

# Touchscreens and teaching English to children with attention deficit disorder: language practices and recreational games

## *Pantallas táctiles y enseñanza del inglés a niños con trastorno por déficit de atención: prácticas idiomáticas y juegos recreativos*

<http://dx.doi.org/10.18381/Ap.v9n1.942>

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### ABSTRACT

#### Keywords

Curricular adaptations;  
inclusive education;  
English; attention deficit  
disorder; educational  
technology

This work aims to socialize an experience that uses the touch screens in curricular adaptations to teach English through play to children with attention deficit disorder. The action research is administered to validate seven curricular adaptations designed for the acquisition of vocabulary in English as a foreign language. Three children diagnosed with autistic disorder participated, who are domiciled in Manabí, Ecuador. To monitor the progress of the participants, a rubric is applied that evaluates the number of new words acquired. The results show that the videos function captures and maintains the participants' attention for a longer time during language practices. Voice recording contributes to the development of their listening comprehension and contributes to the improvement of pronunciation. It is concluded that the use of touch screens appropriately applied can be relevant to the design of curricular adaptations in the teaching and learning process of students with special educational needs..

### RESUMEN

#### Palabras clave

Adaptaciones  
curriculares; educación  
inclusiva; inglés;  
trastorno de déficit de  
atención; tecnología  
educativa

*Este trabajo tiene como objetivo socializar una experiencia que hace uso de las pantallas táctiles en adaptaciones curriculares para enseñar inglés mediante juego a niños y niñas que presentan el trastorno de déficit de atención. Mediante una investigación acción, validamos siete adaptaciones curriculares diseñadas para la adquisición de vocabulario en inglés como lengua extranjera. Participaron tres niños diagnosticados con trastorno autista, quienes están domiciliados en Manabí, Ecuador. Para el monitoreo de los avances en los participantes, aplicamos una rúbrica que evalúa el número de nuevas palabras adquiridas. Los resultados muestran que la función de videos capta y mantiene durante mayor tiempo la atención de los participantes en las prácticas idiomáticas. La grabación de voz aporta al desarrollo de su comprensión auditiva y al mejoramiento de la pronunciación. En conclusión, el uso de pantallas táctiles aplicadas de manera apropiada puede ser relevantes en el diseño de adaptaciones curriculares en el proceso de enseñanza y aprendizaje de estudiantes con necesidades educativas especiales.*

Received: April 6, 2020  
Accepted: July 20, 2020  
Online Published:  
September 30, 2020

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## INTRODUCTION

The features of information and communication technologies (ICTs) allow the use of educational innovation proposals. This paper is focused on the study of tablet digital screens, smart telephones, and portable computers used for the development of curricular adaptations on teaching foreign languages to both boys and girls, with special educational needs, whether linked or not to disability.

In order to fulfill the purpose of social and educational inclusion, technology could be a key ally because the barriers of time and space have been overcome (Palazio-Arko, 2016); this condition boosts access of disabled individuals to educational services of the twenty-first century (Cabero & Barroso, 2016). Nations have had progress on making public policy for educational inclusion (Unesco, 2008); however, Macias & Villafuerte (2020) hold that it is urgent to perfect public policy in Ecuador for social inclusion, to develop teaching practices and to strengthen an inclusive culture.

With the purpose of moving on to build an equitable, inclusive and progressive society, science leads in efforts to detect neurological affection on children aimed to implement treatments as soon as they are diagnosed (Ferre *et al.*, 2019). Studies extend towards childhood (Canas-Ramirez & Sanchez-Herrera, 2020), however, assistance decreases in adolescence and youth (Lo *et al.*, 2016; Segers, Bravo & Villafuerte, 2018).

It is important to see to the demands for free play permanently made by children, which vary with age and context. This work was made under the educational research project with the title of: Recreational Games to Promote Motor Skills of Both Boys and Girls in the Basic Education Level of the Eloy Alfaro Lay University of Manabí 2018-2020 in the Manta District, Ecuador.

Our survey starts from an affirmation made by Clemares (2014) in the sense that the use of digital screens has extended to the diverse educational fields and has caused the emergence of learning and knowledge technology (TAC, by its acronym in Spanish) (Marcet, 2015). Garay (2016) and Villafuerte (2019) have warned that ICTs are the means and not the purposes of learning.

Conversely, Chávez, Pizarro and Jiménez (2018) affirm that teaching technology for foreign languages for learners with attention-deficit hyperactivity disorder (ADHD) is still scarce in the area. Thus, work in this line of investigation might considerably

contribute to the development of educational systems to overcome the individual and group limitations of multicultural contexts (Blanco, 2015; Salgado, 2017).

Access to electronic devices and Internet is directly related to governmental policies and to the level of technological development of a nation at global level (Gomez *et al.*, 2018; Martinez-Dominquez, 2020). It is worth noting that due to the Covid-19 pandemic, educational systems worldwide had to connect to digital education in a matter of months to enable access to children and the youth to education from confinement (Unesco, 2020; Villafuerte *et al.*, 2020).

