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School physical education and autism spectrum disorder: development of a technological tool for pedagogical aid

Dimas Anaximandro da Rocha Morgan
ORCID: https://orcid.org/0000-0002-2657-258X

Jan Erik Mont Gomery Pinto
ORCID: https://orcid.org/0000-0003-4383-506X

Giuliani Paulineli Garbi
ORCID: https://orcid.org/0000-0002-4106-5201

Abstract: In view of the importance of inclusive strategies in School Physical Education classes, as well as the need for planning directed to the inclusion process of autistic children, the objective of this study is to develop a mobile application to direct the pedagogical work of the Physical Education teacher for the inclusion of autistic children in Early Childhood Education. Thus, a technological tool is proposed which helps the teacher in their planning by associating the cognitive, affective and motor factors present in early childhood. The application is structured with electronic files which enable the teacher to plan their classes to provide functionality in their activities, with the differential being the direct relationship with the pedagogical proposal of School Physical Education, defined by the National Common Curriculum Base (*Base Nacional Comum Curricular - BNCC*). It is concluded that the application has the potential to improve planning and execution of more inclusive pedagogical practices, in addition to contributing to develop technological culture in School Physical Education classes, stimulating social interaction and engagement in activities, thereby also contributing to the autonomy of autistic children in Early Childhood Education. However, the study is limited to the development of the technological tool, and in this sense future research is suggested which can test the functionality quality from the user's perspective through a pilot study with teachers in order to validate the application's ability to effectively, efficiently and satisfactorily meet the expectations and needs of the end user.
Keywords: School physical education; inclusion; educational technology; TEA; mobile app.

1 Introduction

Data from the last Demographic Census of 2010 conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística - IBGE*) were analyzed based on the discourse of the Brazilian Inclusion Law No. 13,146 of July 6, 2015, in its Art. 2,

which considers an individual disabled when he/she presents limitations of a physical, mental, intellectual or sensory nature, which may compromise their full social development. The data showed that there are approximately 4 million disabled children in Brazil between the ages of 0 and 14. In light of this scenario, the 2018 School Census by the Anísio Teixeira National Institute of Studies and Educational Research identified that the number of children and adolescents with Autism Spectrum Disorder (ASD) in regular education increased from 77,102 to 105,842, representing an increase of 37% compared to 2017. Considering this reality, the discussion about students with disabilities and/or neurodevelopmental disorders in regular education goes beyond thinking about their specific difficulties and begins to signify what the school can do to respond to their needs. From this perspective, the core of the debates on this topic prioritizes the current pedagogical approach which argues that the inclusive process represents a new order to be recommended to schools and society, believing it to be the way to realize ideas which correspond to the needs of a school open to all (Brasil, 2015; IBGE, 2012; INEP, 2018; Ferraioli; Harris, 2011; Ribeiro *et al*., 2020; Catelli; D'antino, 2016; Almeida, 2015).

In turn, teachers faced with this reality which demands a more humanized view of the inclusion process have a fundamental role in the knowledge acquisition process. Given this scenario, the search for an alternative didactic and methodological support which strengthens the school's pedagogical intentionality in view of the need for an inclusive process that facilitates the teacher's planning and enables developing skills and abilities in children with ASD (Ferreira, 2022) is justified.

In this sense, it is up to Physical Education Professionals to seek alternatives which broaden their perspective on the inclusion subject, since School Physical Education represents a curricular component of great interest to children and adolescents. The adapted practice of Physical Education in the inclusion process at school is a differentiated and significant activity for the experience of students with typical and/or atypical development (Cruz; Ferreira, 2020; Moraes; Macedo, 2021; Nogueira, 2020).

Therefore, planning activities in a targeted and coherent manner based on the needs of the context is considered an important element in organizing the pedagogical work of Physical Education teachers given that it facilitates the process of constructing interventions with a view to the inclusion process. In addition, it consists of a tool which provides efficiency to human action, as it organizes decision-making and reinforces the specific understanding necessary for targeted work (Moraes; Macedo, 2021; Miranda, 2021; Brandão *et al*., 2018).

In parallel with this reality, we live in an era of transformations in which the technological revolution has had a major impact on society, especially regarding education inside and outside schools. In this sense, it is extremely important that educators are aligned with new teaching strategies based on information technologies in attempt to redefine their pedagogical practices for the inclusion process (Frias; Menezes, 2015).

Thus, Educational Technologies (ET) emerge, being understood as a multidisciplinary area which enables combining Information and Communication Technologies (ICTs) with the educational process, which in turn enables using new resources and equipment to enrich the teaching/learning dynamics in schools. In view of this, correlating technological knowledge with the educational context to develop a product which meets the needs of Physical Education teachers can be significant for those seeking to enhance inclusive teaching, since technology is already used within the education field in many different ways (Nogueira, 2020; Moraes; Macedo, 2021).

