imaginative, inventive and curious people; meanwhile, low scorers are conservative, cautious, down-to-earth, unartistic, and practical.
- **Conscientiousness**: high scorers are systematic, efficient, organized, reliable, and self-disciplined; however, low scorers are, aimless, careless, disorganized, late and lazy.
- **Extraversion–introversion**: high scorers are sociable, active, assertive, outgoing, and talkative individuals; low scorers are passive, quiet, solitary, reserved, and restrained.
- **Agreeableness**: high scorers are friendly, good-natured, compassionate, forgiving and generous; whereas low scorers are cold, cynical, rude, unpleasant, detached, and uncooperative.
- **Neuroticism–Emotional stability**: high scorers are worrying, anxious, insecure, sensitive, moody and unstable; low scorers are calm, hardy, confident, even tempered, and self-satisfied.

### 4.1.2. Motivation

According to Madrid & Pérez (2001, p. 333), motivation is "an internal state of the individual influenced by needs, and/or beliefs which generate an interest and desire to achieve a goal and moves the individual to attain it with a continued effort". In addition, it is one of the most important factors which affects SLA since it "provides the primary impetus to initiate L2 learning and later the driving force to sustain the long and often tedious learning process; indeed, all the other factors involved in SLA presuppose motivation to some extent" (Dörnyei, 2005, p. 65).

Because of its importance in SLA, research on motivation has always been rich, flourishing since the 1960s. To provide an overview of the field, Dörnyei divides the history of research on motivation in three phases:

> The social psychological period (1959–1990)—characterized by the work of Gardner and his students and associates in Canada.
>
> The cognitive-situated period (during the 1990s)—characterized by work drawing on cognitive theories in educational psychology.
>
> The process-oriented period (2000s)—characterized by an interest in motivational change, initiated by the work of Dörnyei, Ushioda, and their colleagues in Europe. (Dörnyei, 2005, p.67).

In these phases, the basis of the research of motivation and the most important theories were developed. Some important concepts need to be emphasized.

According to Spada & Lightbown (2013), motivation has always been defined in terms of two factors: "learners' communicative needs and their attitudes towards the second language community" (p. 87). This way, they highlight on the one hand Gardner's and Lambert' instrumental motivation and integrative motivation. The former refers to learning to attain a particular goal, whereas the latter has personal growth and cultural enrichment as learning goals. On the other hand, they stress the importance of Dörnyei's process-oriented model of motivation, which comprises three phases: choice motivation, executive motivation and motivation retrospection.

### 4.1.3. Learning styles

The concept of learning styles can be defined as "preferred forms of brain activity associated with information acquisition and processing" (Ehrman et.al., 2003, p. 314). However, this concept can be linked to others such as cognitive style, personality type and sensory preference among others.

According to Oxford (2003) learning styles are not dichotomous, but, instead, usually operate on a continuum. Learning styles can be classified in several categories, but it is quite rare for an individual to be classified as having all or nothing in any of them. Even though there are multiple ways of classifying learning styles, in this paper Fleming's VAK/VARK (Visual, Aural, Reading and Kinesthetic learning) model (1995) is the one which is being discussed.

According to Fleming (1995), there are four learning styles, which are related to sensory modalities:

- **Visual learning**: learners prefer leaning by using visual aids, such as charts, graphs, images or graphs.
- **Aural / auditory learning**: learning through listening (e.g., lectures, group discussions, radio, email and includes talking out loud and talking to oneself)
- **Reading and writing learning**: learning by taking information displayed as words and text.
- **Kinesthetic / physical learning**: learning by experiencing, i.e.: moving, touching, and doing (hands-on activities).

Fleming's model also includes multimodality, which is a combination of two preferred modalities of learning.

### 4.1.4. Learning strategies

Learning strategies refer to "a set of tactics that people use in order to gain control over their own learning process" (Montaño-González, 2017, p. 479). They are usually oriented to a learning goal and learners who use them systematically and in an organized way obtain better results than those who do not make use of them.

According to Ehram et al. (2003), a strategy is only useful if it relates well to the L2 task, fits the particular student's learning style preferences and the student employs the strategy effectively and links it with other relevant strategies. If a strategy comprises these characteristics it will probably enhance the learning, making it more enjoyable and compelling, making students more self-sufficient and self-reliant. Moreover, it is important to consider that, even though some strategies are not visible (e.g. analysing) they have an effect in the students' performances.

Oxford (2003), claims that there are six main groups of L2 learning strategies:

- **Cognitive strategies**, "which enable the learner to manipulate the language material in direct ways, e.g., through reasoning, analysis, note-taking, and synthesizing" (p.12)
- **Metacognitive strategies**, used to regulate the learning process, for instance by outlining, observing wrong utterances or assessing performances.
- **Memory-related strategies**, such as using acronyms or images, which "help learners link one L2 item or concept with another but do not necessarily involve deep understanding" (p.13).
- **Compensatory strategies** (e.g., guessing from the context; using synonyms or gestures) which help compensate for missing knowledge.
- **Affective strategies**, for instance, "identifying one's mood and anxiety level, talking about feelings, rewarding oneself, and using deep breathing or positive self-talk" (p.13), which help learners control their emotions and is interrelated with motivation.
- **Social strategies** (e.g., asking questions, asking for clarification, asking for help, talking with a native-speaking conversation partner, and exploring cultural and social norms). (p.14).

### 4.1.5. Aptitude

The most widespread definition of aptitude was coined by John B. Carroll: "an individual's initial state of readiness and capacity for learning a foreign language, and probable facility in doing so given the presence of motivation and opportunity" (Carroll,

1981, p. 86). This conception portrays language aptitude as stable over the years and a tends towards the notion that it is innate (Singleton, 2017).

Since the beginning of research on language aptitude, this concept has been linked and related to other concepts, such as ability and intelligence. On the one hand, according to Dörnyei (2005), the concepts of *aptitude* and *learning ability* can be used indistinctively, especially in educational contexts, where both concepts can be defined as "an individual's potential for acquiring new knowledge or skill" (2005, p. 32). It is also highlighted that these concepts vary from individual to individual.

On the other hand, the concepts *intelligence* and *aptitude* are quite similar too. Nevertheless, there is a slight difference between both concepts. Gardner (1983) defines intelligence as a mental ability to solve problems or create products. Therefore, intelligence refers to a present ability, while aptitude to future potentiality.

Thus, following Skehan (2002), to discuss language aptitude implies that:

- There is a talent for learning languages that is independent of intelligence.
- The talent is not just the result of previous learning experiences, but potential abilities.
- It is stable.
- It varies between people.

Therefore, this means that aptitude may enable predictions of language learning success.

#### 4.1.5.1.History of aptitude

Research on language aptitude started in 1900. During the first half of the century, little research was done (Spolsky, 2005).

It was not until the 50-60`s when language aptitude research proliferated. In those decades, two main aptitude tests were developed: The Modern Language Aptitude Test (MLAT; Carroll & Sapon, 1959), and the Pimsleur Language Aptitude Battery (PLAB; Pimsleur, 1966). Both tests boosted further research into aptitude, and even today they are still the basis for the main aptitude findings. They have led to our present understanding of the nature of language aptitude (Spolsky, 2005).

After the importance that these tests placed on aptitude, others tests were created. Some of these were the Defense Language Aptitude Battery (Petersen & Al-Haik, 1976), the Cognitive Ability for Novelty in Acquisition of Language (Foreign) Test (CANAL-F; Grigorenko et al. 2000), the Aptitude Test for Studies in Modern Languages (Trost & Bickel, 1981) or the LLAMA aptitude test (Meara 2005). However, none of these had a greater impact than the MLAT. Some of them are different, for instance, the CANAL-F Test analyses foreign language learning differently from the MLAT, since an artificial language (Ursulu) is used. Moreover, it is theory driven and it also draws on the concept of intelligence (Sternberg, 2002). The LLAMA, in contrast, is largely based on the MLAT.

Furthermore, apart from research aimed to measure language aptitude, there was also "research referring to the components of aptitude construct and research on the relationship between language aptitude and treatment" (Grymska, 2016, p. 105). In the psychological and educational fields, and during the 70s-80s, research on attitude was heavily criticized. There were multiple methods and theories which pigeonholed aptitude, such as Krashen's theories distinguishing between learning and acquisition -which characterized aptitude- (aptitude was believed to affect only learning).

