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Evaluation of Motivational Learning Strategies for Children with Dyslexia: A FORDYSVAR Proposal for Education and Sustainable Innovation

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Abstract: This study was part of the European project Erasmus+ FORDYSVAR, whose main objective is to contribute to the educational inclusion of students aged between 10 and 16 with dyslexia through the use of technology. The purpose of this study was to analyze the motivation of students with dyslexia during their learning process and to assess whether technology can be a motivating educational tool to create sustainable educational spaces at a social level. It used a descriptive, transversal, and correlational methodology to determine whether the participating sample showed motivation in the learning process. In order to answer this hypothesis, we designed a data collection instrument that included a motivational assessment questionnaire of the learning. The participants were students with dyslexia aged between 10 and 16 (N = 30). The results obtained allowed us to conclude that information and communication technologies can be used as a motivating educational strategy for students with dyslexia. The conclusions drawn were consistent with previous research showing that the use of technology for educational purposes can contribute to student motivation.

Keywords: dyslexia; educational technology; motivational learning; sustainable education

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1. Introduction

Dyslexia is a specific learning disorder found within the neurological developmental disorders [1] which presents a persistent, specific character and that can be manifested in different contexts and cultures [2]. This disorder has a neurobiological basis and implies a difficulty in the appropriate and fluid recognition of words, including deficiencies in the phonological component of language and affecting the reading environment [3] As a language disorder, it can also affect people's writing ability in some cases.

Although dyslexia is a lifelong condition, it is manageable by intervention through recovery and adaptation therapy. Its worldwide prevalence is estimated between 5 and 15%. In Spain, it has an impact on primary and secondary education in a percentage between 5 and 10% of students [4,5].

The traditional methods that are currently employed to treat this learning disorder are mostly in paper and pencil format, which tend to be monotonous, very demanding, and often leading to poor adherence. In this regard, multisensory approaches have been shown to produce increased treatment adherence and quite promising results [6,7].

Recently, approaches have been made from the field of educational technology [8,9]. Among the advantages that technologies can provide, we found the following: they offer safe and controlled environments, generate greater motivation, allow for interactivity, provide immediate feedback, and contribute to the improvement of skills related to visual processing and working memory [10].

The strength of technology is that it presents the information by means of multimedia elements (audio, text, images, or videos), it can be stored and transferred, and it allows for the combination and transformation of different media. This is considerably beneficial

for the attention to the students' individual needs and contributes to the treatment of dyslexia [11–13].

Along this line, research has been conducted using technological tools to facilitate intervention in specific learning disorders of reading and writing [14–19].

Many of the traditional interventions are usually monotonous and very demanding, and in many cases, students show difficulties in adhering to the treatment. For this reason, it is crucial to develop new intervention approaches that can help students with dyslexia in a more fun way and that imply a greater commitment on their part [20]. On this matter, augmented reality (AR) and virtual reality (VR) are resources that can fill this gap since several studies suggest that these technologies are the only ones that include immersion, presence, interaction, transduction, and conceptual change [10,21]. Furthermore, they are safe and flexible tools with high rates of adherence [22] and have the possibility of offering a multisensory approach [7]; as such, these resources offer some of the most promising treatments in the field of dyslexia [6].

The aforementioned aspects are currently very relevant due to their direct relationship with sustainability in the educational field, as we are working with students with learning difficulties that must be taken into account for adequate educational attention during the compulsory schooling stage in order to improve their academic results in the future. In this sense, in order to achieve the schooling goals of all students, regardless of their limitations, learning strategies that are adapted to each person must be provided. In this area, students' motivation toward learning is a key factor that needs to be investigated in order to provide sustainable educational strategies and appropriate policy legislation for greater educational success. Furthermore, this research introduces technology, which is a fundamental element in today's society that can provide the educational context with support tools to generate sustainable spaces that adapt to the new realities required by today's society and educational inclusion.

1.1. Learning and Motivation

Motivation is one of the mechanisms that regulate learning. It is an internal attitude that moves an individual to learn and it plays a fundamental role in the learning process. There is no doubt that a positive attitude is a necessary tool for learning. Moreover, as stated by Ausubel, in 1963, the individual shall also have significant learning mechanisms, that is, the cognitive structures necessary to relate the previous knowledge with the new.