Given this reality, the search for an alternative methodological didactic support which strengthens the school's pedagogical intentionality in facing the need for the inclusion process is justified. Furthermore, the need for the initiative proposed herein is justified by the analyses of Nogueira (2020), since it enhances the technological culture in the school environment and digital inclusion of the community, aiming to collaborate with the reduced impact of social inequalities. Therefore, given the importance of inclusive strategies in Physical Education classes, as well as the need for targeted planning with pedagogical intentionality to strengthen the inclusion process of autistic children in Physical Education classes, the objective of this proposal was to develop a technological tool to provide pedagogical assistance to Physical Education teachers in their inclusion classes based on the National Common Curricular Base guidelines (*BNCC*).

2 Inclusive Physical Education and the use of technologies at school

Concepts related to people with disabilities have undergone major transformations throughout history influenced by the dynamics of social relations. From a medical model based on a standard of normality which reinforces the definition of disability as a disease, it has evolved into a humanized model, which by law recognizes disability not as a human condition, but rather as a condition of spaces offering adequate opportunities for the inclusion process (Brasil, 2015).

From this perspective, the Federal Constitution of 1988, the Law of Guidelines and Bases (LDB) – Law No. 9,394/96, and the Brazilian Inclusion Law No. 13,146 of 2015 ensure the right to education for students with disabilities in the regular education system. In this sense, Inclusive Education emerges in Brazil as an educational and political proposal that, among other movements, aims to provide students with disabilities with their acceptance in formal education contexts (Brasil, 2008; Sassaki, 2020; Machado; Nazari, 2012).

According to the 1988 Federal Constitution, Special Education is the policy created to guarantee individuals with disabilities the right to full participation in society. In view of this, schools are seen as important instruments for implementing inclusive work for marginalized and excluded groups in society, enhancing their right to access school and learning. School inclusion is more than just including students with disabilities in regular classes; it is about reformulating school practices, attitudes and policies to accommodate diversity. This per-

spective shows that inclusion goes beyond physical access to schools, requiring changes in teaching methodologies, teacher training and the educational environment as a whole (Silva; Lopes; Quadros, 2023; Machado; Nazari, 2012).

In turn, it is important to understand the school as an environment for strengthening and implementing inclusive education, directly dependent on adaptations that impact the macro and microsystems. Given this concept, the macrosystem can be understood as the strategies and decisions that are the responsibility of Federal, State and Municipal education agencies. In contrast, the concept of microsystem relates to the school and all the factors which contribute to the dynamism of its reality. In this case, the necessary adaptations are the responsibility of teachers' initiatives (among other agents) in search for resources to expand and strengthen their pedagogical practice in order to effectively and humanely include these students (Nogueira, 2020; Chicon; Cruz, 2013; Bronfenbrenner, 1996).

Regarding this scenario, the Law of Guidelines and Bases of National Education advocates the importance of adequate preparation of teachers as a prerequisite for developing and implementing inclusive classes, ensuring that regular education students have qualified and specialized teachers for integrating and adapting students with disabilities. Along these lines with regard to Physical Education classes at school, planning interventions should prioritize disease prevention and health maintenance, in addition to emphasizing students' participation, decision-making, autonomy and independence. Therefore, Physical Education offered by schools should include the body, movement and playfulness as inseparable educational aspects and offer educational opportunities appropriate for comprehensive development and the pursuit of objective participation and social integration (Brasil, 2020; Freire; Guimarães, 2011; Darido, 2008; Darido; Rangel, 2008; Kunz, 2000).

In this scenario, Physical Education is recognized as a mandatory curricular component in Brazilian Basic Education. Its relationship with health has gained prominence throughout its historical process and is highlighted in several documents, policies and national programs, such as the National Common Curricular Base (*BNCC*), the "*Movimento é Vida*" report by the United Nations Development Program (UNDP), the Health in School Program (*Programa Saúde na Escola - PSE*) and the Physical Activity Guide for the Brazilian Population (Brasil, 2020; Oliveira, 2022).

Other documents in the international context reinforce the need to offer Physical Education in school curricula as a way of providing opportunities for physical exercise at school, as well as to develop individuals through motor, emotional and social benefits with a view to promoting health and well-being. Based on this, planning activities in a targeted and coherent manner based on the needs of the context is considered an important element in organizing the pedagogical work of the Physical Education teacher, given that it facilitates the process of constructing interventions by these professionals in the school environment with a view to the inclusive

process. In addition, it consists of a tool which provides efficiency to human action, as it organizes decision-making and reinforces the specific understanding necessary for intervention work in the school. However, the difficulties encountered by Physical Education teachers in directing inclusive classes are presented in the literature due to a lack of time to think about the practice, insufficient initial and ongoing professional training for better pedagogical direction according to the specificities of the public, and a lack of knowledge on how to share attention with all students collectively (OECD, 2019; Moraes; Macedo, 2021; Miranda, 2021; Brandão *et al*., 2018; Frias; Menezes, 2015; Cruz; Ferreira, 2020; Moraes; Macedo, 2021; Fiorini; Manzini, 2020).