However, as SLA research continued over the years, researchers started to pay more attention to individual differences. Therefore, more attention was paid to aptitude, and some concepts related to it were reconceptualised. A greater focus was put on finding out if aptitude had any effect on the stages of L2 acquisition. Moreover, according to Smith and Stansfield (2006, p. 8) it was also discussed "whether aptitude subcomponents can shed light on any of the known stages or processes of SLA aptitude" and "whether it effects play a role in important topics in second language acquisition, such as the critical period hypothesis, learners' ability to use feedback, and learning conditions."

Nevertheless, there are areas of research that need to grow. For instance, research on the components of language aptitude is scarce, especially with the memory component.

#### 4.1.5.2.Aptitude and SLA. How to measure aptitude

As already discussed, there are multiple tests devoted to measure language aptitude, which constitutes the bulk of research on language aptitude. The first and most

important one is the MLAT, followed by the PLAB. After these, some others were created, from which the CANAL-F and the LLAMA aptitude test are highlighted. All of these tests will be discussed individually, stating their purpose and their main characteristics.

**a) MLAT**

The Modern Language Aptitude Test was created by John B. Carroll and Stanley Sapon in 1959. It was the product of a five-year research study (1953-1958) carried out under the Harvard Language Aptitude Project (Yoshihiro, 1988).

The test was created from a project which examined biographical, motivational, attitudinal, personality, and cognitive aptitude variables among a total of 1,000 adult students preparing for overseas assignments at the Foreign Service Institute. Data was gathered and analysed by correlation, ANOVA and chi-square (Ehram, 1994).

During a period of five years, several tests were administered to around five thousand people (high school, college students and language trainees) to determine which factors would or would not contribute towards learning a foreign language. When the research was finished in 1958, six factors were identified by Carroll and Sapon (1959) as components of FL aptitude:

- Verbal Knowledge (vocabulary and grammatical structures).
- Linguistic Interest (related to motivation and facility when using linguistic materials).
- Associative Memory.
- Sound-Symbol Association (extent to which an individual has knowledge of sound-symbol correspondences).
- Inductive Language Learning Ability (induce the grammatical rules and properties of a language when suitable learning materials are presented).
- Grammatical Sensitivity or Syntactical Fluency (sensitivity to the functions of words in sentences and ability in producing syntactically coherent verbal materials) (Yoshihiro, 1988).

After further research, Carroll grouped these six factors into four, which are currently seen as the main factors affecting language aptitude. These were:

- **Phonetic coding**: "ability to identify distinct sounds, to form associations between these sounds and symbols representing them, and to retain these associations" (Carroll, 1981, p. 105).
- **Grammatical sensitivity**: "the individual's ability to demonstrate his awareness of the syntactical patterning of sentences in a language and of the grammatical functions of individual elements in a sentence" (Carroll, 1981, p. 105).
- **Rote learning ability**: "ability to learn associations between sounds and meaning rapidly and efficiently, and to retain these associations" Carroll, 1981, p. 105)
- **Inductive language learning ability**: "ability to infer or induce the rules governing a set of language materials, given samples of language materials that permit such inferences" (Carroll, 1981, p. 105)

The purpose of the test is to predict success in learning basic communication skills (especially oral skills) in students who have a native or near-native fluency in English. It indicates how easily an individual may learn a foreign language, so it may be used to determine, on the one hand, which individuals will profit most from language training; and, on the other hand, which learners will find most difficulties in this process.

The MLAT consists of five parts. Each part measures a specific skill related to foreign language learning (Carroll & Sapon, 2002):

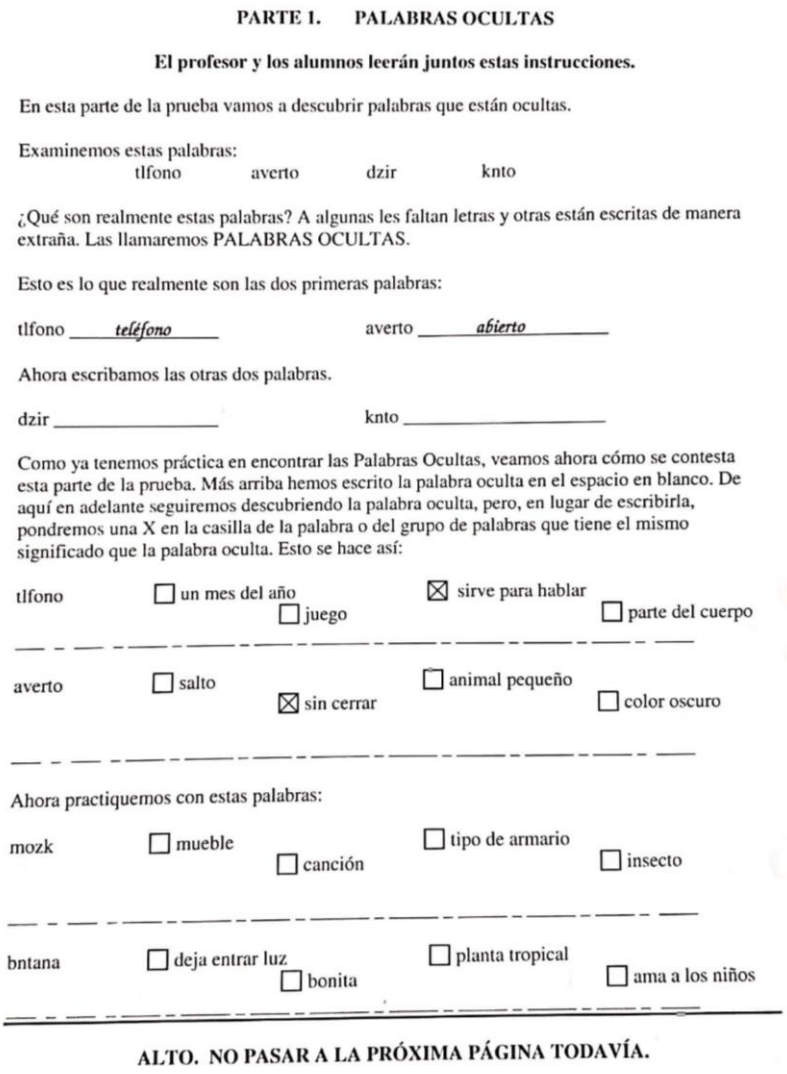
- **Part I: Number Learning.** In this section, a set of numbers are displayed. Examinees should learn it and then recognize different combinations of those numbers.
- **Part II: Phonetic Script.** Examinees are asked to learn a set of correspondences between speech sounds and phonetic symbols.
- **Part III: Spelling Clues.** In part III, examinees must read words that are spelled as they are pronounced, rather than according to standard spelling conventions. They must select the correct word, which is the closest to the "disguised" word.

- **Part IV: Words in Sentences**, measures examinees' awareness of grammatical structure. The examinees are given a key word and must choose another one that functions in the same way in a different sentence.
- **Part V: Paired Associates**. The last section analyses examinees' capability of quickly learning a set of vocabulary words from another language, and memorizing their English meanings.

Even though the MLAT was designed to be used with adults and students, it is also used in churches and missionary organizations (to determine how long they should plan on providing language instruction to a missionary) and in government agencies and international organizations (to identify personnel who would benefit the most from the time and expense of an intensive language training program). Besides, school and clinical psychologists use the MLAT to determine if a student has a foreign language learning disability.

Nevertheless, other versions of the MLAT were created. Each version is adapted to a particular group of examinees:

a) **Computer-Based Modern Language Aptitude Test:** it is appropriate for adults, college/university students. It is the computer version of the test.
b) **Modern Language Aptitude Test- Elementary Version (MLAT-E):** appropriate for students grades 3-6 whose first language is English. Provides guidance and advice to elementary school students beginning or struggling with foreign language study, understanding students' cognitive strengths and weaknesses pertaining to language learning
c) **Modern Language Aptitude Test- Elementary Spanish Version (MLAT-ES**): appropriate for students grades 3-6 whose first language is Spanish. It is the Spanish language adaptation of the MLAT-E. This is the test that will be used in the present study.



**PARTE 1. PALABRAS OCULTAS**

**El profesor y los alumnos leerán juntos estas instrucciones.**

En esta parte de la prueba vamos a descubrir palabras que están ocultas.

Examinemos estas palabras:
tlfono averto dzir knto

¿Qué son realmente estas palabras? A algunas les faltan letras y otras están escritas de manera extraña. Las llamaremos PALABRAS OCULTAS.

