OCNOS Revista de Estudios sobre Lectura
Journal of Reading Research
https://www.revistaocnos.com

Ocnos, 24(1) (2025). ISSN-e: 2254-9099
https://doi.org/10.18239/ocnos_2025.24.1.483

Promotion of executive functions and fluency through games in students with late entry into the educational system

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Abstract

Students with specific educational support needs, particularly those with late entry into the educational system, tend to have low motivation and develop low expectations regarding their abilities. This study proposes using board games through an intervention program to develop executive functions and Spanish vocabulary. A quantitative pretest-post-test study with a control group was conducted to evaluate the program's effectiveness using the Rey Complex Figure Test (Rey, 2003) and Verbal Fluency from *Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños* (Portellano et al., 2009). The study involved 46 immigrant students who had a late entry into the educational system at a school in a socially disadvantaged area of Andalusia. The results show that participants in the experimental group benefited from the program, with significant differences observed in the studied variables. It is concluded that game-based learning can be an effective educational tool for developing cognitive abilities and fostering vocabulary in students requiring linguistic adaptation.

Keywords: Game-based learning; board games; immigrant students; language fluency; executive function.

How to cite: Ait-Abdellah-Sefian, H., Rodríguez-Ferrer, J. M., Rodríguez-Moreno, J., Aguilar-Parra, J. M., & Manzano-León, A. (2025). Promotion of executive functions and fluency through games in students with late entry into the educational system. *Ocnos, 24*(1). https://doi.org/10.18239/ocnos_2025.24.1.483

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Promoción de funciones ejecutivas y fluencia mediante juegos en estudiantes en situación de incorporación tardía al sistema educativo

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Resumen

Los estudiantes con necesidades específicas de apoyo educativo, concretamente los estudiantes en situación de incorporación tardía al sistema educativo tienden a tener una baja motivación y desarrollan bajas expectativas respecto a sus capacidades. Este estudio propone la utilización de juegos de mesa mediante un programa de intervención para desarrollar las funciones ejecutivas y el vocabulario en español. Se realizó un estudio cuantitativo pretest-postest con grupo control donde se evaluó la efectividad del programa con los instrumentos Figura de Rey (Rey, 2003) y Fluidez verbal de la *Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños* (Portellano et al., 2009). Participaron 46 estudiantes inmigrantes en situación de incorporación tardía al sistema educativo de un centro educativo andaluz ubicado en una zona en riesgo de exclusión social. Los resultados demuestran que los participantes del grupo experimental se beneficiaron del programa, observándose diferencias significativas en las variables estudiadas. Se concluye que el aprendizaje basado en juego puede ser una herramienta educativa eficaz para el desarrollo de las capacidades cognitivas y el fomento del vocabulario para estudiantes con necesidades de adaptación lingüística.

Palabras clave: Aprendizaje basado en juego; juegos de mesa; Estudiantes inmigrantes; fluidez verbal; funciones ejecutivas.

Cómo citar: Ait-Abdellah-Sefian, H., Rodríguez-Ferrer, J. M., Rodríguez-Moreno, J., Aguilar-Parra, J. M., & Manzano-León, A. (2025). Promoción de funciones ejecutivas y fluencia mediante juegos en estudiantes en situación de incorporación tardía al sistema educativo. *Ocnos, 24*(1). https://doi.org/10.18239/ocnos_2025.24.1.483

INTRODUCTION

Over the past two decades, Spain has experienced a significant and steadily growing migratory process (Iglesias-Martínez & Estrada, 2018). According to statistics from the Organisation for Economic Co-operation and Development (OECD), Spain is among the top five countries worldwide for receiving immigrants. Torres-Santomé (2010) points out that this immigration is characterised by marked diversity in economic, social, educational, and healthcare conditions, which presents substantial challenges in integrating this group into Spanish society.