This survey was carried out in Ecuador, therefore, we will review its public policy for social and educational inclusion. Based on the Constitution of the Republic of Ecuador (2008), this nation has been declared to be a multicultural and multidiverse space (Pinoargote, 2019). Literary review and the study of context have shown that the goal of turning into an equitable, just and progressive society has been reached in part. This is due to the fact that inclusive education has had an advance in its legal framework, but the teaching practice and inclusive culture are still weak (Luzardo *et al.*, 2018); therefore, social gaps and inequity remain and call for an urgent attention (Cevallos & Villafuerte, 2019; Macias & Villafuerte, 2020).

Under the described scenario which presents the advances and limitations of inclusive education in Ecuador, it is evident that there is a need to focus efforts from scientific research towards the improvement of academic work with learners with ADD. In this context, our research answers the following questions:

- How may digital screens be used for curricular adaptations for teaching foreign languages to children with ADD?
- What kind of assessments may be applied to curricular adaptations using digital screens for the teaching-learning activity of children with ADD?
- What was the progress on learning English achieved by children with ADD who worked with curricular adaptations by means of digital screens?

The purpose of our job is to socialize an experience where digital screens are used for curricular adaptations aimed to promote the teaching-learning activity of English as a foreign language of boys and girls with ADD. Furthermore, we propose didactics to articulate

digital screens with games as a function of the curriculum objectives of the English subject in Ecuador.

## REVIEW OF LITERATURE

### *Digital screens as a teaching-learning tool*

Using digital screens in teaching-learning processes has had a wide expansion worldwide. This is due to conditions of usage of electronic devices, to developed applications and to the operational system used thereby, which favor accessibility thereof (Clemares, 2014). Learning technologies and knowledge (Marcet, 2015) help teachers to structure and manage cognitive processes in the current information era (Cabero & Valencia, 2019; Cevallos *et al.*, 2016) and ease performance of the curriculum in innovative and inclusive learning environments, whether synchronic and asynchronous.

Governments have invested in low-cost tablets with basic functions, as part of their democratization and access to technology policy, as the idea prevails that technological progress does not reach everyone in the same extent and time (Cabero & Barroso, 2016).

Innovation on several teaching-learning processes use Internet tools, sites and activities available which facilitate exchange of information available, where the capability of debate and reflection foster the critical thinking of learners, which is an essential practice (Rivera, Pisco & Velez, 2019). The foregoing notwithstanding, prevalence is recognized of obsolete methodologies and didactics which migrated to online learning environments. This condition has to be surmounted in order to find ways to optimize the use of technological resources (Area, 2010).

At the class of English as a foreign language there are language practices involving the use of educational technology to repeat new vocabulary, for the production of essays and audios, listening and reading comprehension, filtering, reflection and reconstruction of new knowledge (Cabero & Barroso, 2016; Garay, 2016). Therefore, educational services establish the attainment of more demanding levels when computer tools are applied (Palazio-Arko, 2016).

Digital screens are part of the group of audiovisual means usually termed as didactic resources of a multi-sensorial type, whose purpose is that of bringing learners close to more dynamic learning environments aimed to achieve a better proximity between learners and the reality of the subject of study (Barros & Barros, 2015; Aierbe-

Barandiaran & Oregui-González, 2016); hence, it is about permanently updated resources to efficiently answer to context (Chavez *et al.*, 2018).

Thus, initial education processes of teachers of the twenty-first century include digital competences in their curricula (Esteve, Castaneda & Adell, 2018) with the purpose of extending proper use of educational technology in future fields of the professional development of Ecuador (Maiz & Tejada, 2016; Villafuerte, 2019) and to apply ICTs aimed to promote early identification of learning problems (Ferre *et al.*, 2019; Cabero & Martínez, 2019).

### ***Conceptualization of inclusive education and curricular adaptation***

Inclusive education is for people with either one of the following disabilities: deafness, blindness, several types of paralysis, and other neuromotor disorders, such as intellectual disability, or emotional learning (Velásquez & Villafuerte, 2020).

Special educational needs may be linked, or not, to disability. Several behavior disorders in learners are related to impairment of the attention function or impulsivity, and that is the case of ADD (Catala-López & Hutton, 2018; López & Pastor, 2019; Sánchez & González, 2013).

Curricular adaptations are amendments to the elements in the syllabus of a regular course (Hidalgo & Zoutullo, 2014). Its purpose is to provide participation and learning opportunities to learners with some kind of physical, sensorial or intellectual disability (Silva, 2017).

Adaptations usually include amendments of the objectives, expected skills, managed methodology, resources used, activities, time to do the task, assessment complexity, and access conditions to answer to special educational needs and likely response of each learner (Qvortrup & Qvortrup, 2017). Thus, ICTs are used to see to the specific needs being tested by means of modeling techniques (Sánchez-Caballé, Esteve-Mon & González-Martínez, 2020).

There is a tendency to use these processes in personalized education, which ought to be watched so that it would not turn into a way of exclusion that would distance learners with special educational needs from the whole school group, whether linked or not to disability (Baute, Pérez & Luke, 2017). Therefore, it is necessary that

alternative curricular adaptations be designed using ICTs, games, music and art aimed to improve their achievements (Luzardo *et al.*, 2018; Velásquez & Villafuerte-Holguín, 2020).