Esto es lo que realmente son las dos primeras palabras:

tlfono *teléfono* averto *abierto*

Ahora escribamos las otras dos palabras.

dzir _____ knto _____

Como ya tenemos práctica en encontrar las Palabras Ocultas, veamos ahora cómo se contesta esta parte de la prueba. Más arriba hemos escrito la palabra oculta en el espacio en blanco. De aquí en adelante seguiremos descubriendo la palabra oculta, pero, en lugar de escribirla, pondremos una X en la casilla de la palabra o del grupo de palabras que tiene el mismo significado que la palabra oculta. Esto se hace así:

tlfono ☐ un mes del año ☒ sirve para hablar ☐ juego ☐ parte del cuerpo

averto ☐ salto ☐ animal pequeño ☒ sin cerrar ☐ color oscuro

Ahora practiquemos con estas palabras:

mozk ☐ mueble ☐ tipo de armario ☐ canción ☐ insecto

bntana ☐ deja entrar luz ☐ planta tropical ☐ bonita ☐ ama a los niños

**ALTO. NO PASAR A LA PRÓXIMA PÁGINA TODAVÍA.**

*Figure 1* Part 1 of the MLAT-ES (Stansfield, et.al., 2005)

There are two ways of administering the test: completing it entirely, doing the five parts in sixty to seventy minutes or completing only the three reading parts, which is known as the short form (Yoshihiro, 1988).

**b) PLAB**

The Pimsleur Language Aptitude Batery (PLAB) is a 50-minute multiple-choice test designed to predict how well a student will do in foreign language studies (Stansfield, 1988).

In 1966, the PLAB was created, as a product of a long-term research investigation which started in 1958. For eight years, Pimsleur reviewed the literature related to foreign language studies, narrowing the variables which affected language aptitude in seven: intelligence, verbal ability, pitch discrimination, order of language study and bilingualism, study habits, attitude and motivation and personality factors (Keyser, 1988).

He then conducted numerous studies with primary and high school learners, coming to the conclusion that "verbal intelligence and interest (motivation) appeared to be the most important in FL learning, while reasoning, word fluency, and pitch discrimination made significant but lesser contributions" (Pimsleur, 1962, p.15).

When he had identified these variables, he designed an experimental test battery. Once the test was implemented with secondary students, Pimsleur decided to eliminate two of the variables and introduce a new one: Grade Point Average (GPA). Once he did this, he found out that the test had predictive power (Stansfield, 1988).

Once the research was over, the test came out in 1966. However, the PLAB researchers narrowed the previous variables into three, as the main influencers of language aptitude. These were verbal intelligence, motivation or interest, and auditory ability.

- **Verbal intelligence**: "the knowledge of words and the ability to reason analytically in using verbal materials" (Pimsleur, 1966, p. 14).
- **Motivation**, whose uncertain situation within the aptitude complex has already been discussed concisely (Pimsleur, 1966, p. 14).
- **Auditory ability**, which is "the ability to receive and process information through the ear" (Pimsleur, 1966, p. 14).

He claimed that these variables would account for around 35% of the variance in FL achievement.

The PLAB comprises six parts (Pimsleur 1966, pp. 175-186):

- **Part I: Grade-Point Average (GPA).** The examinee needs to remember and fill in the answer sheet his/her most recent grades in English, mathematics, science, and history (or social studies).
- **Part II: Interest.** The examinee indicates, on a 5-point scale provided on the answer sheet, the degree of his interest in studying a foreign language. In figuring the total score, this score needs to be doubled. This section measures motivation.
- **Part III: Vocabulary.** It is a twenty-four item test of English vocabulary knowledge which takes five minutes. In this part, students must find synonyms of given words.
- **Part IV: Language Analysis**. Fifteen items in a foreign language (Kabardian) are displayed, together with their English equivalents. The examinee must find out from these, how other things are said in this language in twelve minutes.
- **Part V: Sound Discrimination**. The examinee is taught, by tape recording, three words in a foreign language (Ewe, a language of Ghana). He/she then hears thirty sentences said in Ewe and must indicate which of the three words it contains in eight minutes. The tree words sound very similar.
- **Part VI: Sound-Symbol.** The examinee hears a disyllabic or trisyllabic nonsense word made up of sounds which exist in English. In nine minutes, he/she is asked to identify, from among four similar-appearing words printed on his answer sheet, the one which was said.

The PLAB was specifically developed for secondary education students, especially intended for students in grades seven through twelve. In total, it takes about thirty-nine minutes to administer. Therefore, it can be done in a single class period (using 15-20 minutes to distribute the materials and give the instructions and 40 for the actual development of the test.) (Stansfield, 1988).

The MLAT and PLAB share similarities and differences. In Dörnyei's words:

> Although some of the tasks in the two batteries are similar and are developed in the same underlying construct (e.g., MLAT's 'Phonetic Script' and PLAB's 'Sound-Symbol Association'), there are also considerable differences, with the PLAB placing greater emphasis on auditory factors and less on memory than the MLAT (Dörnyei, 2005, p. 36).

Besides, the PLAB also contains two items that differ from the MLAT: 'Grade Point Average' and 'Interest in Foreign Language Learning.' It was surprising to link motivation and aptitude. Nevertheless, motivation and interest in language have been proven to be powerful predictors of a good language learning performance (cf. Pimsleur, 1966).

### c) CANAL-F

The CANAL-F test was developed as "one possible instantiation of a cognitive theory of FL acquisition" (Grigorenko et al. 2000, p. 392), which holds that one of the central abilities for FL acquisition is the ability to cope with novelty and ambiguity.

This test was based on the MLAT, however, it presents some differences (cf. Grigorenko et al, 2000, p. 393)

- It was based on a cognitive theory of knowledge acquisition rather than being empirically derived.
- It creates a situation in which FL learning occurs naturally, by gradually introducing a simulated language embedded in a multifaceted language context.
- It is dynamic rather than static, involving the ability to learn at the same time of the test.
- It is multifunctional, as it assesses students' levels of ability and provides information on their strengths and weaknesses.
- It is based on item response theory, permitting adaptive testing and new item development.

In its application to FL learning, it includes five knowledge acquisition processes:

- **Selective encoding**: used to distinguish between more and less relevant information.
- **Accidental encoding**: used to encode background or secondary information and to grasp the background context of the information stream (very important process in FL learning).
- **Selective comparison**: used to determine the relevance of old information for current tasks.
- **Selective transfer**: used to apply decoded or inferred rules to new contexts.

- **Selective combination:** used to synthesize the disparate pieces of information that have been collected via selective an accidental encoding.

### d) LLAMA

The LLAMA test was created in 2005, initially developed for students in a training programme at Swansea University (Rogers et al., 2016). It was largely modelled following the pattern of the MLAT test, and it is based on the same components. Thus, there are not many differences between both, just those regarding the presentation style, which aims to use a more appealing interface (Lognostics, 2016).

Nowadays, it is an "increasingly popular alternative to utilizing the MLAT" (Singleton, 2017, p.90), even though it is not considered a replacement for this aptitude test.

The version of 2005 consisted of four sub-tests: LLAMA_B, LLAMA_D, LLAMA_E and LLAMA_F.

- **LLAMA_B**: "is a simple vocabulary learning task, which measures your ability to learn relatively large amounts of vocabulary in a relatively short space of time" (Meara, 200, p. 5). It does not require any L1 input, so the test is suitable for use with any L1. The words shown are real words coming from a Central American language, and they arbitrarily designate target images.
- **LLAMA_D:** this part does not appear in the MLAT. "It is designed to test if you can recognise short stretches of spoken language that you were exposed to a short while previously" (Meara, 2005, p.8). It tests the skill of recognizing language patterns with the help of the working memory, which helps acquiring vocabulary.
- **LLAMA_E**: this part tests sound-symbol correspondences. "It presents a set of 22 recorded syllables, along with a transliteration of these syllables in an unfamiliar alphabet. Your task is to work out the relationship between the sounds you hear and the writing system" (Meara, 2005, p. 11).
- **LLAMA_F**: it is a simple grammatical inferencing test. A series of pictures are shown, and a short description of each one in an artificial language. From this, examinees should be able to guess some of the grammatical and morphological features of the language (Meara, 2005).

## 4.2. WORKING MEMORY

If Carroll's (1981) definition of aptitude is taken as a reference, aptitude is seen as a trait, as something innate that cannot be trained, as a gift for languages (Rosenthal, 1996). Nonetheless, this view of aptitude has been questioned "especially since the development of a widespread consensus that working memory needs to be recognized as an important component of language aptitude" (Singleton, 2017, p.89). According to this author, working memory was also once interpreted as a trait, but now it is recognized as susceptible of changes, due to the influence of experience and instruction. Therefore, working memory is a non-stable constituent of language aptitude.