The successful integration of immigrant students has been -and indeed is- a significant challenge for the Spanish educational system (Domínguez-Alonso et al., 2015). The right to education is firmly established as a universal right and, in the Spanish context, is supported by *Ley Orgánica 4/2000, de 11 de enero, sobre Derechos y Libertad de los Extranjeros* as amended by *Ley Orgánica 2/2009, de 11 de diciembre*. This is further reinforced by the current education law *Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación*. The act underscores the importance of education in promoting children's capacity to recognise, understand, and respect diverse cultures and individual differences. This includes fostering equality of rights and opportunities between men and women and non-discrimination based on ethnicity, sexual orientation or identity, religion or beliefs, disability, or other conditions.

However, as recent research indicates, the educational integration of students with migrant backgrounds is far from a consolidated reality (Fernández Sierra, 2017). Instead, there is a trend towards disparities in their academic paths, school segregation, early school leaving, and a low access rate to higher education.

Martínez-Usarralde (2021) notes that the integration of migrants within the educational environment has gained increasing importance, as it stems from the socio-educational function of our system, becoming a vital tool in promoting social equity. Therefore, educational institutions must ensure that migrant students acquire the knowledge and skills for effective participation. Dubet et al. (2010) also highlight the essential role of educational institutions in reducing social and economic inequalities. Formal education plays a crucial role in the personal development and economic and social integration of groups at risk of exclusion, including the immigrant community.

Immigrant students often face significant challenges in acquiring reading skills in Spanish, which can impact their academic performance, their integration into the educational system, and their sense of belonging in society (Nikleva & López-García, 2016). The linguistic and cultural diversity these students bring to the classroom can be a valuable source of enrichment. However, it also raises the need to address the linguistic and cultural barriers that may hinder their effective participation in the traditional curriculum.

In this context, implementing Game-Based Learning (GBL) emerges as a strategy to transform the teaching and learning process into a more participative and engaging student experience. This approach involves using games as a learning tool, fostering skill development across multiple areas of growth and academic dimensions (Muñoz-Oyarce & Almonacid-Fierro, 2015).

Higueras (2020) highlights the effectiveness of this pedagogical approach in promoting the social and educational inclusion of immigrant students. Introducing game elements into the classroom makes reading comprehension more accessible and encourages active student participation in the class group. GBL offers a playful approach to engaging immigrant students, allowing them to approach reading comprehension in a less intimidating and more appealing way and enabling them to play and participate in activities related to reading in a group setting. This approach can significantly contribute to their academic development and sense of belonging in the classroom.

A systematic review by Rahmah and Saputri (2021) emphasises the benefits of using games in vocabulary acquisition. The authors point out that games increase motivation in the learning process and encourage friendly competition and collaboration. This, in turn, improves communication skills and

offers students opportunities to use the target language in a playful environment. Manzano-León et al. (2023) examine the use of board games to improve reading processes in secondary school students in disadvantaged areas. The results indicate that board games can be an effective educational tool for promoting the development of reading processes, including word and pseudoword reading, reading speed, and reading comprehension. A significant improvement in lexical, syntactic, and semantic skills was observed after implementing the GBL program.

Games allow for natural repetition and vocabulary reinforcement in a way that is not monotonous for students. Games like *Story Cubes* enable students to use and repeat words and phrases in various narrative situations, facilitating vocabulary retention and comprehension. Consistent use of these games has proven beneficial for developing oral and written language skills (Zsiray & Koós, 2022).

Furthermore, GBL promotes student social interaction and communication, which is essential for language development. Rankin et al. (2021) highlighted that social interactions in digital games can facilitate morphological awareness and other literacy skills in a second language. English as a Second Language students improved their reading and writing skills through interactions in the game. Another noteworthy benefit of GBL is its potential to enhance the development of executive functions in students (Johann & Karbach, 2019; Vita-Barrul et al., 2022). Executive functions are cognitive skills that include planning, organisation, self-regulation, attention, working memory, decision-making, cognitive flexibility, and inhibitory control. These skills are fundamental for learning, behaviour, and daily life (Gatti, 2005).