Following this reasoning, the limitations are justified by a lack of knowledge of the specificities of their students, as well as being directly related to pedagogical practice, which means knowing what to teach atypical students enrolled in regular education. It is therefore necessary to reflect on the planning action and then evaluate whether the planned form meets the particularities, since the teaching and learning process observed in most institutions, characterized by standardized movement and bodies, compromises the development of human potential, becoming detrimental to the development of children and young people who behave differently from the standard established by society (Moraes; Macedo, 2021; Miranda, 2021).

Still investigating the teacher's planning as a discussion object, the precariousness of actions adopted for including autistic children in Physical Education classes is observed. The topic in question is part of the list of knowledge needs regarding the specificity of the disorder for a quality action plan with the aim of proposing new alternatives which awaken curiosity and engagement for new discoveries in order to enable students to achieve school inclusion, effectively contributing to the student's comprehensive development (Almeida; Picanço, 2019).

According to this premise, such unpreparedness is a reflection of the teacher's lack of experience and/or guidance for a direction that is coherent with the student's needs and that effectively meets the demands of the inclusion process in the school environment, as well as a lack of adequate materials and the teacher's commitment to the process. For scholars who seek to identify alternatives in the midst of this reality, these factors make it difficult to identify the specificities of their student and compromise planning their practice in an adapted way with a view to including and integrating them into the learning environment (Moraes; Macedo, 2021; Miranda, 2021).

As explained, Physical Education class may not be a meaningful experience for many students with disabilities and/or neurodevelopmental disorders, since they may face difficulties in interacting with their peers. However, as a way of enhancing teaching strategies, as well as mitigating the negative impacts of exclusion, negative experiences in Physical Education classes can be avoided when some issues are reviewed, such as the strategies used, the teacher's pedagogical practice and the collaborative work of the entire school community together with the participation of the family in monitoring the inclusion process (Almeida; Picanço, 2019; Fiorini; Manzini, 2020; Moraes; Macedo, 2021; Miranda, 2021).

As explained, technological advances have broken down sociocultural barriers and provided opportunities for developing a new professional profile in terms of teacher training and performance in schools. Thus, dissemination of Information and Communication Technologies in the school context has gained increasing notoriety in the scientific community, which has contributed to new thinking regarding teaching and learning strategies, providing a new perspective in the educational process (Pires, 2020; Almeida; Picanço, 2019).

To this end, the use of Educational Technologies as a resource to reduce differences and enhance mediation in the learning process has become a challenge for implementing an inclusive and efficient process in schools. Given this premise, the importance of ICTs in facing society's demands is understood, enabling transformations in the relationship between man, technology and the environment, being inserted within a sociocultural context, modifying and being modified by reality. According to this reality, innovations in the scope of mobile technologies in the formal education environment contribute to the learning process in an inclusive way and favor development of social relationships, strengthening experience sharing among users and providing access to knowledge (Sassaki, 2020; Machado; Nazari, 2012; Fantin, 2019).

According to the literature, the association between games, play and technology is an excellent strategy for stimulating cognitive skills, visual attention, memory and problem-solving in early childhood children with ASD. However, the use of this resource without any relation to the school curriculum emphasizes the clinical therapeutic perspective. Therefore, it is necessary to seek the relationship with the National Common Curricular Base (*BNCC*) with regard to its learning and development objectives and their respective fields of experience (Brasil, 2018).

According to the findings, this search has resulted in evidence of technological tools which stimulate aspects of child development in isolation, directing the work towards developing alternative language, cognition, fine motor skills, as well as to develop behaviors taught individually and fragmentedly, disregarding the child as a social being endowed with movement. In addition, it is observed that the use of these technological tools is not aligned with what is recommended by the legal guidelines for developing skills and competencies defined by the *BNCC* (Catelli; D'antino, 2016; Almeida, 2015; Almeida; Picanço, 2019; Oliveira; Nunes; Munster, 2017).

From this perspective, findings which focused on the use of electronic games in Physical Education classes enable an increase in the physical activity level when compared to sedentary video games demonstrated greater caloric expenditure and increased heart rate during exercise, constituting fundamental aspects for promoting health and treating obesity in autistic children. However, it is important to establish specific procedures, combined with organized pedagogical planning, as well as the participation of health professionals and family members to implement educational technologies (Frias; Menezes, 2015; Cruz; Ferreira, 2020).