### ***Attention Deficit Disorder of children***

Boys and girls who have been diagnosed with ADD and attention-deficit hyperactivity disorder (ADHD) generally have control limitations of emotional impulsivity and difficulties with emotional self-control (Barkley & Murphy, 2010). This limit of self-regulation has an influence on their personal and social relations within the school (Sánchez & González, 2013), and has repercussions on their self-concept and on their academic performance (Klingbeil *et al.*, 2017).

The aspects comprising ADD include: incorporation, attention, full heart, interconnection, emotional intelligence and mindful communication (concentration here and now). Therefore, meditation and reflection are the ways to be followed when treating ADD and ADHD (Silva, 2017).

For the alternative treatment of ADD and ADHD, relaxation, improved sleep, reactivity reduction, self-care, self-awareness and connection with nature are resorted to (Klingbeil *et al.*, 2017). Although, because children and adolescents with this condition cannot manage frustration and irritability (Webster-Stratton & Reid, 2018), they generally have a changing mood (Catala-López & Hutton, 2018; Lopez & Pastor, 2019).

Attending learners with special educational needs, whether linked or not to the disability has psychomotor development and balance as an axis of investigation (Llorca & Riera, 2012). In this sense, there are surveys on social interaction difficulties, symbolization, and restrictive and stereotyped behaviors (López & Pastor, 2019); furthermore, alternative therapies are developed, such as playing music to stimulate language (Acebes-de-Pablo & Giraldez-Hayes, 2019), aimed to support persons who suffer from this conditions with drug-free procedures.

Among the previous works reviewed in this study, we have quoted Marcet (2015), who confirms that the support provided by ICTs is consistent with educational inclusion as this respects time required to complete exercises and ponders manners to adjust the complexity thereof. He adds that it is about a catalyzing process providing fertile ground to the construction of knowledge as learning is encouraged.

On the other hand, the paper of García, Demarzo & Modrego (2017), using mindfulness, has shown its efficacy as it contributes to the physical and mental wellbeing, regarding emotional and cognitive elements of learners with ADD, concerning body awareness, emotional management and self-control, concentration time improvement and stimulus to creativity. The paper of Corral *et al.* (2019) done in Ecuador shows evidence of the need to work on the skills of the faculty regarding innovation of curricular adaptations.

## METHODOLOGY

Quasi-experimental procedures have been used in this paper on research lines for educational inclusion and second language acquisition. For this purpose, we followed the experiences of Llorca & Riera (2012).

In order to put information on record, a log was used throughout the performance of the activities, by directly observing the expressions of participants in the face of activities suggested for each session. Participants were exposed to curricular adaptations for teaching English language vocabulary. This process articulated digital screens, recreational games, and a relevant motivational load on participants. The proposed process covered seven sessions with a duration of 40 minutes each.

There was a pre-test and a post-test in this proposal aimed to measure the progress of participants on the variables: pronunciation, listening comprehension, and number of new words learned in English. The participants were three children whose ages were between six and ten years, who were diagnosed with ADD and with a backlog in the English subject (see table 1).

**Table 1.** Participants in the study

| General Information                                                                                                      | Report of the Student Counseling Department                                                                                                                                                                                             | Report of the English Teacher                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alias: Iehuiah<br>Age: 8 years old<br>Sex: male<br>Study level: 4th grade<br>Intervention: September 2018-February 2019. | He presents attention deficit, dominant behavior and resistance to authority.<br><br>These conditions reflect his non-participation in recreational and socio-educational activities. He also avoids spending time with his classmates. | There is an important backlog in the progress of the English lessons.<br><br>Participates in few class activities and projects.<br><br>Needs help to do schoolwork. |

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|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Alias: Gahethel</p> <p>Age: 8 years old</p> <p>Sex: male</p> <p>Study level: 4th grade</p> <p>Intervention: September 2018-February 2019.</p> | <p>Displays hyperactive behavior during class and attention deficit. This is most evident in classes where there is little physical movement. Prefers to not spend time with his classmates. Shows interest in prehistorical animals.</p> | <p>Minor backlog in the progress of classes is reported.</p> <p>Needs permanent help to perform schoolwork.</p> <p>Pronunciation in English is below the class average.</p>              |
| <p>Age: Anauel</p> <p>Age: 9 years old</p> <p>Sex: male</p> <p>Study level: 5th grade</p> <p>Intervention: September 2018-February 2019.</p>     | <p>Displays attention deficit.</p> <p>Behavior is generally dominant.</p> <p>Does not participate in recreational activities with classmates.</p> <p>Needs support to do homework.</p>                                                    | <p>His backlog is notorious compared to the rest of the English class.</p> <p>Participation in class is rare.</p> <p>Needs help to take notes in class.</p> <p>Fails to do homework.</p> |

## ***Instruments and materials***

Record of achievement and challenges observed during the performance of curricular adaptation.

The instrument managed was designed by the research team, and the purpose thereof was to gather information on outstanding aspects of progress-stagnation-retrogression of participants as they work with digital screens during the work sessions in the English class. Designed curricular adaptations were implemented by trial and error.