Working on executive functions for students who are latecomers to the educational system may be interesting for several reasons. Firstly, these skills improve their ability to learn and assimilate new knowledge (Montes-Miranda et al., 2020). Additionally, strengthening executive functions enhances their ability to adapt to new situations and environments (Gil-Vega, 2020). Secondly, developing these skills fosters student autonomy, helping them make decisions and manage their time more effectively (Ardila, 2013). Lastly, executive functions play a role in emotional regulation (Ramos & Pérez-Salas, 2015), which is essential for social inclusion and successful integration into the school environment and society in general.

In summary, GBL has positively impacted multiple aspects of the educational process. Recent studies (Hernández-Rubio et al., 2023; Zou et al., 2019) highlight its benefits in academic performance, active participation, fostering autonomy, cooperative skills, socio-emotional competence development, and the enhancement of cognitive abilities. Moreover, authors such as Ojanen et al. (2015) support the effectiveness of GBL, emphasising its ability to address curricular content in a motivating way and adapt to the diversity present in the classroom, an essential feature in inclusive education (Plass et al., 2015).

This research explores game-based learning to enhance vocabulary and executive functions in immigrant students who are latecomers to the educational system. For this purpose, an extracurricular educational program using board games was designed, consisting of twelve hours spread over six sessions implemented in the second term of the 2022/2023 academic year. The research questions were as follows:

1) Can game-based learning enhance executive functions in students with late entry into the educational system?

2) Does game-based learning influence phonological and semantic fluency development in students with late entry into the educational system?

METHOD

Design

A longitudinal quasi-experimental design was conducted with a pre-post-test evaluation using a control group and an experimental group.

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Participants

The sample consisted of a total of 46 immigrant primary school students enrolled in the support, guidance, and assistance program in public schools under the Ministry of Educational Development and Vocational Training of the Andalusian Government (*PROA Andalucía* program), aged between 8 and 13 years, with an average age of 10.56 years. The control group comprised 14 boys and 10 girls, with an average age of 10.8 years, and the experimental group consisted of 12 boys and 10 girls, with an average age of 10.3 years.

The sample was collected from students participating in the *PROA Andalucía* program from the second and third cycles of Primary Education within the Linguistic Support for Immigrant Students line. This program aims to strengthen the Spanish language proficiency of newly arrived immigrant children in Spain. The participants in this study were selected through a non-probabilistic sampling process based on the willingness of educational establishments to participate in the research and the subsequent signing of informed consent by the legal guardians.

Once the educational establishments were selected, the groups were randomly assigned, considering the classes' natural distribution. These groups were divided into two categories: a control group, which received conventional reinforcement classes supported by technological resources, and an experimental group, which participated in reinforcement classes using the GBL methodology.

To participate in this research, participants had to meet the following criteria:

a) have signed consent to participate from their legal guardians

b) have attended at least 80% of the sessions during the intervention period.

Instruments

The following instruments were used:

1) Rey Complex Figure Test - Primary (Figure B) (Rey, 2003.

This neuropsychological instrument assesses visuospatial and visuomotor skills through a graphic execution task. The test is also helpful for evaluating executive and visual functions, making it an integral tool in clinical practice and research.

The test is closely linked to executive functions and essential cognitive processes for planning, controlling, and executing complex tasks. The copy phase of the test assesses the participant's planning and organizational abilities. To accurately copy the figure, the individual must develop an effective strategy that reflects their planning and organizational skills.

During the memory phase, the test challenges the participant's working memory, as they must retain and manipulate visual information to reproduce the figure from memory. Cognitive flexibility is also assessed, as the participant may need to adjust their copying and reproduction strategy as needed. Additionally, inhibitory control is evaluated, requiring the participant to inhibit incorrect responses and avoid errors during figure reproduction.