Then, regarding the use of applications on mobile devices for cognitively stimulating autistic children, the functionality for the target audience in question was investigated and it

was concluded that the tool should offer a playful design which is easy to understand and use, providing support to the teacher for planning pedagogical actions and stimulating the student's curiosity. In view of this, Information and Communication Technology resources were identified as possible paths for the teaching and learning processes of children aged 4 to 6 with ASD, as they favored inclusion through accessibility to school activities, which then enabled them to achieve significant pedagogical performance. Strengthening of alternative communication was observed, in which students were able to express their opinions, feelings and choices. However, it is important to emphasize that the use as an isolated resource of a systemic practice can compromise the learning process and overvalue knowledge reproduction (Almeida; Picanço, 2019; Moraes; Macedo, 2021; Miranda, 2021; Brandão *et al*., 2018).

Corroborating this idea, studies conducted with the objective of investigating the social interactions of autistic children described a lack of emotional closeness between them and their peers. Low acceptance of students with ASD who were integrated into the context of regular education was observed, as established by law, but not effectively included in the learning process as recommended by the same law (Catelli; D'antino, 2016; Almeida, 2015).

Corroborating this analysis, a bibliographic study carried out by Fiorini and Manzini (2020) reveals the reality of autistic students in Physical Education classes and recognizes their lack of interaction with the teaching proposals offered. The authors point out that the inclusion process is hindered by some factors which delay adaptations to provide adequate conditions for engaging neurodivergent children, such as materials and methods, the choice of content and the lack of pedagogical intentionality.

In this context, analyzing the perspective of educational technologies as a pedagogical resource in Physical Education classes at school and in accordance with the idea of teaching strategies, Fiorini and Manzini (2020) discussed the need to plan Physical Education classes, and comprehending this action as being essential for the inclusion process. In their analysis of teaching practices, they concluded that planning classes based on difficulties, student characteristics, objectives and content chosen by teachers, and seeking teaching strategies and pedagogical resources which are most appropriate for the student's demands are essential measures to achieve their functionality. Therefore, Fiorini and Manzini (2019) suggest that teachers use specific teaching strategies for each demand that arises in the dynamics of the school environment, aiming at participation and inclusion of students with disabilities and/or neurodevelopmental disorders in Physical Education classes.

A study by Aguiar and Duarte (2020) points out that Physical Education teachers suggest having specialized technical-pedagogical assistance, adequate physical space and materials as resources to include students with disabilities, in addition to training courses. For Oliveira, Nunes and Munster (2017), inclusion in the context of School Physical Edu-

cation in Brazil must be based on a systemic vision that subsidizes actions and provides support for new ways of thinking and intervening in this context.

In turn, a study by Soares and Cunha (2018) revealed the possibility of including students with disabilities and/or neurodevelopmental disorders in School Physical Education classes with quality teaching, respecting their limitations and developing their potential based on appropriate teaching methods and with the support of all those involved in the process (the school community, family and other professionals) as the teaching-learning process is reviewed, thereby rethinking the exploration of school spaces and times and investing in ongoing training. Moreover, the pedagogical practices of Physical Education, which support inclusive proposals, need to be directed through activities which place the student at the center of learning and reinforce the perspective of inclusion, thus rescuing the importance of the social factor for autistic children (Miranda, 2021).

3 Results

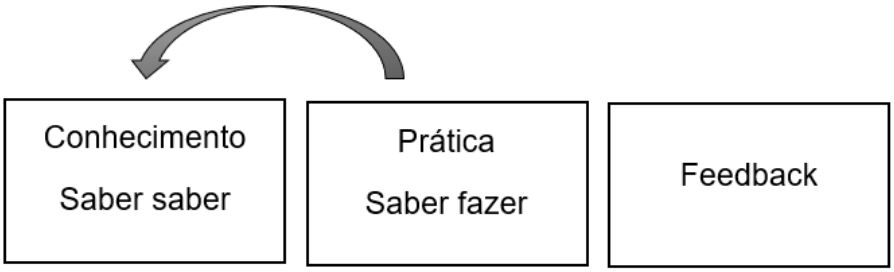
In view of the above, the aforementioned study is characterized as an applied study which, according to Pereira (2023, p. 67) "[,,,] is a systematic method that aims to generate knowledge to solve specific problems in a practical and immediate way". Therefore, the research proposal was performed in the Doctoral Course of the Postgraduate Program in Health Biotechnology at Universidade Potiguar and proposes a mobile application for pedagogical guidance in School Physical Education classes based on quick access to information for teaching planning, as well as strengthening the interaction between the school and the family for including autistic children.

The present proposal is based on a survey conducted in national and international literature in an attempt to find a mobile application to assist in Physical Education classes which is favorable to this demand, as there was no evidence of any instrument for this purpose. The studies present tools which direct the work towards developing alternative language, cognition and fine motor skills, thought of individually and in isolation, without considering the individual as a social and multifactorial being.