Learning is an innate capacity of the human brain and is a dual process. On the one hand, it separates and records the familiar information for the student, and, on the other, it explores the new information in order to learn it. While learning takes place, external stimuli are basic. Feeling the teacher's help is basic since this is an interactive relationship, and it is a mutual commitment between both parties. Peers and teamwork also directly influence the development of learning and motivation. These are an enriching source of knowledge, where collaboration with peers is a necessary element in educational, emotional, and social development. Helping and being helped shows that the teacher is not the only one teaching. Therefore, it is necessary that the educator knows how to face and handle the different situations that can occur in the classroom and is able to prepare adapted and individualized materials in accordance. Furthermore, it is vital that the student shows a receptive attitude [23].

Currently, information and communication technology (ICT) are conceived as educational resources that favor the inclusion and integration of students. They have become powerful teaching tools and are now integrated into the teaching and learning process, both as an aid to acquire skills and competencies and to strengthen the performance and educational achievements of students [24]. In addition, they bring content closer to the students, increase motivation, and stimulate and reinforce student learning by combining school content with entertainment, encouraging the acquisition of knowledge and generating curiosity [25].

In this research, VR and AR were used as emerging technological tools that allow for contributing to educational intervention and, specifically, to the care of students with dyslexia.

The potential of these learning environments has also been acknowledged in the area of special educational needs [26], together with an increased interest in supporting the inclusion of individuals with learning disabilities, such as dyslexia [27,28].

Technology can offer solutions to different problems and provide playful and effective environments for the treatment of different disorders in children and young people. Its main advantage is that it provides a safe and controlled environment, generates motivation, provides a high level of interactivity and immediate feedback, and contributes to the improvement of visual processing skills and short-term memory [8,29].

Some studies have shown that the use of technology also contributes to the improvement of the educational performance of students with difficulties, especially in terms of motivation, cooperation, and attention [30–32].

In this sense, previous research shows that the use of technology, specifically AR and VR, increases students' motivation toward learning [33].

In the case of students with dyslexia, pioneering studies in the field of motivation using AR and VR technology for the treatment of the academic difficulties of these students are now being developed, and so far, they have shown promising results, as demonstrated in the research of [34].

From this perspective, this research paper aimed to analyze whether students with dyslexia are attracted by technologies more than by the traditional system of education. In addition to this, we sought to assess whether technological devices help and/or facilitate the attention and motivation of these students.

1.2. Erasmus+ European Project "FORDYSVAR"

This study was contextualized in the framework of the European Project Erasmus+ FORDYSVAR (fostering inclusive learning for children with dyslexia in Europe by providing easy-to-use virtual and/or augmented reality tools and guidelines), and it is co-financed by the European Union's Erasmus+ program through the project 2018-1-ES01-KA201-050659. FORDYSVAR was awarded funding of €367,544 for the period 2018–2021 by the Spanish Service for the Internationalization of Education (abbreviated SEPIE in Spanish) [35].

The project has a transnational focus and its coordination is carried out at the University of Burgos, with Professor Sonia Rodríguez Cano as the principal investigator (PI). In addition, the project consortium is made up of different European partners:

- Spain: University of Burgos, K-Veloce consulting firm, and the computer development company AR-SOFT.
- Italy: Eugenio Medea Scientific Research Institute.
- Romania: Dyslexia Association of Bucharest.

This project is included within the Strategic Partnership Projects, which is oriented toward the field of school education (KA2), and its main objective is to contribute to the educational inclusion of students with dyslexia that are aged between 10 and 16 through the use of technology, specifically VR and AR to improve the access, participation, and learning achievement of students with this reading and writing disorder. Its purpose is to generate a playful, fun, and safe learning environment, thus achieving a greater commitment to treatment and improving the students' quality of life.

As a result, three products will be developed:

1. A tool kit with software to integrate VR and AR into educational and learning environments for school-aged children with dyslexia.
2. An electronic book with guidelines and good practices on dyslexia and the use of educational technology, together with a compilation of European regulations and the different approaches on dyslexia applied in the EU.
3. A white paper for the establishment of educational policies for children with dyslexia.

2. Materials and Methods

This study focused on the field of learning disabilities, specifically dyslexia, which is the most common difficulty in the educational environment [36]. Therefore, this research aimed to contribute to the educational inclusion of students with dyslexia through motivational learning strategies using technology, specifically through VR and AR.