This test was selected due to its greater independence from cultural and linguistic context. As a graphic execution task, it does not implicitly require specific linguistic skills, making it particularly valuable for use with non-Spanish-speaking migrants. This feature allows for a more equitable assessment of individuals from diverse cultural and linguistic backgrounds, ensuring that differences in scores reflect genuine variations in cognitive abilities and are not influenced by language barriers (Kosmidis et al., 2011).

2) *Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños* (Portellano et al., 2009).

The *Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños* is a comprehensive tool designed to assess various executive functions in children. Among the multiple tasks included in this battery, the verbal fluency task, which is divided into two parts: phonological fluency and semantic fluency, was used for this study. This task measures the child's ability to generate words under specific constraints within a limited time.

In the phonological fluency task, each participant has one minute to say aloud as many words as possible that begin with the letter "M." This part of the test evaluates the child's ability to access and retrieve words from their lexical-semantic memory under a specific phonological constraint, requiring effort in searching and retrieving information from long-term memory. The second part, semantic fluency, instructs participants to name as many words as possible that belong to the category "animals" within one minute. This test focuses on the child's ability to access a specific semantic category and retrieve related words, which also involves organizational and semantic access skills."

Procedure

Initially, a preliminary assessment was conducted to ensure that the groups were equivalent in the variables studied. On the one hand, the intervention with the experimental group consisted of six 120-minute sessions spread over a trimester in alternating weeks, aimed at achieving an adequate level of proficiency in using Spanish as the vehicular language. On the other hand, the control group followed a traditional methodology, including teacher-led classes and the use of ICT resources such as PowerPoint, Canvas, and Educaplay. Both interventions occurred within the school during extracurricular hours and were part of the *PROA Andalucía* program.

The experimental group engaged in a Game-Based Learning methodology with a pirate-themed narrative. This pirate narrative served as a thematic framework for the activities and provided a coherent and engaging structure for the sessions. Students were immersed in an imaginary world where they assumed the roles of daring pirates embarking on exciting adventures and missions to retrieve a golden treasure. This narrative immersion aimed to capture the students' attention and motivate them, encouraging active participation.

The GBL methodology for the experimental group was structured into two-hour sessions organised around the following activities:

- Session start: A message on the blackboard assigned one participant to open the magic box. This participant scanned a QR code and read the letter of the day, which introduced the challenge and activities for the session.

- Daily challenge (the letter's content): The "Lords of the Island," characters from the narrative represented digitally, asked the students to complete the games proposed for each session. These daily challenges were aligned with the learning objectives and designed to be achievable yet challenging.

- Assembly: At the end of each session, an assembly was held, during which the captain of each group wrote on a sheet of paper the name of the game used and their positive and negative evaluations of the session. This reflective activity was intended to help students assess their performance, identify their achievements, and identify areas for improvement.

In each session, students earned medals or points based on their performance concerning their participation, conflict management during the games, and positive attitude, according to a rubric prepared for the workshop. A selection of board games was made that could effectively work on executive functions or reading-related skills, with the most commonly used being *Carrera de Letras* (Editorial Lúdilo), *Código*

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Secreto (Editorial Devir), *Dixit* (Editorial Asmodée), *Ikonikus* (Editorial Zacatrus), *Monster Kit* (Editorial Tranjis Games), y *Taco Gato Cabra Queso Pizza* (Editorial Lúdilo) (see Annex).

Figure 1

Photographs of the GBl intervention

In contrast, the control group used a traditional teaching methodology, including instructional classes and ICT resources such as PowerPoint, Canvas, and Educaplay. The researchers did not design this intervention; instead, the methodology previously implemented by the teachers in the *PROA Andalucía* program was documented and used as the control group. The main teaching elements were:

- Instructional classes: These consisted of lessons delivered by the teacher, focusing on vocabulary development and language acquisition. The teacher used traditional teaching techniques, such as direct explanations, written exercises, and group reading activities.

- PowerPoint: PowerPoint presentations were employed to structure the lessons and visually teach vocabulary and key concepts. These presentations included slides with new words, example sentences, key points, and summaries.