However, some authors even claim that working memory (WM) can replace language aptitude. To analyse that, Yalçın et al. (2016) researched both WM capacity and aptitude (through the LLAMA test) in 72 Turkish university students with advanced English proficiency. The final correlation analysis revealed that "capacity correlated with the language aptitude total score rather than language aptitude subcomponents, with the exception of grammatical inferencing. A principal component analysis further showed WM and language aptitude as separate constructs" (p.144). In addition, two other factors emerged under the aptitude construct. Hence, "the results suggest that WM capacity still has a key role in the renewed aptitude construct, yet these two cognitive abilities are not interchangeable." (Yalçın, et al., 206, p. 144).

Now that language aptitude and working memory have been separated, a definition of WM is needed. The term working memory refers to a "cognitive system that provides temporary storage and manipulation of the information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning" (Baddeley, 1992, p. 556). This definition has evolved from the concept of a unitary short-term memory system, even though both concepts are often used synonymously with short-term memory. Nevertheless, working memory allows for the manipulation of stored information, whereas short-term memory only refers to the short-term storage of information.

WM requires both simultaneous storage and processing of information. It comprises three subcomponents (Baddeley, 1992):

- The **central executive component**, which takes part in coordinating information, supervising operations which are performed in the mind and enabling the access to information stored in our long-term memory.
- The **visuospatial sketch pad**, which manipulates visual images and handles information referring to spatial location and kinesthesis.
- The **phonological loop**, which stores and rehearses information, necessary for the acquisition of both native and second-language vocabulary. It helps to remember the information which is needed.

A new component was added in 2000 by Baddeley: **episodic buffer**, which connects information between different components of our WM. Moreover, it links information from our working memory with that of the long-term memory.

Alternatively, some theoretical models point out that WM has a limited capacity. According to Wen (2019), the limited capacity of WM manifests itself in terms of "(a) the restricted amount of information that can be held consciously in our head during task execution and (b) the short duration of accessibility to this temporarily held information before it disappears completely from our immediate consciousness" (p. 282).

Conversely, WM capacity has been shown to have an impressive impact on second language learning:

- Wen (2015) indicates a close and positive connection between the phonological aspects of working memory and successful attainment in second language lexical acquisition, as well as the acquisition of L2 formulaic sequences and collocations and grammar acquisition and development.

- A strong link has been found between "phonological working memory capacity and the degree of proficiency achieved in relation to lexis, formulaic sequences and morpho-syntactic constructions" (Grymska, 2016, p.107).

- Furthermore, "the process of developing skills and achieving proficiency in L1 is strongly related to the role of WM. Therefore, it is likely to influence learning of L2 in a significant way" (Grymska, 2016, p.108)

- As cited in Grymska (2016, p.109) Johnson & Newport (1989) claim that language acquisition can be limited for adults who learn an L2, because maturational changes occur

in the critical period. This will lead to the conclusion that L2 learning is not only based in L1 acquisition mechanisms, but acquisition of knowledge and development of skills, in which WM takes part. Again, this will relate WM as a component of language aptitude.

# 5. MATERIALS AND METHOD

## 5.1.Type of study

A case study was carried out with students from different schools. There are four students. The study took part between the 7th and 15th of May, 2020. Students were given a week in order to complete the tasks.

## 5.2.Research participants

Target population: primary school learners who are in the same age and classroom and study in CLIL programmes.

Accessible population: because it is not possible to carry out the investigation in a school, the activities will be carried out by a couple of Primary Education students, which may or may not be the same age or participate in CLIL programmes.

I decided to name the students according their names' initial letters.

Table 2

*Research participants.*

| **Name** | **Grade** | **Sex** | **CLIL/ not CLIL programme** | **Type of school** |
|---|---|---|---|---|
| M | 4th | F | CLIL programme | Charter school |
| PL | 4th | M | Not CLIL programme | Public school |
| R | 6th | M | Not CLIL programme | Public school |
| C | 4th | M | Not CLIL programme | Public school |

## 5.3.Data Collection Instrument and Procedure

The students were sent via e-mail a couple of exercises, designed by me and related to aptitude or/and working memory.

The first exercise is a quiz designed using the app Socrative. They had to complete 20 questions divided into three sections. To do so, it is only needed to search "Socrative" online and log in copying the code "CECILIA175". After logging in, the quiz will open.

The next three activities will be available through direct links. They will just have to click on them in order to access to the tasks. They are from the page learningapps.org.

The last activity is in a Word document. They will have to complete 10 questions and e-mail them back in order for them to be assessed.

The results of the activities were available once they finished them (in the case of Socrative and learningapps). Once the activities are evaluated, the results will be gathered and interpreted.

When students finish the activities, they will have to:

- E-mail the results of the last activity back (the communication was made via e-mail with the students' parents).
- E-mail their marks in the CLIL subjects. If they do not study in a CLIL programme, they will have to send their grades in the subject of English as a Foreign Language (EFL). In this way, the results of the tasks could be compared to their performance in language-related subjects.

### 4.4. Materials

#### a) Socrative

Socrative is a tool for effective formative assessment that can be used in the classroom. It is generally used to give feedback to the students, to evaluate through quizzes and foster motivation and participation among learners. Immediate feedback is a vital part of the learning process. Socrative is an efficient way of monitoring and evaluating learning while delivering fun and engaging interactions for learners. Furthermore, this tool lets the teachers download the quizzes to other formats, such as PDF or Excel. Only an Internet connection and a smartphone is needed for its use.

This page has three main options for use. The first one is called *quiz* in which an evaluation is developed through a number of questions. This is the tool used for this particular activity. There is also the option to develop *space race* or *exit ticket*.

As it has been highlighted, the option chosen to develop this proposal is the quiz. There are 20 multiple choice questions, each one with four possible answers.

The quiz is divided into three sections:

The first part is called "*palabras enmascaradas*". This section is an adaptation taken out of the first activity of the MLAT-ES. It measures not only vocabulary knowledge in the students' native language, but also sound-symbol association ability. This part would correspond to the segment of the MLAT designed to the development of **Rote learning ability** (the ability to lean associations between sounds and meanings rapidly and efficiently, and to retain these associations) mainly, and **Phonetic coding ability** (the ability to identify and distinct sounds, to form associations between sounds and symbols and retain them) when constructing the associations between the masked and the actual words.

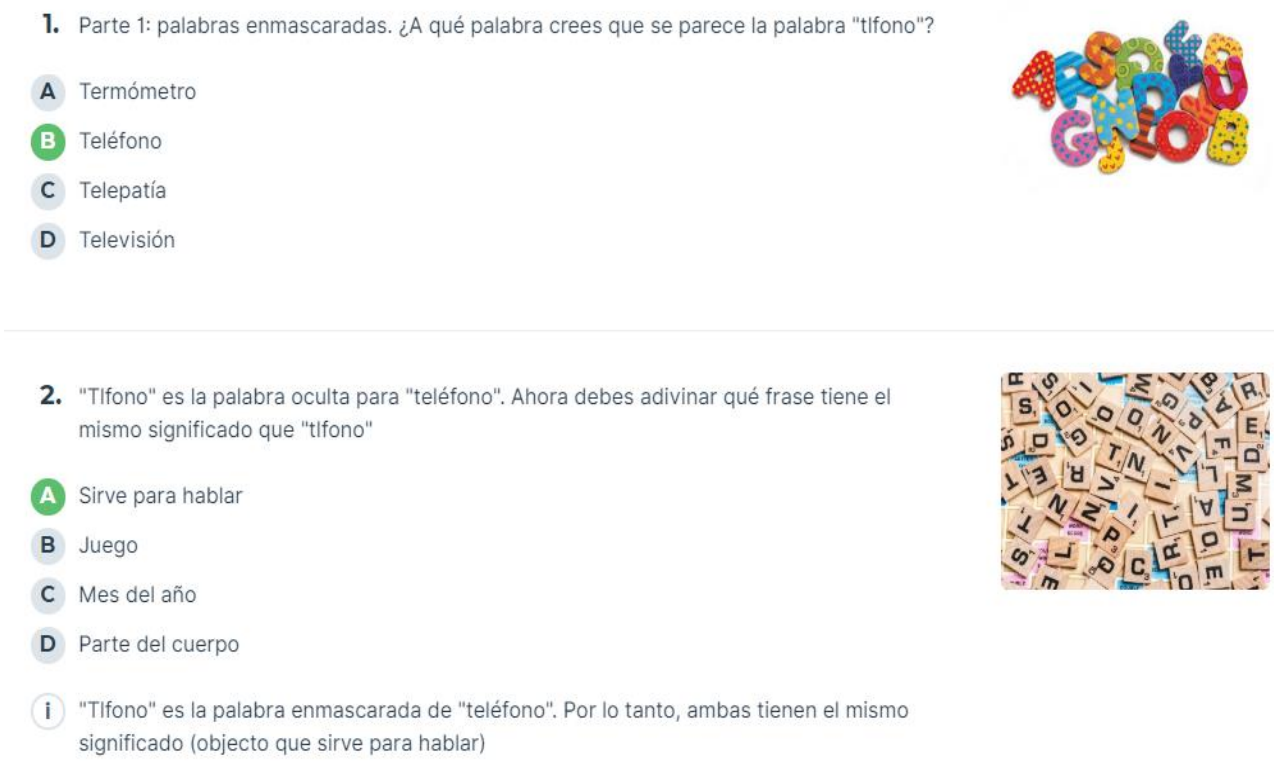



*Figure 2.* First part of the quiz in Socrative.com. Own source.