The introduction of technology into the assessment and intervention process can become a key element for raising the effectiveness of learning, helping to improve visual skills and memory. In addition, it provides people with dyslexia with a safe and controlled environment and fosters their motivation, thus favoring high levels of interaction.

This paper presents the results of quantitative research with a descriptive character, which followed a descriptive, transversal, correlational methodology to determine whether the participant sample was motivated in the learning process.

2.1. Objective

The main objective of the European project Erasmus+ FORDYSVAR is to design a virtual reality app that contributes to the learning process of students with dyslexia.

In line with this objective, this study aimed to understand the motivation of students with dyslexia during their learning process and to assess whether technology can be a motivating educational strategy.

2.2. Sample

The participants in this research were members of associations for dyslexia in Spain. More particularly, the following associations were contacted:

- ADBu (Association for Dyslexia of Burgos (Asociación Dislexia Burgos)) [37].
- DISFAM (Association for Dyslexia and Families (Asociación Dislexia y Familia)) [38].
- DISNAVARRA (Association for Dyslexia of Navarra (Asociación de Dislexia Navarra)) [39].
- ADICA (Association for Families and Children with Dyslexia, Dysortography, Dyscalculia and All AEDs, Dyslexic Adults and Professionals Involved of Cádiz (Asociación Provincial en Cádiz de Familias con Hijos con Dislexia, Disortografía, Discalculia y Todas las DEA, Adultos Disléxicos y Profesionales Implicados)) [40].
- DISCLAM (Dyslexia and AEDs Federation of Castilla-La Mancha (Federación de Dislexia y Otras DEA de Castilla—La Mancha)) [41].
- DISFAM Salamanca—(Association for Dyslexia and Families of Salamanca (Asociación Dislexia y Familia Salamanca)) [42].
- Madrid con la Dislexia (Association for Dyslexia of Madrid) [43].

The sample for this research was made up of a total of 30 people with dyslexia that were aged between 10 and 16 living in Spain, and mainly comprised people from the autonomous communities of Castilla y León and Navarra.

2.3. Instruments

An instrument composed of 65 items that allowed for the survey distribution and data collection was designed online via Google Forms. This instrument took between 10 and 15 min to be completed and consisted of 3 parts:

(a) Social demographics (17 items).
(b) MALP Questionnaire—Motivational Assessment of the Learning Process (33 items) [44]. This instrument provided information related to intrinsic motivation (when the person sets their interest in the work and demonstrates an active role in the development of their aims, goals, and aspirations), extrinsic motivation (motivation that takes outside factors into account), and overall motivation (the sum of the two previous ones) with Cronbach α's of 0.83, 0.93, and 0.93, respectively.
(c) Questionnaire on ICT (15 items).

Yes/no questions were asked to find out whether students with dyslexia were attracted to technology rather than to the traditional teaching system and thus prove that technological devices help and/or facilitate the attention of students.

This questionnaire was made up of a battery of questions that were prepared ad hoc and validated by means of the experts' judgment, with these experts being doctors in education, specialists in dyslexia, and experts in educational technology who expressed their opinion.

2.4. Procedure

The first step was to design the data collection instrument in accordance with the research purpose. After that, we contacted several Spanish dyslexia associations to make up the study sample. Prior to the circulation of the instrument, participants were informed about its voluntary and anonymous nature, and were told that all information provided would be treated confidentially and for research purposes in accordance with the Spanish legislation currently in force [45] (Organic Law 3/2018 of December 5 on the protection of personal data and guarantee of digital rights). To this end, informed consent was obtained from all the participants.

The answers to the items in the first two parts of the instrument were evaluated using a Likert-type scale from 1 to 5, where 1 means almost nothing; 2, a little; 3, sometimes; 4, almost always; 5, always. Items 24, 27, and 33 did not belong to this type of scale and were only taken into account in cases of extreme scorings (above the 95th centile or below the 5th centile). The subsequent interpretation for each type of motivation was done with the different scale tables which were divided according to sex and age.

The analysis of the data obtained was done by adding the values given to each of the answers to the items that made up the questionnaire, which were organized by motivation as follows:

- Extrinsic motivation: items 1, 2, 5, 7, 10, 11, 12, 14, 21, and 22.
- Intrinsic motivation: items 3, 4, 6, 8, 9, 13, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, and 33.