- Canvas: This platform distributed learning materials, assigned tasks, and provided feedback. Activities on Canvas included readings with graphic representations and matching and word-drawing exercises.

- Educaplay: This tool was used to create interactive activities such as crosswords, word searches, and quizzes.

Data analysis

The study was conducted following the objectives. Initially, the questionnaires used were corrected to obtain direct scores. Due to the small number of participants in each group, a normality study was

carried out using the Shapiro-Wilk statistical test. The results of this test indicated that the scores did not follow a normal distribution. Therefore, non-parametric tests were chosen for the comparison of means.

The Mann-Whitney U test was used to compare the means between the control and experimental groups (independent samples). The Wilcoxon test was employed to compare means within each group (dependent samples). After completing these mean comparisons, Cohen's d was calculated to assess the magnitude of the observed differences.

RESULTS

To verify the initial equivalence of the groups (control and experimental) in the variables studied, a Shapiro-Wilk test was conducted, and the results indicated that the scores did not follow a normal distribution in both groups ($p < .05$). Due to this, non-parametric tests were chosen for the comparison of means. Table 1 presents the means and standard deviations of the direct scores obtained at the two measurement points (pre- and post-test).

Table 1

Means and Standard Deviations of the Control and Experimental Groups in Pre- and Post-Test Measurements

	Pre-test				Post-test			
	Control		Experimental		Control		Experimental	
	M	DT	M	DT	M	DT	M	DT
Rey Complex Figure Test – Copy Phase								
Number of items	18.75	2.19	19.82	1.94	18.83	2.12	20.55	1.26
Position of secondary items	13.00	2.04	13.36	2.42	12.83	2.28	13.91	2.35
Items Quality	17.08	3.08	17.73	2.62	10.83	2.04	13.73	1.98
Size (proportionality)	4.79	1.41	5.64	3.53	4.58	1.35	5.45	1.10
The relative position of the four principal figures	4.33	1.17	4.82	3.58	4.46	1.14	5.59	1.62
Rey Complex Figure Test – Memory Phase								
Number of items	12.25	3.35	11.55	3.49	13.75	3.50	16.00	2.62
Position of secondary items	6.42	3.49	5.55	3.54	8.00	3.64	10.73	2.59
Items Quality	10.83	4.02	10.50	3.42	8.33	2.87	11.36	2.57
Size (proportionality)	3.42	1.79	4.23	2.27	3.33	1.37	5.00	2.00
The relative position of the four principal figures	3.33	1.31	3.82	2.38	3.17	1.13	5.45	1.84
Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños								
Phonological fluency	2.66	1.58	2.54	1.53	3	1.35	4.72	2.05
Semantic fluency	1.42	1.21	1.27	1.03	1.26	0.96	2.5	1.26

The decision to use non-parametric tests was based on the number of participants in each group and on the normality analyses conducted previously, indicating a lack of normality in the obtained raw scores. To determine whether the groups (control and experimental) were statistically equivalent before the intervention, means were compared using the pre-test scores (see table 2). The results showed no statistically significant differences, suggesting that the groups were statistically equivalent on the measured variables at the start of the intervention.

To address the research questions, post-test scores of the groups were compared (see table 2). The results revealed statistically significant differences in all the studied variables between the control and experimental groups, favouring the experimental group. Additionally, table 2 includes effect sizes calculated using Cohen's d (Cohen, 1988). The found effect sizes range from medium to large. Notable

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significant findings include Element Quality, both in copying and recalling the Rey Complex Figure Test, and Semantic Fluency in the *Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños* test.