Part 2 is called "*idioma inventado*". This part is inspired in the Llama_B test, which is a simple vocabulary learning task in which the ability to learn relatively large amounts of vocabulary in a relatively short space of time is measured.

Students are given a series of words in a language that does not exist, and they must remember their meanings in Spanish in order to successfully answer to the questions. Here, they will have to match the images to their meaning in the artificial language, developing their **working memory** and **image-word association**. First, an example is given (questions 8 and 9) which gives instructions to the students.


*Figure 3.* Part 2 of the quiz in Socrative.com. Own source.

After the instructions are clear, four new words are given, and students will be asked to link images with their meanings in the artificial language.

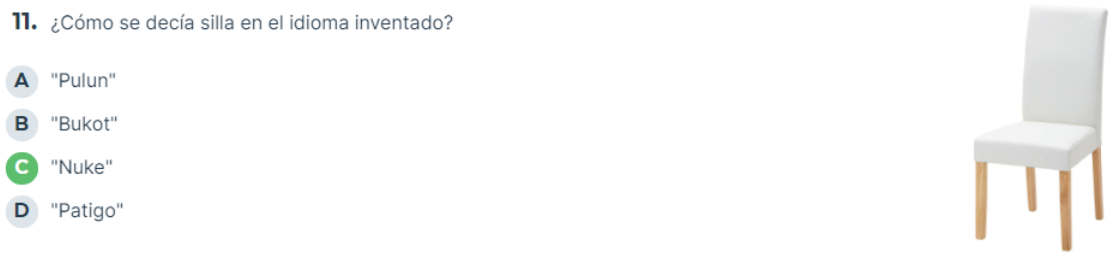



*Figure 4.* Question 11, part 2 of the quiz in Socrative.com. Own source.

Part 3 is called "*números en el idioma inventado*". This section is adapted from part 4 of the MLAT-ES. Here, the testee learns the names of numbers (1, 2, 3, 20 and 30) in an artificial language and uses his/her memory to infer the meaning of new numbers. Thus, this segment apart from measuring the **working memory** component, develops **inductive language learning ability**, which is the ability to infer or induce the rules governing a set of language materials (having previously given examples of those materials).

First, numbers 1, 2 and 3 will be introduced in the artificial language

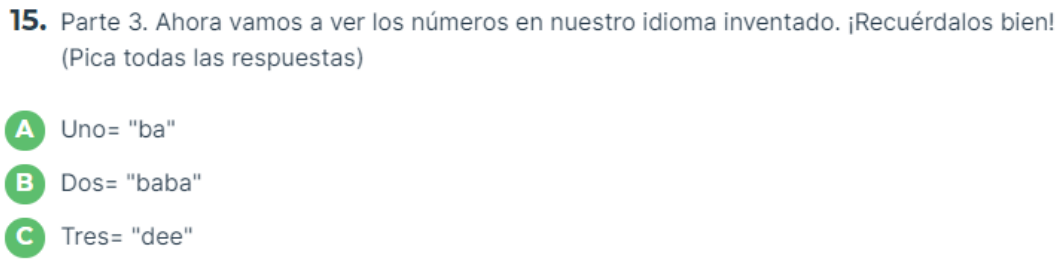



*Figure 5.* Part 3 of the quiz in Socrative.org. Own source.

Once these three numbers have been dealt with, students are presented with numbers 20 and 30.

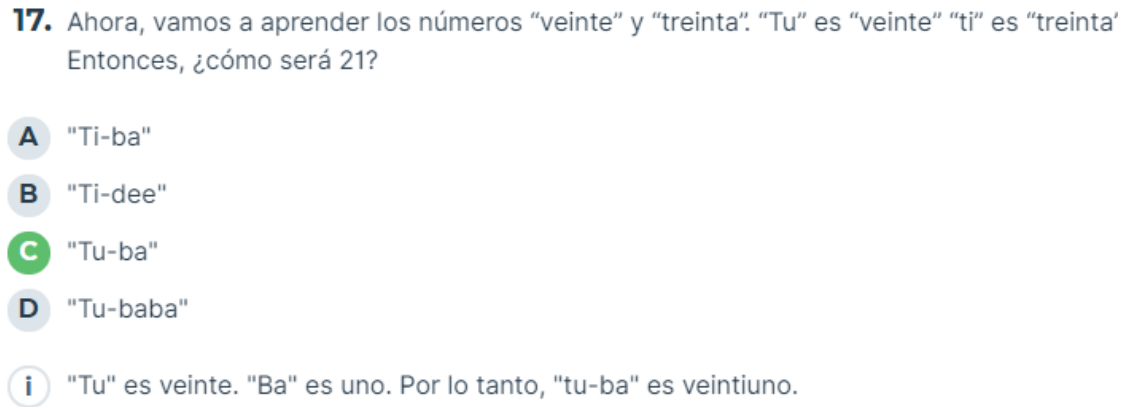



*Figure 6.* Question 17, part 3 of the quiz in Socrative.org. Own source.

Knowing how to write all these numbers in the artificial language, students will be asked to infer how the numbers 21, 22, 23, 31, 32 and 33 will be written in the artificial language.

Once the 20 questions have been answered, the students would have completed the quiz. They will have to close Socrative and log into a new web page: learningapps.org (the link will be in the e-mail). In this webpage, they will be presented with four new activities. While three of them aim to revise what was learnt in the quiz (in order to further practice and gather more information around the topic), the first one measures the ability to hear speech sounds. This activity is called "*rimas*" and develops the **phonetic coding ability**. Here, students will listen to recordings of my voice, in which several words are said. They will have to find out the word that is more similar to the first one, regarding its sound. It is available in the following link: https://learningapps.org/display?v=pw1yxomic20

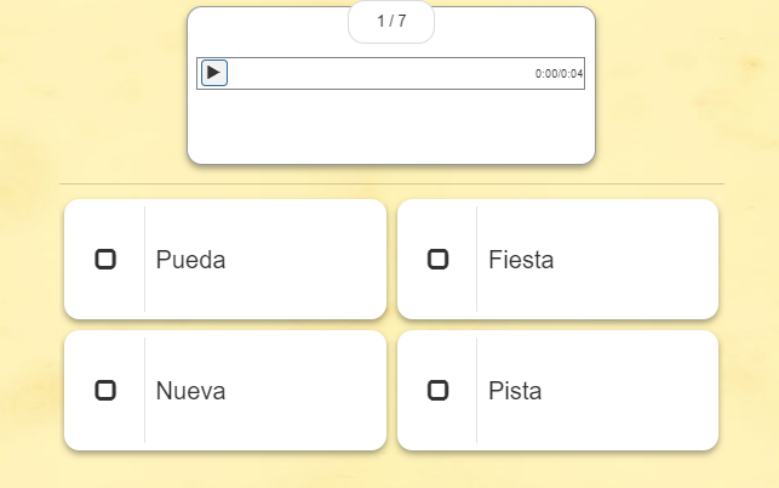



*Figure 7.* Rhyme activity in learningapps.org. Own source.

