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# AUTONOMOUS LEARNING OF ENGLISH AS A FOREIGN LANGUAGE IN A CULTURALLY INTEGRATED B-LEARNING ECOSYSTEM

## APRENDIZAJE AUTÓNOMO DEL INGLÉS COMO LENGUA EXTRANJERA EN UN ECOSISTEMA B-LEARNING CULTURALMENTE INTEGRADO

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### ABSTRACT

The low level of oral skills in learning English as a foreign language seems to be related to the lack of spaces and opportunities to interact in dynamic learning environments since the

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texts and study materials are not related to the context in which the student lives. This research answers the question of whether a b-learning ecosystem with devices for monitoring learning and integrated into cultural dimensions of the students' environment improves the learning of oral skills in learning English. The proposal is based on advances in research on ecosystems of learning and embodied cognition. A system is designed from the specification of learning spaces integrated into a spiral structure. An online learning environment integrates with an



ecosystem with elements of Boyacá cuisine to develop communicative interactions and autonomous learning activities. The proposal is validated by taking as population, grade 11 students from the Colombian system and two equivalent samples of selected students, based on previous performance in the English subject in the current school year. Statistical analysis of results supports the positive answer to the research question and supports the importance of the cultural integration of learning b- learning ecosystems in foreign language learning.

**KEY WORDS.** Learning ecosystem, communicative affordance, autonomous learning, B-learning ecosystem.

## RESUMEN

El bajo nivel de competencias orales en el aprendizaje del inglés como lengua extranjera parece relacionarse con la falta de espacios y las oportunidades de interactuar y de entornos dinámicos de aprendizaje y a que los textos y materiales de estudio no se relacionan con el contexto en el que vive el estudiante. Esta investigación responde a la pregunta de si un ecosistema b-learning con dispositivos para el monitoreo del aprendizaje e integrado a dimensiones culturales del entorno de los estudiantes mejora el aprendizaje de competencias orales en el aprendizaje del Inglés. La propuesta se fundamenta en los avances de investigación sobre ecosistemas de aprendizaje y conocimiento incorporado-embodied cognition -. El diseño parte de la especificación de un sistema de espacios de aprendizaje integrados en una estructura de espiral. Un ambiente de aprendizaje en línea se integra con un ecosistema con elementos de cocina boyacense para desarrollar interacciones comunicativas y actividades autónomas de aprendizaje. La propuesta se valida tomando como población, estudiantes de grado 11 del sistema colombiano y dos muestras equivalentes

de estudiantes seleccionadas con base en el rendimiento previo en la asignatura de inglés en el año escolar en curso. Los resultados muestran que el rendimiento promedio del grupo experimental es significativamente superior al del grupo control, al hacer la comparación con la prueba T.

**PALABRAS CLAVES.** Ecosistemas de aprendizaje, affordance comunicativo, aprendizaje autónomo, ecosistema

B-learning.

## 1. INTRODUCTION

Research trends in the areas that have been grouped under the name of cognitive science are promoting new perspectives for the understanding of the different learning processes, vital for human development. One of these is the learning of a second language, which may well be classified as an enhancer of new learning and that is developed through cultural interaction (Heyes, 2018). The specific case of learning English is on the list of needs for the 21st century in the Colombian educational prospective (Grimaldo *et al.*, 2019)

The levels of learning in English development, in the Colombian case, are not desired and the satisfaction of this need requires changes in conventional institutional practices. Indeed, research shows that the development of skills to produce sentences and ideas with fluency and appropriate intonation requires spaces and opportunities for interaction and use of the foreign language, if the study materials are related to the context in which the student lives, the learning of the foreign language can be better anchored (Barrera, 2014; Velásquez, 2015)

This research emerges from the interest in developing alternatives for improving the learning of English as a foreign language through the identification of relevant research



in cognitive science; in particular, on embedded cognition, learning ecosystems and information technology.

Learning ecosystems have special potential to integrate their own cultural elements with new learning content and promote competency-generating experiences, cooperative work and learning (Maldonado et al., 2019).

Research in information technology for learning, and particularly in B-learning environments, shows that the dynamic combination of digital resources in face-to-face and virtual interactions improves learning possibilities; students feel motivated and safe when they combine digital and traditional devices in the generation of academic products that require putting into practice the foreign language and to the extent that they are located in different real contexts or imagined by them, to reaffirm their knowledge of the language (Barrera, 2014; Rico et al., 2016; Rojas, 2013).