This instrument gathers information on the achievements, response to stimulus with digital screens, new adjustments made during the session, and assessment; it was applied in each session and outstanding aspects were recorded. The instrument was evaluated by a panel of experts composed by researching professors in the fields of inclusive education, English as a foreign language pedagogy, and educational psychology. Assessors are assigned to the Eloy Alfaro Lay University of Manabí, Ecuador. Suggestions made by the experts included to incorporate aspects that need to be improved, attention time, motivation and the desire to learn, in addition to other notes that are to be considered.

### ***Pronunciation tests and vocabulary identification***

We have conducted a pre-test and a post-test in order to measure progress in the acquisition of vocabulary, pronunciation and recognition in English by means of an item designed by the research team. The measuring procedure was verified by the panel of experts, who suggested that only the categories considered in this paper be presented in the instrument.

### ***Research protocol***

This research consists of two differentiated phases: the former, to review available literature on the central problem, and the latter, to perform an empirical work.

#### ***Phase 1. Review of literature***

In this phase we followed the recommendations of Bhattacharya (2017), who says that theoretical review ought to be brief and relevant. We included texts of the public regulations of Ecuador,

because the topic is related with the rights of persons with special educational needs and educational inclusion actions.

### *Phase 2. Empirical work*

- Conducting the pre-test: the process started by diagnosing knowledge of the English language of each participant through a pre-test aimed to determine vocabulary knowledge in English and pronunciation thereof.
- Planning curricular adaptations: from the results of the pre-test, we used planning formats to organize seven class sessions of English adjusted to the national curricular syllabus for teaching and learning English. This instrument includes the following elements: general information (topic, learning objective and resources), activities adapted to teach boys and girls with attention deficit by using digital screens and learning assessment.
- Performing curricular adaptations: sessions were carried out at school centers where informers usually go. The activities were attended by the respective English teachers. Implementation of curricular adaptations was performed at the place for five weeks, subdivided in two sessions per week, with a total of 20 class-hours of 45 minutes, distributed in seven sessions.
- Analysis and interpretation of data: the information obtained during the empirical stage was performed by using the Atlas.ti program and the data were organized in an Excel database.
- During the seven sessions the introduced vocabulary was repeated with the purpose of encouraging knowledge retention of participants and to exercise short- and long-term memory. Each session started by reviewing the contents of the previous session as reinforcement and connection with the new contents to be taught. The sessions included a short test to check each child's learning.

### *Ethical rules*

- Household members or guardians of participants accepted the invitation from the research team and signed a declaration of consent.
- Identity of whistleblowers was kept secret for their protection.
- Gathered data will be kept by the research team for seven years.
- Information resulting from this research may only be used for academic purposes. Under no circumstance will any commercial activity be allowed for data and information obtained.

## RESULTS

This section contains results obtained in the empirical stage of the research. For presentation purposes, we followed the order of the research questions mentioned at the beginning.

Answer to question 1: How may digital screens be used in curricular adaptations for teaching English? We have presented plans for the seven curricular adaptations proposed for practicing English by using digital screens (tablets, smart phone or touch screen of a computer). For design purposes, we have considered the experiences of Bel & Esteve (2019).

Each curricular adaptation planning sheet consists of general information (language content, learning objective, skill and materials) and activities (review, introduction to the topic and assessment). Next, there is a registration sheet for achievements and challenges seen on the curricular adaptation, which include achievements/challenges, response to stimulus with touch screens, adjustments made during the session, and assessment.

The result obtained was to maintain the attention of participants in the learning activity, which went from 40 seconds at the beginning to 135 seconds at the end of session seven. This enabled optimization of the English teaching process to children with ADD.

Using touch screens in curricular adaptations has fostered dynamism in each session; therefore, this curricular adaptation might be used to encourage and stimulate learning of other minors (with or without special educational needs) who show low motivation to learn foreign languages.

There is abundant material available in Internet and it may be selected to cover the different topics in the curriculum for the English as a foreign language class and of other subjects, for example, vocabulary of animals, the human body and transportation, grammar content (personal pronouns, comparative adjectives, and the use of the singular and plural forms of words) were performed by using pictures and comics (see table 2).