The second activity they will have to complete is called "*ordena la secuencia*". Here, students will have to order the numbers from 1 to 43, according to what they have learnt about the artificial language. They will be presented with the words corresponding to the numbers 1, 2, 3, 21, 22, 23, 31, 32, 33, 41, 42 and 43 in the artificial language. Since they have only learnt up until 33, they will have to infer the words for the numbers 41, 42 and 43. Once again, in this activity the **working memory** component will be

developed, as well as the **inductive language learning ability.** It is available in the following link: https://learningapps.org/11071326

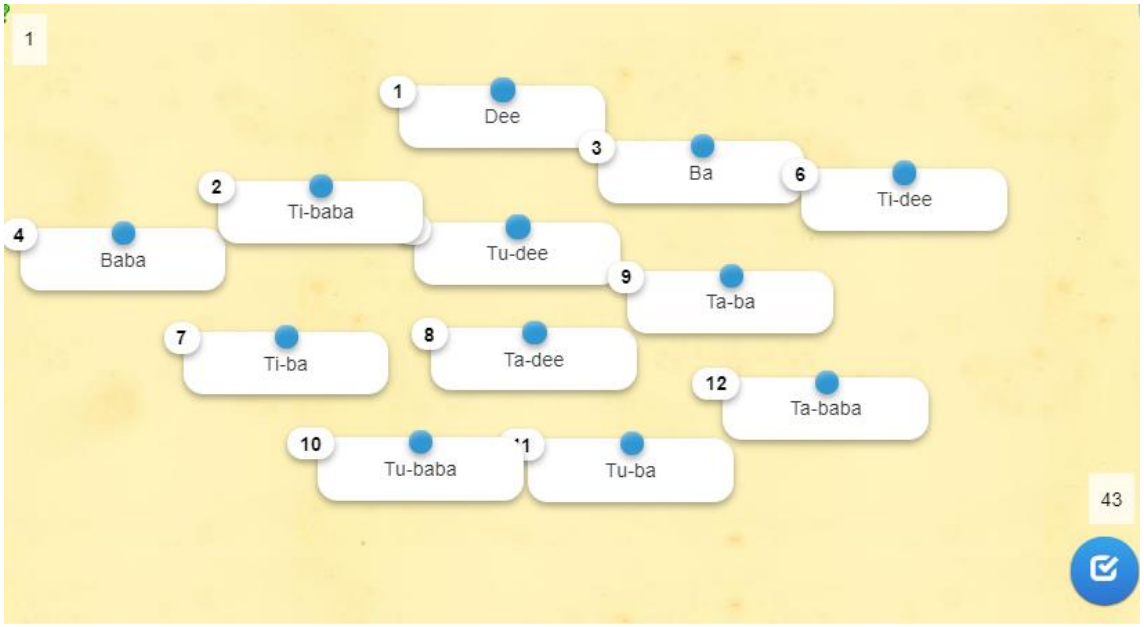



*Figure 8.* Number arrangement activity in learningapps.org. Own source.

Once they have completed these two activities, they will have to move on to the next one. However, depending on their age, the students will be presented with a different activity. Those students who are in the 3rd or 4th grade of primary education will have to complete the activity called "*emparejar*". In this activity, students will have to match pictures with their meanings in the artificial language. The words chosen were the same ones that were presented in the quiz. It is available in the following link: https://learningapps.org/display?v=pf1r32p2c20.

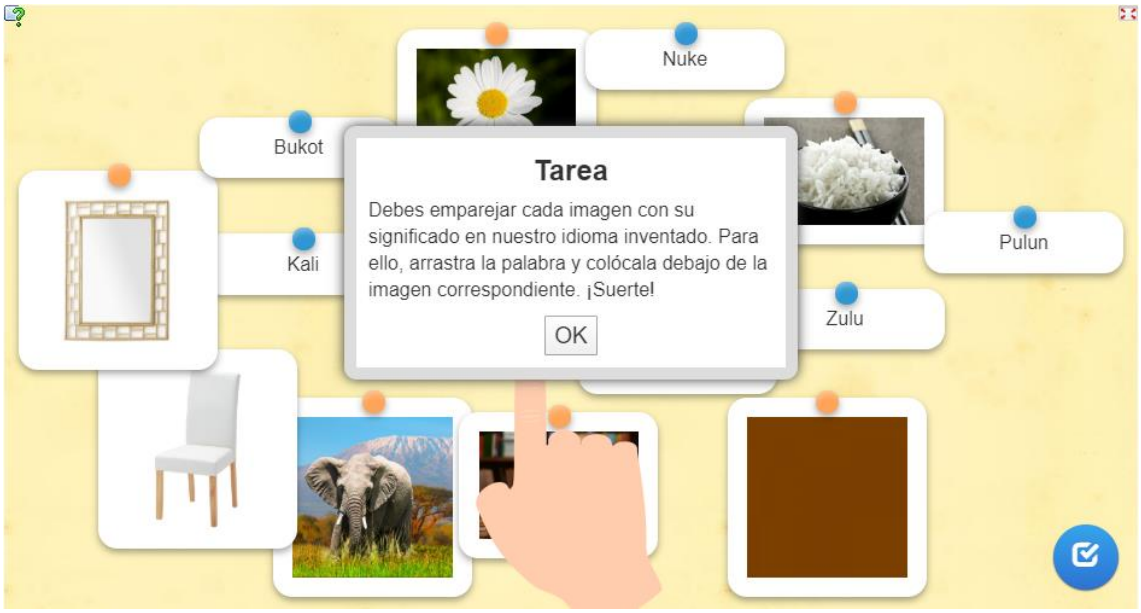



*Figure 9.* Matching activity in learninapps.org. Own source.

For those students who are in the 5th or 6th grade of primary education, the activity is more complicated. They will have to complete the activity called "*empareja con sus imágenes*". This task is a typical pair game. The students will be presented with 24 cards faced down. They will have to click on them in order to see what is on them. The aim is to match each image with its meaning in the artificial language. The activity will be completed when all the cards are facing up.

As in part 2 of the Socrative quiz, these two activities develop students' **working memory** and **image-word association**. Specially, it works the **visuospatial sketch pad** component of working memory**.** It is available in the following link: https://learningapps.org/display?v=pzn2fd5yt20.


*Figure 10.* Pairing activity in learningapps.org (facing down). Own source.

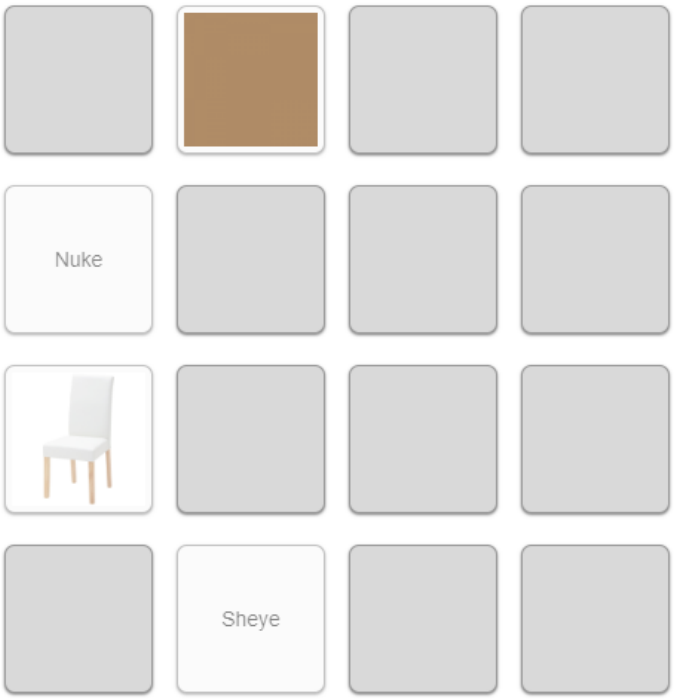



*Figure 11.* Pairing activity in learningapps.org (facing up). Own source.

The last activity, "*palabras ocultas*" is based on the part 2 of the MLAT and the Llama_F. It is a grammatical inferencing test that presents examinees with sentences in their native language. In these sentences, there is a word in capital letters, which is called "hidden word". The aim of the activity is to find out words that have the same grammatical function as the hidden words, working out grammatical rules. *Grammatical inference* is the name given to the process of learning (inferring) a grammar rule from a set of sample strings. In this task, one of the main components of Language Aptitude by Carroll is dealt with: **grammar sensitivity** which is the ability to recognize the grammatical functions of words in sentence structures.

In this activity, the students will have to guess which is the hidden word in 10 sentences. To do so, they will be sent a Word document, which must be completed and sent back via e-mail. Then, the sentences will be corrected, and the data gathered.


INSTRUCCIONES:

En esta tarea, debéis descubrir las funciones que tienen las palabras. Tenéis que prestar atención a las palabras que están escritas en MAYÚSCULAS. Esas serán las **palabras ocultas**.

A partir del ejemplo, tendréis que poner en mayúsculas la palabra oculta. Veamos algunos ejemplos:

- MARÍA come zanahorias.

- ALICIA está pelando una manzana.

- La TAZA del niño se cayó.

Entonces, en la frase "mi perro come galletitas", ¿cuál sería la palabra oculta?

La respuesta es PERRO, ya que tiene la misma función que MARÍA, ALICIA y TAZA.