The research, therefore, takes on the challenges of contributing to the understanding of the dynamics of learning a foreign language by integrating digital devices into ecosystems, testing a strategy for the formation of communication skills in English, suggesting to teachers possibilities to innovate their practices. And offer new possibilities for students to enjoy their own cognitive development and personal growth (Du, 2012).

## **2. BACKGROUNDS AND FRAMEWORK**

### **1.1 Embodied cognition and language**

The learning of a second language can be approached, from theories and studies that converge in the explanation of cognitive development from the sensorimotor experience.

(Wellsby & Pexman, 2014) highlight the role of this experience in children's conceptual and language development, and demonstrate that by interacting with objects, learning is activated and information acquisition and knowledge development are improved; They are based on a significant number of investigations, in which the behaviors and learning processes of babies and children are observed and monitored, when they are exposed to objects with which they interact using their senses. The results aim to demonstrate the cognitive development benefits of interacting with the environment while learning words and concepts.

Embodied cognition (EC), is a term used to refer a class of theories, which emphasizes the importance of experience developed through bodily interactions with the environment to improve learning (Borghi & Cimatti, 2010, Wellsby & Pexman, 2014) and is one of the most important programs in contemporary cognitive science (Dove, 2016).

Two kinds of empirical studies are developed: one that tests systems of action, emotion and perception in apparently abstract cognitive tasks and another that shows the contribution of bodily interaction with the external environment for the performance of such tasks (Dove, 2016)

The use of language is integrated into the sensorimotor experience learning. The formation of concrete concepts integrates sensorimotor information coming, on the one hand, from the interactive experience with objects and, on the other, with an environment of symbols. The understanding of abstract concepts incorporates previous experiences and generates information from the experience with language mainly (Wellsby & Pexman, 2014)

Through active exploration with the environment, children develop a greater understanding of the objects functions and how they can be



manipulated. This knowledge of semantic characteristics and object accessibility helps children to differentiate objects more easily and, simultaneously, to learn words by mapping labels to representations based on previous experiences (Scofield et al., 2009). In this way, perceptions and emotions are linked systemically with actions with the objects and actions of language. The link is evident in the observed tendency to integrate gestures with verbal expressions (Re et al. 2015).

Previous experiences such as communicative and manipulative with its emotional dimensions in physical and social environments configure the evolution of culture from the perspective of individual learning and is the basis, at all times, for the integration of new learning. Language development is a new learning enhancer along with the ability to observe and imitate.

In this context, we state the hypothesis that the integration of sensorimotor experiences with second language learning in culturally significant settings can act as a facilitator for the development of oral communication and effective communication skills.

For example, the preparation of food and the elaboration of typical products of a region, could benefit the learning of English food vocabulary, and also its use in dialogues and narratives, since the incorporated learning experiences may be more beneficial when the sensorimotor information obtained is related to the information learned (Wellsby & Pexman, 2014)

## 1.2 Learning ecosystems

Another theory that supports and provides solid foundations to approach language learning from an environmental perspective is ecology. According to (Maldonado et al., 2019, p.03) "Ecology shows learning as a property of every

living being with autonomous movement, which emerges from its interaction with its environment and is sustained by networks of information exchange". Interaction with the environment is the basis of experience and its elements promote the development of people's capacities to adapt and act on the environment in which they live.

An ecological approach to language learning is related to the dynamics of the environment as Van Lier (2004, pp. 11) points out: events "are happening all the time, in schools, classrooms, desks and around computers. In fact, learning can occur anywhere the learner can have interpersonal or intrapersonal language experiences" (Quoted in Paiva, 2018, p.8)

The ecological educator sees language development as learning with and among students in the environment, relates it to kinesics, prosodics, and other visual and auditory sources of meaning, and consequently develops innovative practices.

According to Maldonado, et al. (2019) the development of learning experiences takes place in ecosystems with unity and in them interacting components can be differentiated. In theory, each of these elements, in synergy with the others, offers possibilities for students to carry out actions whose character is defined by the development of learning through experiences that occur on a continuum.