Table 2

Non-parametric tests for related and independent samples

	Wilcoxon Related Samples				U de Mann-Whitney Independent Samples			
	Control		Experimental		Pre Control vs Experimental		Post Control vs Experimental	
	p	d	p	d	p	d	p	d
Rey Complex Figure Test – Copy Phase								
Number of items	.564	0.04	.070	0.45	.539	0.52	.012	0.59
Position of secondary items	.185	0.34	.485	0.23	.647	0.16	.001	0.67
Items Quality	.001	1.39	.001	1.72	.284	0.23	.002	1.44
Size (proportionality)	.438	0.15	.097	0.07	.469	0.32	.027	0.71
The relative position of the four principal figures	.444	0.11	.000	0.28	.751	0.18	.021	0.81
Rey Complex Figure Test – Memory Phase								
Number of items	.014	0.44	.001	1.44	.435	0.2	.035	0.73
Position of secondary items	.095	0.44	.000	1.67	.315	0.25	.007	0.86
Items Quality	.012	0.72	.000	0.28	.691	0.09	.002	1.11
Size (proportionality)	.001	0.06	.005	0.36	.285	0.4	.006	0.97
The relative position of the four principal figures	.728	0.13	.012	0.77	.810	0.26	.000	1.49
Evaluación Neuropsicológica de las Funciones Ejecutivas en Niños								
Phonological fluency	.489	0.23	.001	1.21	.761	0.08	.003	0.99
Semantic fluency	.686	0.15	.006	1.07	.741	0.13	.002	1.11

In addition to comparing the groups with each other, within-group mean comparisons were conducted to assess their internal development. The results of these tests are reported in table 2.

In the control group, some statistically significant changes were observed in the studied variables, with medium effect sizes and a large effect size in the case of Element Quality.

In the experimental group, statistically significant differences were found in comparing post-test scores with the control group and pre-and post-test scores within the experimental group across all studied variables, except for the Number of items and Position of secondary items. The effect sizes for variables with statistically significant changes were small or medium. It is important to note that these two variables did not show significant changes within either group when comparing intra-group. Therefore, the statistical differences observed in this group are attributable to the intervention carried out, except for the variables Number of items and Position of secondary items, where the observed differences might be due to accumulated differences between the groups.

Thus, as indicated by the results shown in table 2, the control group shows within-group improvements. These improvements are consistent and attributable to several reasons. Firstly, the activities carried out in the *PROA Andalucía* program with traditional teaching and ICT tools provided a structured learning environment. Secondly, the natural maturation of the students, as the study was conducted over a term, was sufficient for immigrant students to experience growth in their second language vocabulary. Thirdly, familiarity with the test, due to its repetition, may have facilitated better student performance.

However, where the GBL was implemented, the experimental group showed significantly more improvement within and between groups, as reflected in the effect size, with statistically significant differences in all evaluated variables. This suggests that, in addition to the previously mentioned factors

such as maturation and test familiarity, the use of board games and a gamified narrative provided additional and substantial benefits.

DISCUSSION

Adapting to a new environment, an unfamiliar language and a different culture can be complex and challenging. A review of the existing literature provides a broad perspective on games' capacity to improve reading processes (Berns et al., 2016; Chen et al., 2019). However, research on its use with immigrant students is limited despite demonstrating significant results in favour of playful strategies (Manzano-León et al., 2022).

The results of this study indicate the positive impact of this methodology on the fluency of immigrant students. These results align with previous studies on Spanish as a foreign language, which suggest that using playful materials enables students to improve their understanding and use of Spanish in a fun and engaging way (Dixon et al., 2022; Ibrahim, 2017). Reinforcing this idea, Reinhardt and Sykes (2012) highlight that play provides a rich and dynamic context in which students can practice the language and benefit from repetitive processes creatively and flexibly without losing motivation.

Conversely, the connection between game-based learning and the development of executive functions is a crucial aspect of this study. The development of executive functions, which include skills such as planning, attention, and working memory, can be crucial for academic performance and social adaptation. Using board games promotes the natural and motivating practice of these skills (Sánchez-Montero, 2021). For example, during a board game, students must plan their strategy, decide their next move, etc. These activities involve constant practice of executive functions as students need to maintain attention, remember the rules, and adapt to new situations that arise during the game. This active and playful learning type is particularly effective for developing these skills practically and engagingly (Gibb et al., 2021; Rosas et al., 2019; Yogman et al., 2018).