In this context, the differential of this application consists of a direct relationship with the pedagogical proposal of School Physical Education based on the guidelines of the National Common Curricular Base (*BNCC*) for planning and defining learning goals for developing skills and abilities related to the body culture of movement. In addition, it offers the teacher the possibility of the necessary knowledge about Autism Spectrum Disorder to plan the intervention based on the human behavior areas affected by the spectrum, namely language, communication and social interaction.

The application consists of a practical and objective interface to facilitate use by the teacher. The teacher will start from the following premise for the pedagogical moment in School Physical Education, as shown in Figure 1:

Figure 1 – Pedagogical practice in School Physical Education.



Source: The author.

Knowledge (know-how) in Physical Education at School, preceded by practice (knowing how to do), is essential for mediating conscious interventions which meet the student's needs as a whole, redefining the clinical-therapeutic nature of interventions and socially and enjoyably enhancing playfulness. Therefore, based on this approach, the application aims to provide quick and necessary information about both the child and about ASD to support the teacher's planning, helping them to make decisions regarding the best teaching strategy to achieve learning objectives, whether motor, cognitive, affective or social.

To this end, the teacher will have access to a form containing basic questions that will compose an anamnesis with fundamental information about the child, guidelines on ASD to achieve a conscious and inclusive practice, in addition to the direction of pedagogical action, which will guide decision-making for establishing goals. Finally, the teacher must produce a report on the experience of the class for the purposes of recording and monitoring the intervention process and share the document with other stakeholders in the inclusion process, in this case the family and school management. In view of this reality, the aforementioned application is registered with the National Institute of Industrial Property under process number BR512024001339-3 on the date of issue of April 30, 2024 in accordance with Article 2 of Law 9,609 of February 1998.

Therefore, the technological tool uses Java and XML programming language and consists of a database, called Firebase, using Android Studio as its main ID. The application is supported from Android version 7 (Android Nougat), ensuring broad compatibility. The application is available for download on the Android, iOS and Windows Phone operating systems to make this process more dynamic and easy to access, in addition to a web platform version to cover all lines of digital communication.

Figure 2 – Home screen.

Source: The author.

In view of the above, the application's home screen is as shown in Figure 2. There, the teacher has access to four options provided by the tool, which are: Anamnesis, understanding ASD, Pedagogical guidelines and Report.

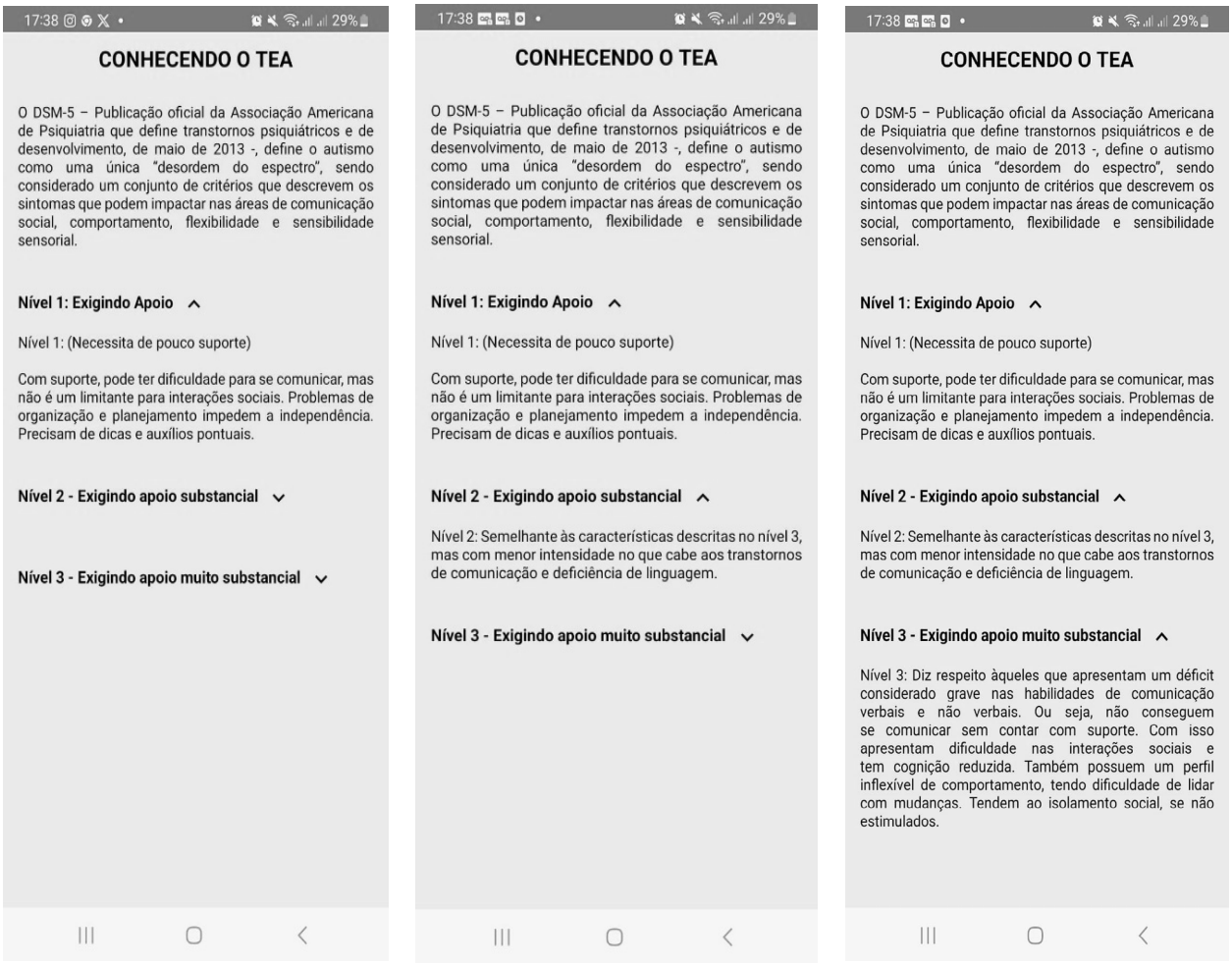
The first item, called "Anamnesis" as shown in Figure 3, consists of a form with basic questions about the child's identification. In addition, it covers the family profile and information about the child's overall development. This development is related to motor and social behavior. This initial moment is important to bring the teacher closer to the child's reality.