Gibson (1977) takes the niche concept of ecological studies to see its relationship to learning and perception. A way of life in nature implies a form of environment or niche that is characterized by a specific set of affordances or links between perceived elements and actions (Quoted by Maldonado et al. 2019, p. 26).

In the case of the English language as a foreign language, the learning niche is the environment in which its elements are linked to the physical



and communicative actions of the students, and in which interactions generate abilities and skills; it opens opportunities for the learner to interact and generate meaningful learning.

From the ecological perspective, the student is immersed in an environment full of potential meanings that are activated as the student acts and interacts within and with it; there the apprentice finds the necessary information and sufficient stimulation to act and react in the face of various situations (Van Lier, Leo, 2000).

### 1.3 Communicative Affordance

The development of oral ability in the English language finds its full progress with the communicative approach. In this regard, (Wade, 2009) believes that oral competence can occur entirely in this model through interaction and in various contexts (pages 111-127). This approach emphasizes communicative competence, defined as the ability to produce language in a situational and socially acceptable way; in other words, it is the ability to know what to say, how to speak or to whom, when, in what way to do it and about what (Hymes, 1974).

In the scenario we propose, the student activates communicative affordances at each level for each cycle, allowing him to have direct contact with his environment and peers, which facilitates the acquisition of knowledge and information available. According to (Gibson, 1979) the word affordance refers to a reciprocal relationship between an organism's action and a particular characteristic of its environment. An affordance generates an inclination to action (but it does not cause or trigger it), depending on what the organism wants and is useful to it. (Quoted in Van Lier, 2000, p.p. 252)

The learning of affordances is progressive and the interactions of the subject with his environment

generate cycles of information in the form of a spiral: each interaction generates a differentiation advance that makes the next interaction operate from the previous advance. The generation of affordances advances as the subject develops and forms his capacity to process information and recognize his environment. Intelligence as adaptive capacity is developed based on these components and implies that affordances are differentiated by the subject himself and from other subjects (Maldonado, et al., 2019).

The learner's confidence and participation in constant oral interaction affects the development of communicative competence. Hadaway, Vardell, & Young (2001) point out the need to create a comfortable learning environment in the English classroom. Educational technology in teaching English can help students feel comfortable speaking, either spontaneously or by preparing oral presentation activities.

ICT in English learning can be used to support language practice in real situations and monitoring of language skills (listening, speaking, writing and reading) in interactive and collaborative experiences (Chacon, C; Perez, CJ, 2011) .

### 1.4 B-learning Systems

The b-learning system consists of establishing a scenario with activities both virtual and face-to-face, in which students and teachers combine the available resources and adapt them to teaching and learning situations. They are constantly reinvented as they vary their applications and increase their potential as teaching tools. This training model makes use of the advantages of 100% online training and face-to-face training, combining them in a single type of training that streamlines the work of both the trainer and the student (Barrera, 2014).



B-learning is a didactic strategy that makes it easier for the student to acquire their learning in an interactive way; due to the extensive tools available in platforms such as Moodle or Google classroom, it allows the evaluation of learning and planning of activities, and the student is aware of the evolution of his own learning, his acquired skills to work independently, and is able to control and monitor his progress.

### 1.5 Autonomous Learning

An agent is autonomous in relation to an environment as each change has possibilities of alternative action to adapt. Perceiving the change in the environment, being aware of the possibilities of action, deciding on an option and controlling its execution are basic components of autonomy (Maldonado, 2012).

According to (Morales, 2008; McGroarty, 1993; Olsen and Kagan, 1992), as the student takes responsibility for his own learning, he also motivates and encourages peers to learn through the interaction and socialization of knowledge acquired in a setting where they are distributed in pairs or in small groups.

Every student may learn to plan, monitor and evaluate their learning, which requires an active and direct participation (Richards and Rodgers, 2001).

Hubbard (2004) "indicates that autonomy is related to the ability of students to acquire the language deliberately and systematically outside the classroom with or without the guidance of the teacher, tutor or classmate" (cited in García *et al*, 2012 p. 12). Therefore, according to (Healey, 1999) "the main objective of the training is that the student can learn to manage time, place, the way forward to achieve the goal and to realize the success of their performance" (quoted in García *et al*, 2012 p. 12).