Finally, by adding up all the items we obtained a number that, after applying the scale tables, yielded a centile value. A value of 50 refers to the average motivation of the students, a value below this was classified as low motivation, and a value above it was classified as high motivation.

The process of statistical data analysis was carried out with the software Statistical Package for Social Sciences (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, version 21.0. Armonk, New York: IBM Corp. licensed by the University of Burgos).

3. Results

This section is divided into four subsections. The first one provides the sociodemographic information under a descriptive analysis. The second subsection shows the information collected through the MALP questionnaire. The third subsection reflects part of the data obtained from the questions related to ICT. Finally, the fourth subsection presents the results of an inferential analysis that was carried out in order to extract more data from the study.

3.1. Sociodemographic Variables

The sample is made up of a total of 30 participants, 17 male 56.7%) and 13 female (43.3%), all ranging from 10 to 16 years old. The average age of the male sample was 12.12 (dt: 2.176) and the average age of the female was 11.62 (dt: 2.142). A total of 60% of the sample were primary education students and 40% attended secondary school.

As shown in Table 1, 53.3% of the 26 people who answered this question regarding whether they had dyslexia had phonological/dysphonetic dyslexia, 10% had surface/dyseidetic dyslexia, and 23.3% had deep/mixed dyslexia.

Table 1. Types of dyslexia in the participant sample.

Types of Dyslexia	Frequency	Percentage
Phonological/dysphonetic	16	53.3%
Surface/dyseidetic	3	10.0%
Deep/mixed	7	23.3%
Total	26	86.7%
Lost in the system	4	13.3%
Total	30	100.0%

3.2. Motivational Assessment of the Learning Process (MALP)

With regard to extrinsic motivation (Table 2), which took into account external factors, 46.7% of people presented low motivation and 53.3% presented high motivation.

Table 2. Extrinsic motivation.

Low Motivation/High Motivation	Frequency	Percentage
Extrinsic low motivation (lower than 50)	14	46.7%
Extrinsic high motivation (between 50 and 100)	16	53.3%
Total	30	100.0%

In relation to the intrinsic motivation (Table 3), where the person fixes his/her interest and shows an active role in the achievement of the goals, we observed that 90% of participants had low motivation and 10% had high motivation.

Table 3. Intrinsic motivation.

Intrinsic Low/High Motivation	Frequency	Percentage
Intrinsic low motivation (lower than 50)	27	90.0%
Intrinsic high motivation (between 50 and 100)	3	10.0%
Total	30	100.0%

Finally, in the overall motivation (Table 4), the sum of the previous two kinds of motivation, we observed that 83.3% showed low motivation in their learning process, as opposed to 16.7% that showed high motivation.

Table 4. Overall motivation.

Extrinsic Low/High Motivation	Frequency	Percentage
Extrinsic low motivation (lower than 50)	25	83.3%
Extrinsic high motivation (between 50 and 100)	5	16.7%
Total	30	100.0%

The data indicated that most people with dyslexia who answered this questionnaire generally showed low motivation in their learning process.

It is important to point out that only two people in the sample collected showed high motivation for both extrinsic and intrinsic motivation, while the rest of the participants reported low motivation in at least one of them, as Table 5 shows.

Table 5. Contingency table: extrinsic and intrinsic motivations.

		Low and High Intrinsic Motivation According to the Scale		Total
		Intrinsic Low Motivation (Lower than 50)	**Intrinsic High Motivation (50–100)**	
Low and High Extrinsic Motivation According to the Scale	**Extrinsic Low Motivation (Lower than 50)**	13	1	14
	Extrinsic High Motivation (50–100)	14	2	16
Total		27	3	30

3.3. Assessment of the Use of ICT in the Classroom and the Interest That Students with Dyslexia Show toward Them

Table 6 below shows the purely descriptive data from the third part of the questionnaire. In general terms, the following results were observed:

- Participants considered the use of ICT to be important (86.7%).
- ICT had a positive impact on their learning process (83.3%).
- They were more motivated when completing tasks using ICT (93.3%).
- They would like to take assessment tests and exams using ICT (83.3%).
- They would prefer that all courses were taught using ICT (83.3%).
- Nine out of 10 used technological tools in the classroom.
- They found it more motivating when the teacher used technology for explaining concepts (93.3%).
- They used the paper format more in the classroom (73.3%) and did not use ICT in most of their courses (63.3%) but believed that the use of ICT should be increased in the classroom (90%).
- More than half studied with ICT at home (60%).
- Eight out of 10 believed that teachers were not prepared for increasing online teaching.
- Almost all of them had increased the use of technological resources and online teaching (93.3%) during the coronavirus disease 2019 (COVID-19) lockdown.