Ahora os toca a vosotros. Para responder, debéis escribir la frase entera poniendo la palabra oculta en mayúsculas. En este ejemplo, la respuesta sería esta:

Mi PERRO come galletitas.

*Figure 12.* Instruction of the grammatical inference activity. Own source.

**8. Ejemplo:**

- A mí me gusta la brisa FRESCA del campo

En la frase "Carla está leyendo una novela muy entretenida", ¿cuál sería la palabra oculta?

**9. Ejemplo:**

- SUSANA le quitó el sombrero a María.

En la frase "cuando se acerca el invierno, los pájaros vuelan hacia el sur", ¿cuál sería la palabra oculta?

**10. Ejemplo:**

- Marcos BAILA merengue con Ana.

En la frase "los niños descuidados dejan los libros en el suelo", ¿cuál sería la palabra oculta?

*Figure 13.* Grammatical inference activity. Own source.

# 6. RESULTS AND DISCUSSION

The results are divided according to the aptitude component. Rote learning ability, inductive language ability, phonetic coding ability and grammar sensitivity will be analysed, as well as working memory and image-word association ability. The data is gathered according to the results of the tasks. They are presented in tables.

## 1. Rote learning ability

This component is worked on in questions 1-7 of the Socrative quiz.

Table 3

*Rote learning ability results.*

| NAME | RIGHT ANSWERS | WRONG ANSWERS | PERCENTAGE |
|---|---|---|---|
| M | 7 | 0 | 100% |
| PL | 6 | 1 (number 5) | 85% |
| R | 5 | 2 (numbers 3 and 5) | 71% |
| C | 5 | 2 (numbers 3 and 4) | 71% |

Student M got all questions right, even number 6 and 7 which had two correct answers. Student PL only got one question wrong, question. Students R and C got two questions wrong, questions 3 and 5 and questions 3 and 4, respectively.

Both PL and R got question 5 wrong because they only picked one answer. They both chose answer "A", while they did not pick answer "D". That may be due to their misunderstanding of the instructions. Question 5 was the following one: "*ahora puede haber varias respuestas correctas. ¿Qué puede significar la palabra "hozeano"?"*

Lastly, students R and C got question 3 wrong. This question was: *"ahora vamos a probar con una palabra nueva: "mozk". ¿Qué significado puede tener?"*. They had trouble identifying the Word "mosca", choosing a different answer.

### 2. Working memory and image-word association

These components are developed in questions 8-14 in the Socrative quiz. Questions 8 and 10 just provide instructions, so they are not included in the results.

Table 4

*Working memory and image-word association results.*

| NAME | RIGHT ANSWERS | WRONG ANSWERS | PERCENTAGE |
|---|---|---|---|
| M | 5 | 0 | 100% |
| PL | 5 | 0 | 100% |
| R | 5 | 0 | 100% |
| C | 5 | 0 | 100% |

This part of the quiz seems to be the easiest for them, since all of the students got every question right.

These two components are also present in activities 3 and 4 of the web page learningpps.org. Every student completed these exercises successfully, in around 2-4 minutes. It is worth highlighting that R was the only student who completed the activity *"empareja con las imágenes"* while the others did activity *"emparejar*" (due to their age and grade).

### 3. Inductive language learning ability

This component is carried out in questions 16-20. Question 15 just provides instructions to develop this part, so it is not computed in the results.

Table 5

*Inductive language learning ability results.*

| NAME | RIGHT ANSWERS | WRONG ANSWERS | PERCENTAGE |
|---|---|---|---|
| M | 5 | 0 | 100% |
| PL | 4 | 1 (question 18) | 80% |

| | | | |
|---|---|---|---|
| R | 5 | 0 | 100% |
| C | 5 | 0 | 100% |

This component is further worked on in activity 2 of learninapps.org ("*ordena la secuencia*"). Student M had some difficulties while developing this activity, because she could not figure out how to order the numbers. She had the help of her cousin, and was able to complete it once she understood how the activity operated. All of the students completed this activity in a time span from 2 to 7 minutes, being student M the one who spend more time on it.

### 4. Phonetic coding ability

This activity is the only one in which sound is involved. It is the first activity in the learningapps.org web, and it is called *"rimas"*.

Table 6

*Phonetic coding ability results.*

| NAME | RIGHT ANSWERS | WRONG ANSWERS | PERCENTAGE |
|---|---|---|---|
| M | 5 | 2 (questions 1 and 3) | 71% |
| PL | 6 | 1 (question 3) | 85% |
| R | 7 | 0 | 100% |
| C | 7 | 0 | 100% |

Questions 1 and 3 may be difficult for the students. Question 1 asked which answer rhymed with the word "respuesta", and student M chose option "D" ("pista") instead of option "B" ("fiesta"). She only focused on the last part of the word. Question 3 asked which word rhymed with the word "hombre". Both students M and PL answered the option "hombro", instead of "escombro", since it is the most similar one.

Since student R is older, maybe he is more familiar with the concept of rhyme, and that is why he had no trouble completing this task. Notwithstanding, student C also completed the activity successfully.

### 5. Grammar sensitivity

Last component was developed through the activity done in a word format *"palabras ocultas"*. The students' parents e-mailed their answers back, and these were the results:

Table 7

*Grammar sensitivity results*

| NAME | RIGHT ANSWERS | WRONG ANSWERS | PERCENTAGE |
|---|---|---|---|
| M | 8 | 2 | 80% |
| PL | 10 | 0 | 100% |
| R | 10 | 0 | 100% |
| C | 9 | 1 | 90% |

I noticed that student R, did not complete the activity as it was asked. The exercise repeatedly asked students to write the whole answer with the hidden word in capital letters: "para responder, debéis escribir la frase entera poniendo la palabra oculta en mayúsculas", "recuerda que debes escribir la frase entera, con la palabra oculta en mayúsculas", "para responder, escribe la frase "Juan ganó la pelea" poniendo en mayúsculas la palabra oculta". However, he just wrote the hidden word in capital letters. Nevertheless, the results were optimal.

Once again, student M required the help of her cousin in order to complete the activity. She only got two questions wrong.

If every component is compared, the working memory one is the one which has been most successfully developed. Conversely, the rote learning ability and the phonetic coding ability are those in which students had more difficulties. These are the components in which emphasis should be placed on, since are the most difficult one for the students.

Table 8

*Aptitude components results comparison*

| COMPONENT | RIGHT ANSWERS | PERCENTAGE |
|---|---|---|
| Rote learning ability | 23/28 | 82% |
| Working memory | 20/20 | 100% |
| Inductive language learning ability | 19/20 | 95% |
| Phonetic coding ability | 25/28 | 89% |
| Grammar sensitivity | 37/40 | 92% |

Now, in this table, all percentages obtained will be given. Even though students have similar results, and every single one of them got a mark of 90% or higher, there are some differences:

Table 9

*Students' results comparison*

| | COMPONENT | | | | | |
|---|---|---|---|---|---|---|
| **NAME** | Rote learning | Working memory | Inductive language learning | Phonetic coding | Grammar sensitivity | **FINAL PERCENTAGE** |
| M | 100% | 100% | 100% | 71% | 82% | 90.6% |
| PL | 85% | 100% | 80% | 85% | 100% | 90% |
| R | 71% | 100% | 100% | 100% | 100% | 94.2% |
| C | 71% | 100% | 100% | 100% | 90% | 92.2% |

For student M, her weakest part is phonetic coding ability, followed by grammar sensitivity. She had trouble understanding the concept of rhyme. Nevertheless, she had perfectly completed the other parts, getting a final percentage of 90.6%. She is the only one who completed the rote learning ability part perfectly. Her average grade in the CLIL subjects is a 9, which agrees with her results.

Conversely, student PL got some questions wrong in the parts of rote learning ability, inductive language learning and phonetic coding ability. This made him had a percentage of 90% questions right. When he was asked which activity was his favorite and which one was the most difficult for him, he asked that the working memory one was his favorite, but also the most complicated one. In this part, PL got a 100% of questions right. Furthermore, since he is not in a CLIL programme, he gave his average grade in EFL, which is a 9 (matching his results).

Student R is the one who got the highest score: 94.2%. When he was asked which part was his favorite, he responded that the working memory one (in which he got a 100% of right questions). However, the one which he found more difficult was the phonetic coding one, even he got every question right. The only one in which wrong answers are registered correspond to rote learning ability. He completed the other parts perfectly. His mark in EFL varies between 10 and 9, which agrees with his results.

Lastly, student C got a 92.2%, being his weakest one the rote learning ability part. His second lowest mark corresponds to the grammar sensitivity part, which is the one he found more complicated. He indicated that the activity he preferred was, once again, the working memory one (in which he had a 100% of right answers). His average grade in EFL is 9, which coincides with his results.