## 3. METHODOLOGY

The development of oral competence in learning English as a foreign language is a necessity, given the problems identified in the evaluations of Colombian schools that run in parallel with the lack of learning ecosystems that stimulate the exercise of active oral communication. The research referred to in the previous sections suggests possibilities for structuring an ecosystem with a b-learning approach from the computer perspective and anchoring the knowledge incorporated in cultural dimensions of the environment in which students live to promote autonomous learning.

### 1.1 Issue

This study searches about the structural and functional characteristics of a learning ecosystem designed to facilitate the interaction of the learner with significant elements of their own physical, social and cultural environment and with components located online, to support the development of autonomous learning experiences of oral expression in English, and tests the effect that a system with these characteristics can have on the development of oral competence in the learning of English.

The general objective of this research is to design and validate a B-learning learning ecosystem aimed at improving the development of oral skills in handling English as a second language.

Consistent with the background checked and the conceptual framework, a b-learning ecosystem is designed that integrates cultural elements of the culture in which the students are involved.

The hypothesis to try on is that students in an ecosystem b-learning with integration of cultural elements from their environment show superior development of oral skills in English than those who follow the conventional system.



The project is developed in two stages: in the first, the b-learning eco-system is designed and implemented, and in the second, its pedagogical value in the development of oral competence in learning English is tested.

## 1.2 Design of the b-learning Ecosystem for autonomous learning

This stage included three processes:

### a. Design of learning spaces

A learning space is made up of a set of concepts that relate to actions. The set of concepts is the base or foundation from which the student consolidates and projects their own development and from which a process of collaboration of actors in the learning scenario is interwoven (Maldonado, 2012).

This learning space is framed in a regular basic training study program in the Colombian educational system. It is formally identified as an English subject of 11th grade. In the context of this subject, the topic is chosen: typical culinary recipes from Boyacá, which determine the specific components of learning.

### b. Design of affordance levels

Five levels related to each other are delimited, forming a system for verbal production in such a way that each level generates an advance in differentiation that facilitates the next level (Illustration 01). The levels are the following:

1. Vocabulary: grammatical categories are identified and objects are associated with names.

2. Propositional: the association - affordance - is integrated between word-object in propositions: perception is of a dynamic structure as an acting subject - propositional affordance -.

3. Dialogal: integrates the previous ones in the dialogue as a new interactive affordance.

4. Narrative: integrates complex units to represent processes as systemic units.

5. History: integrates the previous levels in the action of making accounts of lived or imagined processes.

### c. Design of learning scenarios

The B-learning ecosystem has two action scenarios: a. Face-to-face in which sensorimotor and social processes are developed - classroom, library, auditorium and bilingual room -; b. Virtual: modules designed and arranged on the google classroom platform, for students to register, find content designed for them and developed study activities and monitoring their learning..



*Illustration 01. In the learning strategy that is followed in this project, the formation of affordances advances as the student develops his ability to detect information and execute actions linked to structures and dynamics in his environment.*



### 1.3 Affordance Levels

#### Level I: Vocabulary affordance

Table 1. Level 1 learning space. Association of concepts with actions as basis of competences.

Actions	Pronounce/ read	Spell	Write	Association of names to objects	Item list categorization
Concepts					
Food	X	X	X	X	X
kitchen appliances	X	X	X	X	X
Adjectives to describe food	X	X	X	X	

For the first level of learning, specific actions were selected, which the student had to carry out for each stipulated concept within the vocabulary level, as observed in Table 1. The vocabulary is classified by categories to learn and understand it better. In each of the categories, the student identifies the words related to the topic, then learns their correct pronunciation, also learns to spell to strengthen diction and fluency when pronouncing, and finally uses vocabulary to do exercises in which they were identified and related to the corresponding objects.

In the classroom, students recreate a culinary context where they bring food related objects, interacting and linking these objects to their respective names. For this activity the students have visual and auditory aids such as dictionaries and audio tracks with which they could learn the correct pronunciation of the vocabulary, as well as its correct writing.

For the virtual ecosystem, the Google Classroom platform, divided by chapters is available. In Chapter I: Vocabulary affordance, a series of exercises and practical games are presented, and the four skills of listening, reading, speaking, and writing are developed. The exercises are designed in order to learn the vocabulary worked on in the classroom.