Table 6. Questionnaire on information and communication technology (ICT).

Yes/No	Frequency	Percentage
Question 1. Do you consider the use of ICT in the classroom to be important?		
Yes	26	86.7%
No	4	13.3%
Total	30	100%
Question 2. Do you think that ICT has a positive impact on your daily learning in the classroom?		
Yes	25	83.3%
No	5	16.7%
Total	30	100%
Question 3. Do you use technological tools in the classroom on a daily basis (tablet, computer, whiteboard, etc.)?		
Yes	27	90%
No	3	10%
Total	30	100%

Table 6. *Cont.*

Yes/No	Frequency	Percentage
Question 4. Are you more motivated by the teacher's use of technology when explaining topics?		
Yes	28	93.3%
No	2	6.7%
Total	30	100%
Question 5. Do you use technology more than paper in the classroom?		
Yes	8	26.7%
No	22	73.3%
Total	30	100%
Question 6. Do you think that the use of ICT should be increased in the classroom?		
Yes	27	90%
No	3	10%
Total	30	100%
Question 7. Do you use ICT in most of your courses?		
Yes	11	36.7%
No	19	63.3%
Total	30	100%
Question 8. Are you more motivated to complete tasks if you use ICT?		
Yes	28	93.3%
No	2	6.7%
Total	30	100%
Question 9. Do you use ICT when studying at home?		
Yes	18	60%
No	12	40%
Total	30	100%
Question 10. Would you like to take the exams or be assessed using ICT?		
Yes	25	83.3%
No	5	16.7%
Total	30	100%
Question 11. Would you like all courses to be taught using ICT (including lessons, exams, homework, etc.)?		
Yes	25	83.3%
No	5	16.7%
Total	30	100%
Question 12. Has the use of online teaching and technological resources increased during the lockdown period?		
Yes	28	93.3%
No	2	6.7%
Total	30	100%
Question 13. Do you think teachers are prepared for the increased use of online teaching today?		
Yes	5	16.7%
No	25	83.3%
Total	30	100%

3.4. Inferential Interpretation of Data

A study of the quantitative variables was carried out to see whether they were distributed according to the normal curve. In this case, we must look at the Shapiro–Wilk test because the sample had less than 50 participants (Table 7).

Table 7. Normality tests.

	Kolmogorov–Smirnov			Shapiro–Wilk		
	Statistic	**gl.**	**Sig.**	**Statistic**	**gl.**	**Sig.**
Student's age	0.246	30	0.000	0.819	30	0.000
Number of siblings	0.440	30	0.000	0.577	30	0.000
Extrinsic percentile according to age and sex	0.169	30	0.028	0.906	30	0.012
Intrinsic percentile according to age and sex	0.169	30	0.028	0.855	30	0.001
Overall percentile according to age and sex	0.158	30	0.054	0.885	30	0.004

The results did not conform to the normal curve, i.e., non-parametric tests were used with statistical significance set to $p < 0.05$.

After analyzing the Mann–Whitney *U* with the educational stage variable (students attending primary and secondary school) and with the extrinsic, intrinsic, and overall motivation variables, we observed that only the overall motivation variable tended to be significant ($p = 0.095$); thus, it can be said that, depending on the educational stage, the motivation was greater or lesser.

Therefore, we drafted a contingency table (Table 8) to examine whether those students attending primary or secondary school were more motivated, where the variables "educational stage" and "overall motivation" were crossed. We found that 94.4% of the primary education students who answered showed low overall motivation. In contrast, 5.6% of the same educational level had a high overall motivation. As for secondary education, 66.7% showed a low overall motivation, whereas 33.3% reported a high one. Therefore, we can state that the secondary education students in the sample collected were more motivated overall than those who attended primary school (Table 8).

Table 8. Contingency table: educational stage and overall motivation.