**Table 2.** Touch screens for curricular adaptations of children with attention deficit disorder.

| Planning sheet for the curricular adaptation, Session 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Content: Fruits</p> <p>Learning objective: Identify the names of animals</p> <p>Skill: Oral expression and recognizing new vocabulary</p> <p>Materials: Tablet, internet and video</p>                                                                                                                                                                                                                                                                                                                                                           | <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>• Play a video about fruits in English</li> <li>• Record the child's voice repeating words in singular and plural forms</li> <li>• Interact with the child as listening to their own recording</li> <li>• Introduce new vocabulary: "Animals"</li> <li>• According to the images presented in the tablet, try to make basic affirmative sentences</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>• Mark in the text the names of animals to pronounce them</li> <li>• Recognize the animal and say its name in English</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 1                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>• Accomplishments: Attention was focused in the practice</li> <li>• Response to the stimulation with touch screens: At the beginning of the sessions, the children seemed distracted. When they recorded their voices and heard themselves, we noticed they were interested in how the activity worked.</li> <li>• Adjustments during the session: None.</li> <li>• Assessment of the session: The practice was completed but doing it in English did not draw the attention of the participants.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Planning sheet for the curricular adaptation, Session 2 |            |
|---------------------------------------------------------|------------|
| General Information                                     | Activities |
| Content: Professions                                    | Review:    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Learning objective: Near and Far</p> <p>Skill: Oral expression</p> <p>Materials: Tablet, internet and photographs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Show photographs and review fruits in English</li> </ul> <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>• Play a video about the concepts of near and far</li> <li>• Introduce the new vocabulary to be learned about professions</li> <li>• Record the child's voice as they read the words in English</li> <li>• Interact with the child as they listen to their own recording</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>• Play with photographs showing objects that are near and far</li> <li>• Recognize the reading vocabulary by putting the corresponding sound</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>• Accomplishment: Children correctly recognized the vocabulary they were taught</li> <li>• Response to the stimulation with touch screens: Children seemed enthusiastic and active at the beginning. They reacted positively to the recording of their voices.</li> <li>• Adjustments during the session: We gave them five minutes between activities so that they could perform better</li> <li>• Assessment of the session: The participants were very interested in reviewing the new vocabulary. They showed interest in doing a proper work</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Planning sheet for the curricular adaptation, Session 3                                            |                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                |                                                                                                                                                       |
| <p>Content: Animals</p> <p>Learning objective: Use possessive adjectives to express possession</p> | <p>Review:</p> <ul style="list-style-type: none"> <li>• Show photos to remember fruits and professions</li> </ul> <p>Presentation of the subject:</p> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Skill: Oral expression</p> <p>Materials: Tablet, Internet and photographs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Play a video about animals and their sounds</li> <li>• Present images to reinforce the topic of personal pronouns</li> <li>• Record the child's voice as they read the words in English</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>• Recognize the vocabulary through photographs and videos</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Accomplishments/challenges: Agreement of personal pronouns and possessive adjectives. They recognize the differences between singular and plural possessive adjectives</li> <li>• Response to the stimulation with touch screens: Videos shown to the children are fun and serve the purpose of pointing the possessive adjectives</li> <li>• Adjustments during the session: Children asked the videos to be replayed. Children commented on the characters in the videos they watched</li> <li>• Assessment of the session: The activity favors learning</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                            |

| Planning sheet for the curricular adaptation, Session 4                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                                                                                                                     | Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>Content: Parts of the body</p> <p>Learning objective: Identify the names of body parts</p> <p>Skill: Oral expression and recognizing new vocabulary</p> <p>Materials: Tablet, Internet and video</p> | <p>Review:</p> <ul style="list-style-type: none"> <li>• Try to make basic affirmative sentences and questions according to the images presented in the tablet</li> <li>• Motivate learning with a simple but colorful reward (a star, a diploma, etc.)</li> </ul> <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>• Play a video presenting the parts of the body in English</li> <li>• Record the child's voice as they repeat the new vocabulary</li> </ul> |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Interact with the child as they listen to their own recording</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>Ask the child to point a part of their bodies. Figures available on the Internet can be used</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>Accomplishments/challenges: Correctly associates the photos with the words in English. Accomplishes the description of a classmate</li> <li>Response to the stimulation with touch screens: Children enjoyed the activities and want to complete the whole activity. Children understand the need for review</li> <li>Adjustments during the session: A 3 to 6-minute break is offered</li> <li>Assessment of the session: The children listen to their own voices and show interest in improving their pronunciation</li> </ul> |                                                                                                                                                                                                                                                                                   |

| Planning sheet for the curricular adaptation, Session 5                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                                                                                            | Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Content: Figures and colors</p> <p>Learning objective: Identify verbs in English</p> <p>Skills: Recognize new vocabularies</p> <p>Materials: Tablet, Internet and video</p> | <p>Review:</p> <ul style="list-style-type: none"> <li>Remember the vocabulary about body parts</li> </ul> <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>Show photos and play a video about figures and colors</li> <li>Describe the verbs used during a school day</li> <li>The student records their own voice as they repeat the verbs</li> <li>Interact with the child as they listen to their own recording</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>Ask the child to point out the verbs they use at school</li> </ul> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Make the necessary corrections of pronunciation</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 5                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                     |
| <ul style="list-style-type: none"> <li>• Accomplishments/challenges: Correctly associates photos with words in English. The student is completely focused in the activity</li> <li>• Response to the stimulation with touch screens: Favorable. Children ask to repeat the activity</li> <li>• Adjustments during the session: None</li> <li>• Assessment of the session: The activity allows children to recognize the most used actions at home and school in the English language</li> </ul> |                                                                                                     |

| Planning sheet for the curricular adaptation, Session 6                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                                                                                                                                 | Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Content: Clothing</p> <p>Learning objective: Say in English the clothes they like the most</p> <p>Skills: Recognize new vocabularies</p> <p>Materials: Tablet, Internet and video</p>                            | <p>Review:</p> <ul style="list-style-type: none"> <li>• Formulate occasional questions about animals and colors</li> </ul> <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>• Play a musical video about clothing</li> <li>• Present a game to identify clothing in English</li> <li>• The student records their own voice as they repeat the names of clothing to go out, do sports and go to school</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>• Ask the child to point out the differences between girl and boy clothing</li> <li>• Make the necessary corrections of pronunciation</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 6                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• Accomplishments/challenges: Students progressed towards a more complex level of vocabulary. They associate the photos with the English words with some mistakes</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