According to these results, there would be a correlation between aptitude and successful performance in language learning. Every student did well in the tasks, getting a mark of, at least, 90% of correct answers. This result matches with the marks gotten in language-related subject, specifically EFL. Therefore, aptitude can be considered a predictor in the process of acquiring a foreign language.

# 7. CONCLUSIONS

To assess if the research was successful, we analysed whether the objectives were successfully attained. The main objective, which was to analyse language aptitude as a predictor of Second Language Acquisition, has been the centre of the investigation. Activities related to language aptitude and working memory, which aimed to analyse language acquisition, have been developed and presented to a group of students. These tools were created to measure language aptitude and working memory, and the results were then linked to CLIL and language learning contexts. Moreover, the association between these key concepts were explored in the theoretical framework. Therefore, the specific objectives have also been attained.

Regarding the limitations, a couple of them were faced during the research. The first one is the number of participants. In my opinion, the investigation would have been more trustworthy if the students' ratio was higher. The ideal situation would be to perform the research in a whole class, in which students are the same age and receive a similar education.

Furthermore, it would have been more reliable if the exercises had been monitored by teachers. Since the students did these exercises at home, some may have used the help of their parents, which hinders the research's results.

The last limitation was the lack of deepening on the analysis of their performance when acquiring an L2. Due to the impossibility of being at a school, the results could only be compared with their marks in their subjects, and not with their actual performance in the lessons (it would have been interesting to check if the students have in fact difficulties in the areas in which the results were lower). It was only possible to get a general view of the issue that was being researched.

In the future, it would be interesting to continue to study aptitude in CLIL or language learning contexts, so the results of the activities can be further analysed and more conclusions can be drawn. Moreover, it would be enlightening to know how the students feel about these activities in a deeper way. After the results are gathered, it would be a good idea to use their strengths and weaknesses in order to foster language acquisition.

# REFERENCES:


Baddeley, A. D. (1992). Working memory. *Science 255* (5044), 556-559.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? *Trends in Cognitive Sciences, 4*(11), 417–423.

Canga, A., Torre, R., & Martín, J. (2012). *Convergent Approaches to Mediaeval English Language and Literature*. La Rioja: Cambridge Scholars.

Carroll, J. B. (1981). *Individual differences and universals in language learning aptitude.* Rowley, MA: Newbury House.

Carroll, J. B., & Sapon, S. (2002). *Modern Language Aptitude Test: Manual 2002 Edition.* N. Bethesda, MD: Second Language Testing, Inc.

Cenoz, J., Genessee, F., & Gorter, D. (2014). Critical analysis of CLIL: Taking stock and looking forward. *Applied Linguistics 35*(3), 243-262.

Costa, P., & McCrae, R. (2012). The Five-Factor Model, Five-Factor Theory, and Interpersonal Psychology. *Handbook of Interpersonal Psychology: Theory, Research, Assessment, and Therapeutic Interventions.* 91-104.

Coyle, D., Hood, P., & Marsh, D. (2010). *Content and Language Integrated Learning.* Cambridge: Cambridge University Press.

Keyser, D. J., & Sweetland, R. C. (1988). *Test Critiques, volume VII*. Kansas City, MO: Test Corporation of America.

Dörnyei, Z. (2005). *The Psychology of the Language Learner: Individual Differences in Second Language Acquisition*. Mahwan, New Jersey: Lawrence Erlbaum Associates.

Ehrman, M., Leaver, B., & Oxford, R. L. (2003). A brief overview of individual differences in second language learning. *System. 31* (3), 313-330.

Fernández Fontecha, A. in Ruiz de Zarobre, Y., & Jiménez, R. M. (2009). *Content and Language Integrated Learning: Evidence from research in Europe.* Bristol: Miltilingual Matters.

Fleming, N.D., & Mills, C. (1992). Not Another Inventory, Rather a Catalyst for Reflection. *To Improve the Academy, 11*, 137-155

Gardner, H. (1983). *Frames of mind. The theory of multiple intelligences.* New York: Basic Book

Grigorenko, E. L., Sternberg, R. J., & Ehrman, M. E. (2000). A theory based approach to the measurement of foreign language learning ability: The CANAL-F theory and test. *Modern Language Journal. 84,* 390-405.

Grymska, B. (2016). New Conceptualizations of Language Aptitude-The Potential of Working Memory in Second Language Acquisition (SLA). *Theory and Practice of Second Language Acquisition. 2* (1), 103–118.

Krashen, S. (1982). *Principles and Practice in Second Language Acquisition.* California: Pergamon Press Inc.

Lasagabaster, D., & Ruiz de Zarobe, Y. (2010). *CLIL in Spain: Implementation, Results and Teacher Training.* Newcastle: Cambridge Scholar.

Meara, P. (2016). *The LLAMA Language Aptitude Tests.* [Computer software]. Lognostics.

Madrid, D., & Pérez, M. L. (2001). Exploring the students' motivation in the EFL class. E. García Sánchez (ed): *Present and Future Trends in TEFL,* 321-364.

Marsh, D. (2012). *Content and Language Integrated Learning (CLIL). A Development Trajectory*. Córdoba: University of Córdoba.

Meara, P. M. (2005). *LLAMA Language Aptitude Tests: The Manual.* University of Wales Swansea.

Meara, P. M. (2019). *The LLAMA Tests v3.* Cardiff: Lognostics.

Mehisto, P., Marsch, D., & Frigols, M. J. (2008). *Uncovering CLIL. Content and Language Integrated Learning in Bilingual and Multilingual Education.* Oxford: MacMillan.

Montaño-González, J. X. (2017). Learning Strategies in Second Language Acquisition. *US-China Foreign Language. 15* (8), 479-492.

Oxford, R. L. (2003). *Language Learning Styles and Strategies: An Overview.*

Oxford, R.L. (1990). *Language Learning Strategies: What Every Teacher Should Know.* Boston: Heinle & Heinle.

Pervin, L.A., & John, O.P. (2001). *Personality: Theory and research* (8th ed.). New York: Wiley & Sons.

Pimsleur, P. (1966). *Pimsleur Language Aptitude Battery*. New York, NY: Harcourt Brace Jovanovich.

Pokrivčáková, S. et al. (2013). *CLIL in Foreign Language Education*. Nitra: Constantine the Philosopher University.

Robinson, P. (2005). Aptitude and second language acquisition. *Annual Review of Applied Linguistics 25*, 46–73.

Rogers, V., Meara, P., Barnett-Legh, T., Curry, C., & Davie, E. (2017). Examining the LLAMA aptitude tests. *Journal of the European Second Language Association 1*(1), 49–60.

Rosenthal, J. (1996). *Teaching science to language minority students: Theory and practice*. Clevedon: Multilingual Matters.

Singleton, D. (2017). Language aptitude: Desirable trait or acquirable attribute? *Studies in Second Language Learning and Teaching 7*(1), 89-103.

Skehan, P. (1991). Individual Differences in Second Language Learning. *Studies in Second Language Acquisition*. (13), 275 - 298.

Smith, M., & Stansfield, C. (2016). Testing Aptitude for Second Language Learning.

Spada, N., & Lightbown, P. M, (2013). *How Languages are Learned,* Oxford Handbooks for Language Teachers, IV ed., Oxford: Oxford University Press.

Spolsky, B. (1995). Prognostication and language aptitude testing, 1925-1962. *Language Testing, 12*(3), 321–340.

Stansfield, C. (1988). *Pimsleur Language Aptitude Battery.* San Antonio, Texas: The Psychological Corporation.

Sternberg, R. J. (2002). The theory of successful intelligence and its implications for languageaptitude testing. In P. Robinson (Ed.*), Individual differences and instructed language learning*. Amsterdam: John Benjamins.

Teepe, J. (2004). On the Relationship between Aptitude and Intelligence in Second Language Acquisition. *Teachers College, Columbia University Working Papers in TESOL & Applied Linguistics, 4.*

Wen, Z. (2015). Working memory as foreign language aptitude. In Z. Wen (Ed.), *Working memory and second language learning: An integrated approach*. Bristol: Multilingual Matters.

Wen, Z. (2019). *Language aptitude: Advancing theory, testing, research and practice.* London: Routledge

Yalçın, S., Çeçen, S., & Erçetin, G. (2016). The relationship between aptitude and working memory: an instructed SLA context. *Language Awareness, 25* (1-2), 144-158.

Yoshihiro Nakamura, Y. (1988). *Foreign Language Aptitude in Foreign Language Learning.* Faculty of Education, Kagoshima University.