			Low and High Overall Motivation According to the Scale		Total
			Low Overall Motivation (Lower than 50)	**High Overall Motivation (50–100)**	
Educational Stage	**Primary**	**Head Count**	17	1	18
		Percentage of Their Educational Stage	94.4%	5.6%	100.0%
	Secondary	**Head Count**	8	4	12
		Percentage of Their Educational Stage	66.7%	33.3%	100.0%
Total		**Head Count**	25	5	30
		Total Percentage	83.3%	16.7%	100.0%

Afterward, we continued analyzing the different variables in order to assess which ones presented significant values. In this case, we found that the variables "mother's work

situation" and "intrinsic motivation" were significant (p = 0.042). This meant that the mother's work situation might somehow affect the intrinsic motivation.

Then, we proceeded to cross the ICT variables with the types of motivation and we found that the extrinsic motivation question: "Do you think that the use of ICT should increase in the classroom?" tended toward significance since $\chi^2(1) = 3.810$, $p = 0.051$, as shown in Table 9.

Table 9. Chi-squared test.

	Value	gl.	Asymptotic Sig. (Bilateral)	Exact Sig. (Bilateral)	Exact Sig. (One-Sided)
Pearson chi-square	3.810a	1	0.051		
Continuity correction	1.801	1	0.180		
Likelihood ratio	4.957	1	0.026		
Fisher's exact statistics				0.090	0.090
Linear by linear association	3.683	1	0.055		
N of valid cases	30				

Based on this, the corrected residuals were checked and were greater than |1.96|, which meant that there tended to be significant differences between students who believed it was necessary to increase the use of ICT in the classroom and those who felt such an increase was not necessary. We concluded, therefore, that the relationship between extrinsic motivation (which takes into account factors of an external nature) and the use of ICT was related in the sample analyzed.

Out of the 90% (Table 6) who considered that ICT should be increased in the classrooms, 40.7% were students with low extrinsic motivation and 59.3% were students with high extrinsic motivation (Table 10).

Table 10. Contingency table: ICT question 6 and extrinsic motivation.

			Low and High Extrinsic Motivation According to the Scale		Total
			Low Extrinsic Motivation (Less than 50)	High Extrinsic Motivation (50–100)	
Do You Think That The Use of ICT Should Increase in The Classroom?	Yes	Head Count	11	16	27
		Percentage of Those That Answered Yes	40.7%	59.3%	100.0%
		Corrected Residual	−2.0	2.0	
	No	Head Count	3	0	3
		Percentage of Those That Answered No	100.0%	0.0%	100.0%
		Corrected Residual	−2.0	2.0	
Total		Head Count	14	16	30
		Percentage of Respondents	46.7%	53.3%	100.0%

Regarding overall motivation, the question: "Would you like all courses to be taught with ICT (including classes, exams, homework etc.)?" produced statistical significance for the sample since $\chi^2(1) = 8.112$, $p = 0.004$, as shown in Table 11.

Table 11. Chi-squared tests.

	Value	gl.	Asymptotic Sig. (Bilateral)	Exact Sig. (Bilateral)	Exact Sig. (One-Sided)
Pearson chi-square	8.112a	1	0.004		
Continuity correction	4.800	1	0.028		
Likelihood ratio	6.365	1	0.012		
Fisher's exact statistics				0.022	0.022
Linear by linear association	7.842	1	0.005		
N of valid cases	30				

a: Three boxes (75.0%) had an expected frequency of less than 5. The minimum expected frequency was 0.83.

Likewise, the corrected residuals were checked (Table 12) and were greater than |1.96|, meaning that significant differences were observed between students who would like all courses to be taught using ICT and those who do not.

Table 12. Contingency table: ICT question 11 and overall motivation.

			Low and High Overall Motivation According to the Scale		Total
			Low Overall Motivation (Less than 50)	High Overall Motivation (50–100)	
Would You Like All Courses to be Taught Using ICT (Including Classes, Exams, Homework, Etc.)?	Yes	Head Count	23	2	25
		Percentage of Those That Answered Yes	92.0%	8.0%	100.0%
		Corrected Residual	−2.8	2.8	
	No	Head Count	2	3	5
		Percentage of Those That Answered No	40.0%	60.0%	100.0%
		Corrected Residual	−2.8	2.8	
Total		Head Count	25	5	30
		Percentage of Respondents	83.3%	16.7%	100.0%

Out of the 30 students who answered this question, 25 gave affirmative answers (83.3%), and 23 out of these students showed low overall motivation as opposed to two who show high overall motivation.