- Response to the stimulation with touch screens: Favorable. Working other activities with the tablet has been productive, for example, digital puzzles about the subject
- Adjustments during the session: Completing the activity required more time than expected
- Assessment of the session: It was difficult for the children to understand the selection of girl clothing and boy clothing. Dividing the content in at least two sessions is recommended.

| Planning sheet for the curricular adaptation, Session 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Content: Food</p> <p>Learning objective: Identify favorite foods in English</p> <p>Skills: Recognize new vocabularies</p> <p>Materials: Tablet, Internet and video</p>                                                                                                                                                                                                                                                                                                                                                                                         | <p>Review:</p> <ul style="list-style-type: none"> <li>• Repetition of clothing showing photographs</li> <li>• Make occasional questions about places to eat</li> </ul> <p>Presentation of the subject:</p> <ul style="list-style-type: none"> <li>• Show photos of food and say the names in English</li> <li>• Identify names of breakfast or lunch food in English</li> <li>• Present a game about food in English</li> </ul> <p>Evaluation:</p> <ul style="list-style-type: none"> <li>• Ask the child to plan a breakfast and a lunch</li> <li>• Make the necessary corrections of pronunciation</li> </ul> |
| Registry card of accomplishments and challenges observed in the curricular adaptation, Session 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• Accomplishments/challenges: Students recognize the vocabularies related to food without difficulty</li> <li>• Response to the stimulation with touch screens: Students respond positively to the stimulus of photos in a tablet</li> <li>• Adjustments during the session: This activity suggests the use of games or realia to make a more significant session</li> <li>• Assessment of the session: The course is concluded with an activity that contributes to the integral education of the participants</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Below we present the opinions of teachers of English who partook in the process. Their analysis confirms the efficacy of digital screens to articulate curricular adaptations in the English as a foreign language lesson.

B.1.4. Children show their enthusiasm to work with touch screens. They want to learn new words in English

B.1.7. A child's attention is greater when he/she works on a tablet or a smart phone.

B.2.5. The recorder has shown it is useful in this practice, because it seems that children like to hear their voice.

B.2.11. Using ICTs enabled a significant progress in the acquisition of English vocabulary.

B.2.14. Children repeat words without difficulty. Maybe they ought to be controlled because at times, they get disconnected from the activity and it is necessary to motivate them to complete the practice.

Answer to question 2. What kind of assessment may be conducted on curricular adaptations using touch screens to teach English to children with attention deficit? We presented a learning assessment system using an item with the purpose of measuring progress of each child in the acquisition of English vocabulary. Children were accompanied by their teachers on each activity in this research project. Variables considered to be measured with this tool included: vocabulary pronunciation and recognizing written words.

### *Assessing vocabulary pronunciation*

The item considers pronunciation success among ten opportunities given to each learner. Maximum time for this test is three minutes (there may be two breaks within that time in the event the child is nervous). Aspects to be assessed are: excellent (seven to ten correct answers), good (four to six correct answers) and acceptable (two to three correct answers). When two correct answers are obtained, the topics the child was not able to answer should be reinforced.

### *Recognizing each written word by showing a figure*

The number of English words each child related correctly with the pictures shown is recorded. The maximum participation time is four timed minutes (two or three breaks may be made as required).

Quantitative and qualitative criteria in the assessment are: give a point for each correct word done during the educational action, and half a point when the answer is close to the correct answer, for example:

Correct answer: house (one point); answer received: home (half a point).

Correct answer: dog (one point); answer received: puppy (half a point).

When using the tool, it is possible to give a score objectively in order to determine whether the participants are either making progress or become stagnated in the English vocabulary acquisition process (see table 3). It is confirmed that permanent motivation is necessary to manage them to execute each step in the practice. The assessment was done individually as each practice came to an end. There were recommendations given to the teacher so that she would make an effort with each participant.

**Table 3.** Item suggested to assess whistleblowers' learning.

| Factors                     | Excellent                                                                                                                                   | Good                                                                                                                                          | Acceptable                                                                                                                                                    | Must keep trying                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Pronunciation of vocabulary | Correctly pronounces words that are presented in the tablet or smart phone. Does not require corrections. Interested in completing the test | Correctly pronounces words that are presented in the tablet or smart phone. Requires few corrections. Time wasn't enough to complete the test | Adequately pronounces words that are presented in the tablet or smart phone. Requires corrections almost every time. Requires motivation to complete the test | Incorrectly pronounces or does not pronounce the words that are presented in the tablet or smart phone. Requires motivation to complete the test |