For each vocabulary category, two exercises are proposed: the first consisted of developing games such as crossword, puzzles, word search, as shown in the illustration, and the second, in learning the correct pronunciation of the vocabulary, by means of the projection of images and audios.



## Level II: *Propositional affordance*

Table 2 shows the concept-action relationship for the second level. Students perform actions while expressing these actions in propositions, combining nouns with adjectives, and nouns with actions, and then, in a sentence, noun +

verb + complement, to finally build complete sentences with noun + verb + complement + adjective, resorting to the present, past and future verb tenses. For example, the student takes an onion and peels it, at the same time as he writes and says the action: "I peel an onion."

*Table 2. Construction of propositions with different levels of complexity.*

Actions	combine	Conjugate in present simple	Conjugate in past	Conjugate in future	Pronounce in oral expressions	Elaborate propositions
Concepts						
Nouns+ verbs	X				X	
Subject+verb+ object	X	X	X	X	X	
Subject+verb+ compleme nt+adjective	X	X	X	X	X	X

At this level, a kitchen context is recreated in the classroom, for the process of preparing the typical recipe. Kitchen items such as chopping boards, pots, containers, and ingredients are used. An interaction space is created between the students and the culinary environment recreated by them.

The virtual space, for the propositional affordance level, is divided by skill categories and for each one a series of activities related to the construction of propositions are proposed.

For the first listening category, a listening exercise is formulated, which consists of watching a video about a typical Colombian recipe, such as chicken sancocho, and once the video is observed, an exercise about relate and organize step-by-step the video recipe is accomplished.

For the reading category, reading activities are implemented: the recipe for the video is transcribed and a questionnaire based on the text is designed. Through this exercise, students identify the structure of an instructional text, and



answer textual and inferential reading questions.

Finally, in the writing category, it is proposed to structure the instructional text of a typical recipe from the department of Boyacá, following the structure of the recipe text for chicken

Sancocho worked in the previous category. As a final product of the level, a podcast is uploaded where the brief description of the chosen recipe is made.

**Level III: *dialogal affordance***

For level three, a description process was followed through a sequence of questions and answers. An announcer and an interlocutor, developed a dialogue accompanied by actions that lead to the preparation of recipes. Through the appropriation of gastronomic recipes from the region, its elaboration, the recognition of the process and the implements required to arrive at the final product, the construction of propositions and their pronunciation is activated.

*Table 3. Dialogue creation and interaction with classmates during the recipe preparation process.*

Actions	Formulate	Pronounce	Write	Describe
Concepts				
Question	X	X	X	X
Answer	X	X	X	X
Process				X

The elaboration of a typical recipe of the region is the setting that triggers the interaction and dialogue of the participants; for this process the implements and a clear work structure is organized. In the physical environment, there are the resources and implements necessary to carry out the recipe, in addition to didactic aids such as posters, books, recipes and videos that would facilitate the understanding and production of propositions and engage in natural and spontaneous conversation in a context real.

To strengthen the process developed in face-to-face space, a series of complementary activities shared on the platform are available. The level is divided into categories and, like the previous level, the four language skills are practiced in each of them.

For the first listening category: “cooking for parents”, a video is arranged about a dialogue between two brothers who are preparing a recipe for their parents; in the dialogue, the use



of question and answer structures is observed, as well as the vocabulary of level I. Based on the video, an exercise in understanding true and false is proposed.

In category two “Reading activity”, the transcript of the observed dialogue is shared and the exercise of completing it with the structures of Wh questions is proposed, helping to identify which are, and how to use them in a conversation.

In the “writing activity” category, a guide for the elaboration of a script for a cooking show is designed, and the exercise of writing and structuring a dialogue between two or more

people is encouraged, recreating the setting of a show. Finally, for the speaking category, it is proposed the exercise of cooking TV. show, record it and share it on the platform.

**Level IV: narrative level**

For level four, the concepts of sentences, propositions, and paragraphs are assigned. For each one of them, a series of actions to be developed is organized, so that the student make use of all the elements worked on and learned during this level and could easily express their ideas through the preparation of paragraphs about developed experiences.