Out of the total of students who answered no (16.7%), two had low overall motivation and three had high overall motivation

4. Discussion

The main purpose of this study was to identify the motivation of students with dyslexia aged between 10–16 during their learning process and to assess whether technology can be a motivating educational strategy.

In this regard, this research contributed to the sustainability of the educational and social environment since it allowed for assessing the extent to which the learning motivation of people with dyslexia can be influenced by internal and external factors that can provide an integrating space for people with learning difficulties.

The results obtained provide evidence that the sample had a slightly high extrinsic motivation. However, a large proportion of the intrinsic motivation was low; thus, it can be said that the overall motivation was low since the sum of both motivations gave a result below the 50th centile.

In order to guide a person with dyslexia to academic success, it is essential to adopt an educational approach that differs from the ordinary one, namely, a high-quality approach that the student could achieve under the same conditions as the rest of their peers. To this end, motivation is a key player, and the adaptation of the materials that allow for the students to belong to a constructive environment leads to the development of a more positive attitude.

Therefore, motivation influences learning [46] and plays a fundamental role in the reading performance and the learning process of students with lexical and understanding difficulties [47].

The use of ICT provides important resources for learning and becomes a motivating educational strategy. Likewise, the use of digital materials as an educational response to students with dyslexia is essential due to the fact that these tools compensate for the students' difficulties by taking advantage of new information channels and making learning and multisensory teaching available [46]. In this regard, the results obtained in this research showed that the sample considered the use of ICT in the classroom to be important (86.7%), that ICT had a positive influence on their learning (83.3%), that they were more motivated to use ICT when completing tasks (93.3%), and that they even showed more motivation when the teacher used these tools to explain concepts in class (93.3%).

Other studies state that ICT is a motivating element for students and consider them as a strategy to make the most of diversity, as well as to stimulate students through inclusive and collaborative environments such that their motivation increases over the years [48].

The results also showed that the secondary education students in the sample collected were more motivated overall than those attending primary school. This result may be due to a variety of factors, including the pressure to change stages or even because in secondary education, there are more courses to choose from, which is an aspect that makes students focus more on their interests. These data are consistent with those obtained from other studies [49].

Finally, it is worth highlighting that the results of the variables "mother's work situation" and "intrinsic motivation" were significant. The results suggest that the mother's work situation might affect the intrinsic motivation of the children to some extent. With regard to this significance, it is important to mention that the role of the family is fundamental in the educational development of the children; in this case, the mother would also have an essential role. Likewise, no research developing this idea has been found, but reference is made to research in which the mother's work situation does not influence the psychological development of the children since she spends her time with them, which does not necessarily influence the child's psychological development [50].

5. Conclusions

In general terms, the analyzed sample showed low motivation. People with dyslexia aged between 10 and 16 that took part in this study (N = 30) considered the use of ICT in the classroom to be important (86.7%), believed that ICT had a positive influence on their learning (83.3%), and felt more motivated when they used technology to complete tasks (93.3%). As such, they would like to take assessment tests and exams using ICT (83.3%) and would rather have all courses taught through technology (83.3%). Furthermore, in relation to the use of technology, 90% said that they used it in the classroom and also said that they felt more motivated if the teacher used technology when explaining concepts in

class (93.3%). However, 73.3% stated that they used the paper format more in the classroom and that technology was not used in most of their courses (63.3%), although they believed that the use of ICT in the classroom should increase (90%). Regarding the use of technology by these young people, the analysis found that 60% studied with ICT at home and believed that teachers were not fully prepared for the increase in online teaching (83.3%). Finally, as for the use of technological resources and online teaching during the pandemic lockdown, 93.3% stated that their use had increased.

Among the limitations of the research was the sample size. We are aware of the small size of the sample (N = 30), but it should be mentioned that it is difficult to access the child and adolescent population diagnosed with dyslexia.

Based on the results obtained, we can conclude without any kind of hesitation that ICT can work as a strategy to improve the motivation of people with dyslexia. In this sense, this study confirmed and substantiated previous research [9,51], which showed that the use of technology in children with dyslexia is an enriching element that helps to generate a safe and controlled learning environment from a playful and motivating perspective.

Therefore, the data from our study brings us closer to prior research that showed that the use of technology for educational purposes is an opportunity for the researcher to know what aspects motivate students such that they can be implemented when designing quality educational products [52] and to turn video games into a great opportunity or the "new silver bullet" of education, as many have claimed [53].

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