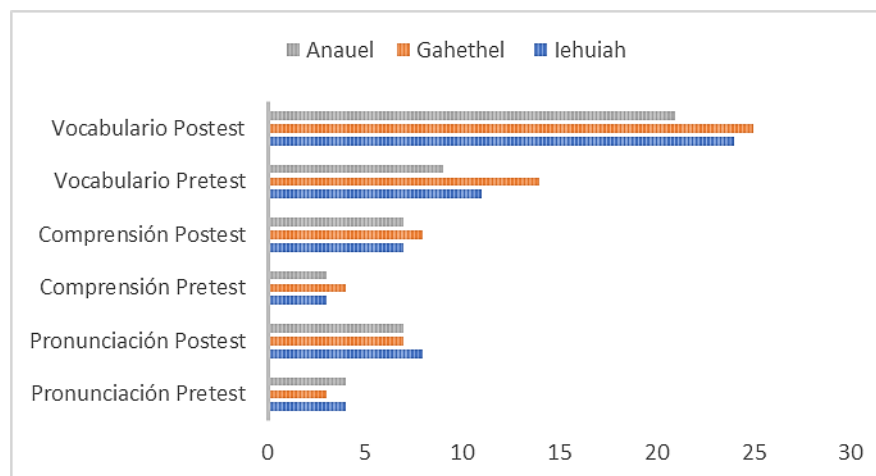
|                             |                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |                                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Understanding of vocabulary | Easily recognizes the words presented in the tablet or smart phone.<br><br>Enjoys the test.<br><br>Does not need corrections | Easily recognizes the words presented in the tablet or smart phone.<br><br>Shows interest in completing the test.<br>Needs few corrections | Hardly recognizes most of the words presented in the tablet or smart phone.<br><br>Does not show interest in completing the test.<br><br>Needs constant corrections | Does not recognize the words presented in the tablet or smart phone.<br><br>Refuses to complete the test |
| Points                      | 7 to 10                                                                                                                      | 4 to 6                                                                                                                                     | 2 to 3                                                                                                                                                              | Less than 2                                                                                              |

Answer to question 3. What was the English learning progress of children with attention deficit who worked with curricular adaptations by means of touch screens? We present table 4 and chart 1.

Table 4 contains the results of the pre-test conducted at the beginning of the process and of the post-test once the curricular adaptation sessions were performed. We saw a progressive improvement of the variables: vocabulary pronunciation, vocabulary listening comprehension, and number of new English words learned. The results show evidence of improvement of every participant in respect of the mentioned variables.

**Table 4.** English learning attained with curricular adaptations with digital screens

|             |       | Organizatio<br>n of group<br>work | Communicatio<br>n systems | Interpersonal<br>relationships | Limitations |
|-------------|-------|-----------------------------------|---------------------------|--------------------------------|-------------|
| N           | Valid | 299                               | 299                       | 299                            | 299         |
|             | Lost  | 0                                 | 0                         | 0                              | 0           |
| Median      |       | 73,200                            | 78,100                    | 78,100                         | 34,600      |
| Minimum     |       | 1,8                               | ,0                        | ,0                             | ,0          |
| Maximum     |       | 100.0                             | 100.0                     | 100.0                          | 100.0       |
| Percentiles | 25    | 58,900                            | 67,200                    | 64,100                         | 21,200      |
|             | 50    | 73,200                            | 78,100                    | 78,100                         | 34,600      |
|             | 75    | 87,500                            | 85,900                    | 90,600                         | 50,000      |



**Chart 1.** Performance of English learning of whistleblowers.

## DISCUSSION

Education of both boys and girls in a community is a task not only of their parents. Meeting special educational needs is not only an exclusive responsibility of therapist or professionals of the Learners' Guidance Department of schools. Educational inclusion, actually, is the work of each member of the community.

In this research, ICTs are confirmed as a resource that contributes to the improvement of limitations in the traditional classroom, and it is made more inclusive as well as revolutionary, as learning motivation is awakened in a group of infants with special educational needs, upon whom autonomous learning was fostered. Thus, we have confirmed the task of teachers in the search of the necessary means to enable that learners reach the goals required by the country (Chavez *et al.*, 2018).

This study showed the transcendence of the interdisciplinary participation for inclusive education. Regardless of the terms and definitions on review, the authors have proposed innovations when designing curricular adaptations and amendments within the field of English as a foreign language, a relevant contribution because this subject began being taught from the second grade of basic education in 2016. Therefore, we are facing the possibility of contributing to the improvement of the educational system in Ecuador, where minors with special educational needs may be assisted to, as this

ought to not be taken as a burden, for it is an opportunity to contribute to national development.

Using touch screens for curricular adaptations to work in the English class has extended the real time of concentration of children with special educational needs who were part of this study. This would be a significant achievement, when dealing with minors who were diagnosed with ADD; in spite of this, children said they needed to rest, so there were established break periods of between three and five minutes during the linguistic practice.

This experience confirms the relevance of technical accompaniment provided by teachers to design and carry out curricular adaptations and amendments to the syllabus. At this point, though, we agree on the affirmation made by Luzardo *et al.* (2018) in the sense that it is highly likely to find learners with special educational needs in every classroom of conventional schools. Therefore, there is a need for teachers who are willing to and who have the knowledge to design and manage creative curricular adaptations offering significant learning experiences. In this sense, educational technology and gamification show their great articulation capability. The following stand out among the findings from this survey:

- There is an ongoing need to reinforce the knowledge of English teachers in Ecuador aimed to plan and carry out curricular adaptations geared towards promoting work with learners with special educational needs.
- The use of touch screens has provided better dynamism to curricular adaptations for teaching foreign languages to learners who have, or do not have, special educational needs, from the universal teaching approach.
- In this experience, the use of touch screens enabled the creation of significant learning environments which encourage learners to complete all the sessions.
- One of the main contributions to working with touch screens is the feature to record audio. This has facilitated the self-work of children when they are asked to repeat new words.