*Table 4. Join the propositions to finally make paragraphs. The paragraph is the unit that is made up of propositions to create a text.*

Actions	Organize	Combine	Punctuate	Use connectors	Write
Concepts					
Statements	X	X			
Propositions	X		X	X	
Paragraphs	X		X		X

In the classroom, the reading-writing process is encouraged, through the writing of paragraphs describing the experience lived in the culinary context, the use of playful and practical exercises that allow identifying the structure of a paragraph was resorted to. For the platform, a single category was designed that consisted of complementing the activities carried out in the classroom, which contribute to the writing

process, by means of examples and guides to work on the structure of a paragraph.

**Level V: story level**

For the fifth level, the proposed concepts are related to the structure of a story; the student creates and narrates the entire process of selection, preparation and presentation of his



typical dish, through a descriptive text both orally and in writing; and to create this story, he followed a sequence of steps or actions that allowed him to build the text with meaning and coherence.

*Table 5. Combine paragraphs to get a story with a start, middle, and end.*

Actions/ Concepts	Select characters from the story	Choose the place and time where the story takes place	Describe the sequence of events on the stage and in the time of the story	Write an ending to the story	Read the story in front of an audience.
Beginning	X	X		X	
Development			X	X	
Result				X	X

This ecosystem, for which a b-Learning modality is adopted, included both on-line and face-to-face activities, pedagogically structured, so that it facilitates achieving the proposed goals and expedites the work of both the trainer and the student.

The ecosystem activates a process in which the student measures and regulates their own progress in the learning process; a series of strategies are developed that allowed the

students to self-evaluate their performance and be aware of their strengths and weaknesses at each of the levels. Likewise, being an ascending process, it implies that to advance from one level to another, it was required that the proposed goals had been reached, since each level includes and complements the previous one.



### 3.4 Population and sample

For the development of this project, the public educational institutions of the department of Boyacá are taken as a population as the sample two eleventh grade courses from the public educational institution Guillermo León Valencia at the city of Duitama, where the conditions required for the investigation are done.

Two courses are selected based on their academic performance in the academic period prior to experimentation, so that there are no significant differences in their means and the number of students was similar. Table 6 shows the statistical comparison of the two selected groups.

Table 6. Comparación de los grupos seleccionados con base en su rendimiento académico previo en la asignatura de Inglés

Summary Statistics	Grupo A Experimental	Grupo B Control	A-B Mean Diff	
Sample Mean	3,2641	3,5531	-0,2890	
Median	3,1300	3,5300	-0,4000	
Min	2,1000	2,3800	-1,8000	
Max	4,5000	4,6300	1,0200	
Std. Deviation	0,7056	0,4491	0,8359	
Std. Error	0,1310	0,0834	0,1552	
95% Lower Limit	2,9958	3,3823	-0,6069	
95% Upper Limit	3,5325	3,7239	0,0290	
Mean Diff (A-B)	Std. Error	t	DF	p <
0,2890	0,1552	-1,8617	28	0,0732

The absolute value of the mean of the control group is 0.289 higher than the experimental group, but the comparison using Student's t-test finds that the relationship between systematic variance and error is -1.8617 with a probability of associated error of 0.0732, greater than the minimum acceptable value of 0.05. Consequently, the two groups are assumed to be equivalent. The two groups are accepted as equivalent samples from the same population.

### 3.1 Instruments

To collect the information and analysis data from this research, the following instruments were used:

1. Written test on knowledge of Boyacense culinary and gastronomy, consisting of 15 multiple-choice questions with a single answer and applied in two ways, in the control group on paper and in person, in the experimental group virtually and through the Quizizz platform.
2. Rubric for the evaluation of oral competences: in the two groups, both experimental and control, the exercise is carried out by presenting orally a gastronomic dish from the region, using the English language to describe and give characteristics. The control group made a face-to-face presentation using slides in the classroom; the experimental group holds an open-air gastronomic fair where the students recreate the stage and spontaneously



expose the process of making a typical recipe in front of their peers and invited public.

### 3.2 Experimentation

The two selected groups followed the same academic training program in English, with the same time intensity. One of them, who served as a control or control group, attended their classes following the standard form of the institution. The group that serves as experimental develops their learning in the b-learning ecosystem designed for research.