Figura 3 – Teadapta Screens – Anamnesis.

Source: The author.

The second option of the tool, called “Getting to Know ASD” and illustrated in Figure 4, grants the teacher access to guiding information about support levels for ASD. According to Mariano (2023), this classification is made on three levels, depending on the degree of the individual’s impairment. This impairment is related to the dependence level on other people or professionals. These guidelines are fundamental for planning the intervention work.

Figura 4 – Teadapta Screens – Understanding TEA.



Source: The author.

The third Teadapta option, called “Pedagogical guidelines” as illustrated in Figure 5, guides the teacher on the strategies which can be adopted for their didactic planning. At this point, the teacher has access to the set of guidelines that are based on the recommendations of the National Common Curricular Base for Physical Education in Schools regarding the body, gesture and movement experience field and their respective guidelines in relation to pedagogical practice, as well as the learning goals, which should be encouraged for developing the skills and abilities recommended by the document. The teacher must consider

the diversity of students and promote activities that are accessible to all to ensure inclusive planning of Physical Education classes in the “Body, Gesture and Movement” experience field, according to the *BNCC*. The goals include exploring different ways of developing body awareness.

Figura 5 – Teadapta Screens – Pedagogical Guidelines – Fields of Experience.

Source: The author.

Finally, the fourth option available on the application’s home screen is called “Report”, as shown in Figure 6. In it, the teacher has the opportunity to document the experience lived in the class and save a PDF file for the purposes of recording, monitoring and evaluating the teaching process, as well as sharing the record with school management and family with the aim of highlighting the intervention process in the Physical Education class.

Figura 6 – Teadapta Screens – Report.

Source: The author.

The reports provided by the app allow the teacher to record relevant data on the motor, behavioral and social performance of children during classes. According to this reality, it is possible to align educational and therapeutic strategies, promoting more comprehensive and effective monitoring. Therefore, the Physical Education teacher not only teaches motor skills, but also contributes to the child's overall development, respecting their individuality and potential (Oliveira, 2022).

4 Discussion

Information and Communication Technologies (ICTs) are a multidisciplinary knowledge area which aims to eliminate barriers, encourage full participation and enhance teaching strategies for the student's comprehensive development. They should be understood as yet another teaching and pedagogical tool, just like any other resource used in Physical Education. Therefore, they should not be underestimated by formal education (Almeida; Picanço, 2019).

Thus, a technological tool is proposed to assist teachers in their planning by associating the cognitive, affective and motor factors present in early childhood. The application is structured with electronic files, containing anamnesis, information on ASD and pedagogical guidelines with learning goals, which enable teachers to plan their classes in an attempt to

provide functionality in their activities for the child. Finally, teachers have the possibility of creating reports for systematic monitoring of student development and engagement in their classes.

The tool was developed with the user in mind, offering an intuitive and simplified navigation experience. It is clear from the first access that every detail was carefully planned to provide maximum ease of use. Therefore, according to Fiorini and Manzini (2020), an easy-to-use tool enables teachers to focus on their teaching activities, saving time and reducing frustration with complex tools. This is especially relevant for a Physical Education teacher who often needs agility to record student performance data and quickly adjust plans. Ease-of-use ensures that the application meets practical day-to-day needs, improving workflow and the quality of student monitoring (Oliveira; Nunes; Munster, 2017).