Although the results suggest promising advances for applying Game-Based Learning to students with late entry into the educational system, certain limitations must be considered. Firstly, the current study is limited by the relatively small sample size. Future research would benefit from conducting quasi-experimental studies with more extensive and comparable samples, allowing for greater generalization of the findings. Another limitation lies in the sample selection method, as data were collected in the natural classroom setting. To address this issue, future research could employ random sampling techniques. Lastly, the study design was based on pre-and post-quantitative tests. Future research on this topic would benefit from a qualitative exploration of the educational community's perceptions of this methodology and a longitudinal assessment of the long-term impact on the studied variables.

CONCLUSIONS

This study indicates that GBL is an effective tool for developing Spanish vocabulary and executive functions in late educational system integration students. The intervention, consisting of six two-hour sessions, demonstrated that participants in the experimental group achieved significant improvements in verbal fluency tests, both phonological and semantic, compared to the control group.

The study also showed a notable improvement in students' executive functions in the experimental group. Skills such as planning, organization, working memory, and cognitive flexibility were significantly enhanced, demonstrating the positive impact of GBL on overall cognitive development. The activities' structure and the games' narrative may have contributed to creating an engaging learning environment, fostering active participation and enthusiasm among students.

A detailed analysis of the results revealed that, while the control group also experienced improvements, these can be primarily attributed to factors such as the natural maturation of the students, regular classroom activities and teaching, and familiarity with the test due to its repetition. Although these factors may have influenced the experimental group, the improvements observed in the experimental

Ocnos, 24(1) (2025). ISSN-e: 2254-9099
https://doi.org/10.18239/ocnos_2025.24.1.483

group were significantly more significant. They can be directly attributed to implementing the GBL methodology, as both groups were equivalent before the intervention, and the intra-group and inter-group changes were more significant in the experimental group.

In conclusion, the study demonstrates that Game-Based Learning can be a valuable methodology for enhancing Spanish vocabulary and executive functions in immigrant students in late educational system integration. Implementing similar programs in other educational settings could provide a relevant and practical approach to addressing the challenges faced by immigrant students, thus contributing to their academic and social integration in a more efficient and motivating manner.

CONTRIBUTION OF AUTHORS

Hajar Ait-Abdellah-Sefian: Data curation; Writing – original draft; Research; Methodology.

José M. Rodríguez-Ferrer: Formal analysis; Writing – review & editing; Methodology; Software; Supervision; Validation.

Javier Rodríguez-Moreno: Supervision; Visualisation.

José M. Aguilar-Parra: Supervision; Visualisation.

Ana Manzano-León: Project administration; Conceptualisation; Writing – review and editing; Resources; Supervision.