For the analysis of the results obtained, a measurement of the average of the efficiency in oral competence was made by means of two tests, applied during an academic period at

#### 4.1 Application of Student's t-test to find mean difference.

*Table 7. Descriptive parameters for the two groups.*

	Control Group	Experimental Group
Group mean	17,2069	25,7419
Standard Deviation	14,9126	18,1787
Sample size	29	31

Table 7 shows the descriptive analysis of the results in oral competence for the two groups. The Conventional Group shows a lower mean than the B-Learning Group, but the standard deviation is also lower, which indicates lower performance, but also less dispersion than the data of the experimental group.

*Table 8. T-test for the two samples*

	F-ratio	DF	p <
Homogeneity of Variance	1,4894	(30, 28)	0,1462
	T-statistic	DF	p < (1-tailed)
Equal Variance	-1,9804	58	0,0022013
Unequal Variance	-1,9936	58,95	0,00249966

the institution, that is, in the second semester of 2019. Since the subjects are not randomly assigned to the groups, a quasi-experimental design is used, comparing the results in the post-test.

## 4. RESULTS

The oral competence of the students in learning the English language is considered as a dependent variable, since the two groups, both control and experimental, focused on the development of these competences in the English language but with different methodologies. The validated b-learning ecosystem in the experimental group is considered as an independent variable.



Table 8 shows the results of applying the Student t-test to decide if the difference in the means is significant or attributable to chance. The reason F to test the homogeneity of the variance is not significant, which indicates that the samples, after the experience, are not homogeneous. If equal variance is assumed, the probability value that the difference is attributable to chance

is less than 0.05, which is the accepted value in statistical tests in the social sciences; but if unequal variance is assumed, also the value  $p < 0.05$ . This allows us to state that the average in oral competences in English of the B-Learning Group is greater than that of the conventional group and that the difference is statistically significant.

#### 4.2 Analysis of results in written test

As a complement to the research hypothesis test, the Student's t-test was applied to the results of a written test. The number of correct responses is taken as the dependent variable.

*Table 9. Descriptive analysis of the results of the written test.*

	Control Group	Experimental Group
Group mean	8,6207	10,3226
Standard Deviation	2,5831	2,5217
Sample Size (n)	29	31

Table 9 shows a higher mean in written test results for the B-Learning group and a slightly lower standard deviation, which is associated with less dispersion of the results.

	F-ratio	DF	p <
Homogeneity of Variance	1,0469	(28, 30)	0,4497
	T-statistic	DF	p < (2-tailed)
Equal Variance	-2,5819	58	0,0124
Unequal Variance	-2,5798	59,51	0,0128

*Table 10. Application of the t-Test to test whether the differences in the means of results in the written test are significant.*

The results of the application test do not allow us to confirm homogeneity of variance of the groups after the experience. The difference of the means assuming both equality of variance and inequality of the same has a probability of error less than 0.05. We can affirm that the learning effect of the B-Learning ecosystem is significantly higher in the learning of competences evaluated in written test than the conventional ecosystem. This result

reinforces the importance of the B-Learning ecosystem.



### 4.3 Gender-related differences in student performance

Table 11. Descriptive parameters of performance by gender in the oral test.

	Males	Females
Sample Mean	20,4667	30,6875
Standard Deviation	18,4618	16,9969
Sample Size (n)	15	16

Table 11 shows the comparison of the performance in the oral test of men and women. At first glance, the 16 women who participate in the experimental group perform better in oral skills in English.

Table 12. Application of the T test to assess the mean differences for men and women in the oral proficiency test

	F-ratio	DF	p <
Homogeneity of Variance	1,1746	(14, 15)	0,3794
	T-statistic	DF	p < (2-tailed)
Equal Variance	-1,6050	29	0,1193
Unequal Variance	-1,6006	30,32	0,1219

Table 12 shows that when applying the Student's t-test to assess the degree of significance of the differences in the means related to gender, this difference is not statistically significant.

The average in the written test for men was 10.26 and for women it was 10.37, very similar to each other. This shows that the apparent superiority of women in terms of oral competence is not replicated in the results of the written test. However, there is no statistical support to affirm significant differences related to gender.

## 5. DISCUSSION

The results obtained demonstrate that the proposal implemented as a b-learning ecosystem that integrates elements of the students' culture for learning the English

language as a second language is a better pedagogical solution than the conventional system followed in the institution. Pedagogy is a discipline that integrates knowledge derived from other disciplines in the search for better solutions to the training problems of the students and, in this way, contributes to the improvement of educational quality.