Furthermore, an easy-to-use technological tool can allow teachers to be more effective in their interactions and in organizing activities. Easy access and objective guidance for planning pedagogical actions can significantly contribute to more positive, engaging, and motivating experiences, helping to develop motor, social, and emotional skills (Oliveira, 2022).

The items which compose the anamnesis of the technological tool are based on the screening form used for the interdisciplinary care of autistic children who participated in the Child Development Laboratory Extension Project (LADIN) at the Universidade Potiguar, in Natal, RN, Brazil. The instrument development involved collaboration with a Physical Education professional, a Psychologist, and a Social Worker with professional experience with the target audience.

Therefore, preliminary information in understanding ASD as a neurological condition that affects the way an individual perceives and relates to the world, with an impact on communication, socialization, and often motor skills will help the teacher understand the child's individuality. From this perspective, atypical children often have motor development impairments, such as difficulties with coordination and balance skills, as well as possible changes in muscle tone (American Psychiatric Association, 2022). These factors can limit their participation in physical activities which require complex movements or greater interaction with their peers. The literature highlights that adapted motor interventions, based on individual needs, are effective in improving the engagement and motor skills of these children (Oliveira, 2022).

In this context, Nogueira (2020) reinforces that the role of the Physical Education teacher becomes crucial, as he/she must be able to adapt their teaching strategies to meet the specific needs of these children, promoting active participation and to develop motor, cognitive and social skills. Corroborating this perspective, Miranda (2021) analyzes that this initial moment of collecting information through anamnesis is justified by the importance of

building a bond with the child and the family. The author positively evaluates that understanding the specificities of each child allows the teacher to develop personalized strategies which meet the demands and encourage the child's active participation in the group.

According to this reality, the Physical Education class environment can positively impact the self-esteem of autistic children, as long as the proposed activity respects their singularities. According to studies, the feeling of belonging and acceptance among peers is directly related to improvement in the emotional well-being of these children (Catelli; D'antino, 2016; Almeida, 2015). Successful inclusion therefore depends on the effort to create activities that provide successful experiences and value individual progress.

Moreover, this process not only aims at identification, but also at bringing the teacher closer to the child's reality, respecting their limitations and potential. Inclusive education in this sense becomes a learning process for everyone; not only for autistic students, but also for the school community as a whole, which, through technological culture, seeks to overcome daily challenges (Fiorini; Manzini, 2020).

As explained, Physical Education at School is a powerful space for comprehensively developing children on the autistic spectrum. However, it is essential that teachers understand the motor, social, and emotional history of their students for this potential to be fully explored. This knowledge facilitates developing inclusive pedagogical strategies which not only favor learning, but also promote autonomy and inclusion in the school environment.

It is known that autistic children present a wide variety of profiles, with significant variations in motor, sensory, and emotional aspects. Some may have difficulty maintaining attention or communicating verbally, while others may demonstrate exceptional skills in certain areas, such as motor coordination or memory (Oliveira, 2022). Therefore, knowledge about autism characteristics allows professionals to understand the particularities of each student, adjusting their approaches and avoiding generalizations that may be harmful. Without this prior knowledge, the teacher runs the risk of adopting methods that do not meet the student's needs, thus excluding the child from the dynamics of the class, which harms their self-esteem and learning (Moraes; Macedo, 2021; Miranda, 2021).

In light of this, the National Common Curricular Base (*BNCC*) represents a significant step forward for school inclusion in Brazil, establishing that all students have access to an equitable and quality education. In turn, the *BNCC* offers guidelines in the "Body, Gesture and Movement" experience field which can promote the motor, social and emotional development of autistic children when applied appropriately in Physical Education classes, actively integrating them into the school environment (Brasil, 2008; Sassaki, 2020).

In addition to inclusive pedagogical practices, development of skills and competencies in atypical children requires the support of technologies and specialized professionals, such as school mediators. The Brazilian Inclusion Law (LBI, Law No. 13,146/2015) and the

National Policy on Special Education (*Política Nacional de Educação Especial - PNEE*) reinforce mandatory provision of resources and services which guarantee access, retention, and learning for these students. However, Sassaki (2020) warns that "there is a gap between what is provided for in legislation and the practical conditions for implementing a truly inclusive education."