An unexpected finding by the research team is related to the positive collaboration of children. There was no need to run elaborate behavior controls of participants. The global assessment of the process shows that pronunciation and identification of new vocabulary by participating children were achieved, which was one of the objectives proposed in our study.

Therefore, the teaching activity ought to be possible by means of touch screens with recreational games as supporting activities. This articulation allows us to attract and maintain the attention of children with ADD and ADHD for a longer time. This is also applicable to another child who is not motivated to practice the language.

Among recommendations to use touch screens which the authors of this survey have proposed, are the following:

- To select tasks that are achievable by learners in accordance to age and interest. We recommend that learners be encouraged by watching videos and by means of relaxation and meditation activities and games, among others. A puzzle may be of a picture used to present content, in a way that this puzzle turns into a reinforcement activity.
- To maintain routines for each session (review + presentation of the new topic + repetition exercise + assessment) is the expected cycle. This will help learners to feel they control the experience as they anticipate what is going to happen, moreover, this conveys security and confidence.
- In the face of the likely refusal of children to repeat new words or to partake in games, they are to be explained, in a friendly manner, the need to complete the task, without forcing them in any way. An agreement may be reached to reduce the practice or to discontinue it and resume after a break or on the following session.
- It must be remembered that enjoyment is a key element in these curricular adaptations; therefore, we insist on the creation of friendly learning environments using proper spaces. Language and suggestive voice tones ought to be maintained by the teacher from the beginning of a session.
- In the event work is done with several children at the same time, it is convenient to set an order of participation turns. We suggest, in this case, to have relaxation spaces where the child may wait for his/her turn in the company of an assistant.
- Having enough time for learners to complete all the proposed activities without rushing them. We recommend that a weekly plan be devised with teachers of the different areas so that the processes of other classes or academic activities are not interrupted.
- To make use of the recording feature to control the pronunciation of learners; this must also be used for projects that stimulate their artistic and creative senses. If a child refuses to have his/her voice recorded, his/her decision shall be respected and the activity will be replaced by another one that makes repetition of words likely to exercise pronunciation, intonation, etc.
- In the event the teacher notices that a learner is disappointed, another activity shall be offered or there will be a few minutes to

rest. Learners may resume once they have rested, meditated or relaxed. Breaks required by the child should be facilitated.

- The biological rhythm of children or participants shall be respected. It is necessary to maintain communication with the tutor of the course of participating children. The idea is that they be informed of achieved progress/stagnation. We suggest that a log be kept of activities where the progress of learners is recorded before each session.
- Instructors must have a clear idea of each stage in the sessions; this will facilitate that goals be attained. We recommend templates with charts for each session stage. This strategy would help establishing routines as required to keep the concentration of each participant. They may also be used to explain the routines children are doing to their parents.
- It is convenient to protect tablets and hardware they use. Both the children and the instructor must prevent fluid consumption when they do the practices. If needed, there will be breaks as necessary to drink water. Tablets must not be connected to the power line when the practices are performed. A recommended administrative measure is to have an insurance for the protection of the hardware.
- Failed tests or activities in each session shall be recorded in the log with the purpose of providing the respective reinforcement, which may be between sessions.

## CONCLUSIONS

The results from the review of specialized literature and execution of an empirical stage of this survey allows us to sustain that the proposed objective for our survey has been completed. Once the sessions for teaching English to children with attention deficit have been performed, supported by touch screens and recreational games, we concluded that the greatest achievement was that English vocabulary was increased, followed by pronunciation improvement of the words in this language.

The research team believes this has been possible as participants were exposed individually to significant learning experiences. Another key factor in the process is the session planning stage, which starts from the curriculum of the English subject for the basic education school level. The review activity in each session helps teachers to have the new words acquired in the foreign language fixed in the memory of participating children. Similarly, the recording feature was most widely accepted by the children, which contributed to have their pronunciation in the foreign language improved.

This experience may be taken to mirror other proposals for curricular adaptations with the purpose of assisting learners with special educational needs. We encourage educational researchers to make new studies that contribute to have teachers trained in the different fields of knowledge on the use of digital screens for the academic work of learners with and without any disability.

### **ACKNOWLEDGEMENTS**

To the educational research project named Recreational Games to Promote Motor Skills of Both Boys and Girls in the Basic Education Level of the Eloy Alfaro Lay University of Manabí 2018-2020 in the Manta District, Ecuador.

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#### HOW TO CITE:

Villafuerte Holguín, Jhonny Saulo & Alonzo Rezabala, Martha Elena. (2020). Touchscreens and teaching English to children with attention deficit disorder: language practices and recreational games. *Apertura*, 12(2). <http://dx.doi.org/10.32870/Ap.v12n2.1908>