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ANEXO 1

Board games used in the experimental group

Name and publisher	Game Type and Components	Description	Reading processes worked on in the game	Executive functions worked on in the game
Carrera de Letras (Editorial Lúdilo)	Competitive by teams. Board, cards, tokens, clock.	In teams, they compete to form words using letter cards. Each team selects a word and moves the corresponding tiles on the board. The goal is to be the first team to move eight letter tiles off the board.	Word identification: Players must identify and select correct words. Letter recognition: Each letter used moves on the board, promoting visual letter recognition. Vocabulary development: By forming words, players expand their vocabulary. Reading Comprehension: Players must understand the clues to select the correct word. Spelling: The game reinforces the correct writing of words.	Working memory: Remembering the rules of the game and the letters available to form words. Planning: Selecting the most effective words and anticipating the opposing team's moves. Cognitive flexibility: Adapt to new letters and change strategy according to the game's circumstances. Inhibitory control: Wait your turn and follow the game's rules without impulsivity. Fluency: Finding words that fit the available letters and given clues improves the ability to generate words fluently.
Código Secreto Imágenes (Editorial Devir)	Competitive by teams. Cards and board.	Players are divided into two teams, and each team has a leader who knows the locations of their team's cards on a 5x4 grid. The leader's goal is to give clues in images so that his team correctly guesses all the associated cards before the opposing team.	Visual Comprehension: Players must interpret abstract images to communicate clues. Association of ideas: Relate images to relevant concepts or words. Analysis and synthesis: Break down and combine visual elements to understand and create messages. Inferential reasoning: Deducing the correct image based on visual cues provided by the team leader.	Attention and working memory: Players must concentrate and remember images to interpret and give accurate clues. Planning: Strategize to choose the best images that match the tracks. Cognitive flexibility: Adapt to new tracks and change strategy as the game progresses. Inhibitory control: Avoid revealing clues that may benefit the opposing team. Fluency: Generate and understand visual cues quickly.
Dixit (Editorial Asmodée)	Competitive. Cards and board.	Players use illustrated cards to tell stories. A player acts as the narrator, choosing a card and giving a clue as a word or phrase. The other players select cards from their hands that match the clue. Then, all the cards are shuffled and voted on to guess the narrator's card. The goal is to be imaginative enough for some, but not all, to guess correctly.	Visual comprehension: Interpret and understand the illustrations of the cards. Inference: Making assumptions based on clues given by the narrator. Storytelling: Creating imaginative stories or descriptions for the cards.	Attention: Players should keep an eye out for clues and cards. Working memory: Remembering the cards seen and the clues given. Planning: Strategizing how to give and guess clues. Cognitive flexibility: Adapting thinking to new clues and interpretations. Fluency: Invent and understand descriptions and stories based on images.
Ikonikus (Editorial Zacatrus)	Competitive. Cards.	Players use cards illustrated with emoticons to communicate how they would feel in various situations proposed by other players. In each round, one player describes a situation, and the others select a card representing their emotional reaction. The player who best interprets his teammates' emotions wins the game.	Narration: Explain why a card represents an emotion in a specific situation. Effective communication: Express and justify card choices.	Attention and working memory: Staying focused to correctly interpret emotion cards and remember previous emotions and situations discussed in the game. Cognitive flexibility: Changing perspectives to understand how other people might interpret emotions. Planning: Select the most appropriate emotion card for each situation presented. Inhibitory control: Wait your turn and do not choose cards impulsively. Fluency: Explain and justify the emotions selected in various situations.
Monster Kit (Editorial Tranjis Games)	Individual without competition. Cards.	Players design their monsters using different pieces with the help of cards. The goal is to create the most impressive monster according to the	Initial reading and writing (pseudowords): The game includes components that encourage essential reading and writing. Each part of the	Attention: Players must focus on correctly selecting and combining the monster pieces. Working Memory: Remembering the available parts and the requirements of the monster they

Ocnos, 24(1) (2025). ISSN-e: 2254-9099
https://doi.org/10.18239/ocnos_2025.24.1.483

Name and publisher	Game Type and Components	Description	Reading processes worked on in the game	Executive functions worked on in the game
		established categories, such as the strongest or the most sympathetic. It can be used with different game modes. In this case, the monsters were designed with the cards, and the players had to create stories about them.	monster contains syllables to form the monster's name.	are creating. Planning: Designing a monster following specific guidelines or characteristics. Cognitive flexibility: Adapt the monster's design based on the available pieces and the game's rules. Creep: Describe and explain the characteristics of the monster created.
Taco Gato Cabra Queso Pizza (Editorial Lúdilo)	Competitive. Cards.	Players must get rid of their cards matching the word they say: "Taco", "Cat", "Goat", "Cheese" or "Pizza". When a card matches the word, everyone must put their hand on the center pile, and the last to do so takes all the cards. The goal is to be the first to run out of cards.	Association of images and words: Relate the images of the cards with the corresponding words.	Attention: Players should be attentive to detect matches between cards and words. Working memory: Remembering the sequences of words and cards played. Inhibitory control: Resist impulsivity and act only when there is a coincidence. Processing speed: Quickly process visual and verbal information.