Thus, as discussed by Moraes and Macedo (2021), planning inclusive Physical Education classes in schools is a constant challenge for teachers. The National Common Curricular Base (*BNCC*) establishes guidelines that value diversity, equity, and the comprehensive development of students, reinforcing the need for pedagogical practices which meet the different needs, skills, and interests present in a classroom. In this context, Teadapta emerges as a highly relevant tool. The use of ICTs in the educational context, especially in Physical Education classes, should encourage the development of pedagogical strategies which promote the inclusion of students with disabilities, overall developmental disorders, high abilities or giftedness, in addition to considering sociocultural differences, ensuring that all students have access to learning, respecting their individualities (Pires, 2020; Fantini, 2019).

It is important to emphasize that in addition to implementing technologies in education aligned with developing skills and abilities of children with ASD, deconstructing the clinical therapeutic character and stimulating the individual's integrality, ICTs are presented as an important tool for inclusion (depending on the direction of the Physical Education class and pedagogical objective), as long as there is effective and targeted mediation with the learning objectives and the human relationship necessary for social life and citizenship formation. In this line of reasoning, the use of technological tools should not only facilitate planning, but also promote pedagogical innovation, allowing teachers to expand their repertoire of practices and strengthen their role as mediators of inclusive learning. Moreover, the protagonism of students is encouraged to create opportunities for everyone to actively participate in activities, respecting their limitations and potential (Brandão *et al*., 2018; Sassaki, 2020).

For Miranda (2021), systematized information helps to identify specific patterns and needs of each autistic student, thereby enabling adjustments in activities to meet these aspects. From this perspective, the use of digital reports favors communication between the school, family members, and other professionals involved in the child's development, such as occupational therapists or psychologists.

According to this reality, it is possible to align educational and therapeutic strategies, promoting more comprehensive and effective monitoring. Thus, the Physical Education teacher not only teaches motor skills, but also contributes to the child's overall development, respecting their individuality and potential (Moraes; Macedo, 2021; Miranda, 2021). According to Miranda (2021), another relevant point which deserves to be highlighted in this

analysis involves the time saved by automatically generated reports for the teacher, who can dedicate themself to planning more creative and adapted activities. Furthermore, qualitative analysis of the document allows the teacher to continually evaluate the effectiveness of pedagogical strategies, promoting continuous improvement in the teaching-learning process.

In view of this, teachers faced with the inclusion process need to adapt their planning to the reality of their students, using new technologies which can meet and support each of their students in their needs, so that they can develop autonomously during classes with the support of their family and school community. The pedagogical relationship between technology and education has become irreversible and fundamental for the modern teacher, as the use of applications with this functionality demonstrates a commitment to inclusive education and the use of technology in favor of teaching. Physical Education, as a field of stimulation, must ensure that autistic students feel valued and fully participate in the proposed activities (Fiorini; Manzini, 2020; Nogueira, 2020; Oliveira; Nunes; Munster, 2017).

5 Conclusion

The ET proposal outlined herein aims to streamline and facilitate the teacher's planning process to strengthen the inclusive process in Physical Education classes for autistic children in Early Childhood Education, optimizing their time, ensuring quick access, reliable data and regular backup of information from lesson plans and anamnesis of the children involved, in addition to generating pedagogical feedback, observation reports and monitoring. However, the study is limited to the development of a technological tool to assist in organizing teaching work in the school environment. Therefore, it aims to make it more dynamic and consistent with the educational and health needs demanded by inclusive Physical Education classes in schools. With this, it seeks to encourage managers and professionals in the area to take more assertive actions regarding the inclusion process in the formal education environment.

However, since it is a technology-based product and easy to apply, with real-time processing capacity and Internet connection, future research is suggested to test the quality of the project from the user's perspective. To this end, a pilot study with teachers is important to validate the ability to effectively, efficiently and satisfactorily meet the expectations and needs of the end user. Accordingly, it is important to promote implementing projects which seek to understand the dynamics of the formal education context in relation to inclusion, enhance educational strategies and promote health in the school environment.

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MINI BIOGRAPHY

Dimas Anaximandro da Rocha Morgan
PhD in Health Biotechnology from the Potiguar University. Coordinator and Professor of the Physical Education Course at Faculdade Estácio FATERN. Research Professor in the following areas: Child development; motor literacy, information and communication technologies, inclusion and ASD.
E-mail: dimasanxmorgan@gmail.com

Jan Erik Mont Gomery Pinto
PhD in Electrical and Computer Engineering. Adjunct Professor DE of the Electrical Engineering course at UFERSA, Caraúbas Campus. Experience as a university professor at Potiguar University, in undergraduate and Stricto Sensu in the area of Biotechnology (PPGB-UnP).
E-mail: jan.pinto@ufersa.edu.br

Giuliani Paulineli Garbi
PhD in Space Engineering and Technologies from the National Institute for Space Research (INPE). Professor of the Graduate Program in Aerospace Engineering at UFRN; and Professor of the Graduate Program in Biotechnology at Potiguar University.
E-mail: giuliani.garbi@gmail.com

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