The design and implementation of the validated proposal configures learning spaces that relate language concepts with actions forming pairs, each of which is considered a projected learning state and, therefore, a goal to achieve (Heller et al. 2006). Couples concept action opens the possibility of projecting affordances, in the ecological vision of learning and the path to active learning, highly emphasized by constructivist approaches.



From the design of learning spaces, a system of affordances is designed by levels in which the learning of the lower level becomes structural element of the next higher level. In this way, prior learning is activated and consolidated at each level, a strategy that may well be supported by the contributions of the constructivism research, and introduces an advance by operationalizing the spiral advance generated by the sequence of projected experiences. It can be interpreted that with this strategy students systematically consolidate their learning.

Validation results can be interpreted from research embodied cognition and language processing (Wellsby, and Pexman, 2014; Dove, 2016). The learning ecosystem activates the perception of the environment, for example, kitchen appliances and ingredients to prepare food and preparation processes, induces actions in that environment, such as selecting and taking, or communicative actions such as naming, asking, answering or requesting, and generates emotions linked to these actions and interactions. Consistent with this approach, it can be interpreted that linking language learning with cultural characteristics of the environment can facilitate initiative and mutual tolerance of members who interact in learning processes (Soliman, Gibson, & Glenberg, 2013). The ecological approach to learning implemented shows that the organization of learning ecosystems that integrate their own cultural elements with new learning content, promotes experiences that generate competencies.

The digital component is integrated into the system, facilitating the monitoring of learning through problem-solving experiences linked to interactive experiences. Students could identify their achievements and difficulties and activate content review and consultation strategies. It can be interpreted that the ecosystem promotes autonomy and independence, strengthens cooperative work, and fosters self-regulation of

the student's own learning, setting goals and proposing a sequence of activities to achieve those goals.

The pedagogical value of b-learning environments focused on improving the linguistic competences of the English language is supported by a broad set of investigations (Morales, & Ferreira, 2008, Mosquera, 2014, Rojas, 2013, Abi Samra, 2010; Solano, 2013; Hernández, 2014), however, the innovation of this proposal is in the Boyacense culinary ecosystem implemented both face-to-face and virtual, since it seeks to promote the student's belonging sense to their own culture, value and rescue the ancestral knowledge and practices belonging to the culture of this region. Likewise, autonomous language learning is encouraged, allowing the student to direct and monitor their progress in the learning process.

The implemented ecosystem favors the development of meaningful learning experiences in students, since by interacting and creating student-student, student-environment, student-teacher relationships, cognitive processes of language learning are enriched and complemented.

Since students learned the second language in a real context, they faced situations where they were exposed and forced to use the foreign language, and to achieve assertive communication, they had to put their knowledge into practice.

The scenarios and virtual learning environments used in this research, helped to create an interactive and dynamic space where the student was the active and main agent, demonstrating what the authors Pérez Marin, Santacruz, & Gómez, (2012) affirm, that this modality results in the teaching processes going from being masterful to being participatory and constructive.



Based on these results, the B-learning ecosystem is validated in the development of oral proficiency in the English language, as well as in the strengthening of students' autonomous learning.

This work has limitations typical of an investigation carried out with groups given in an institution during the normal development of its mission. The expansion of the sample, the development of more learning units and for longer with students from other levels could contribute positively to testing the external validity of the results.

## 6. CONCLUSIONS

This research proposal is based on the theory of learning ecosystems and projects it into the acquisition of a foreign language, the promotion of autonomous learning and the strengthening of oral communicative competence in English: it proposes an environment that favors innovation led by trainers and the enjoyment of cognitive processes by students and teachers.

The B-learning ecosystem integrated into the culture of the learners, is a pedagogical strategy that combines face-to-face classes with online activities using technological devices and provides the opportunity for teachers and students of the 21st century to develop autonomous and collaborative learning, and energize the learning process, by promoting real interaction with the environment and its elements.

Learning theories and pedagogical models help to understand and interpret learning processes in educational institutions, and information technologies open up possibilities to structure, organize and improve ecosystems for meaningful learning.

This entire development process is aimed at meeting the educational needs of the 21st

century, and anchoring the training of students in their real and daily lives, providing instruments and strategies that allow them to seek solutions to the problems they face every day.

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