




## PHYSICAL EDUCATION AND ASSISTIVE TECHNOLOGY FOR SCHOOL INCLUSION OF SPECIAL EDUCATION STUDENTS: A SYSTEMATIC REVIEW

*EDUCAÇÃO FÍSICA E TECNOLOGIA ASSISTIVA PARA INCLUSÃO ESCOLAR DE ESTUDANTES DA EDUCAÇÃO ESPECIAL: UMA REVISÃO SISTEMÁTICA* 

*EDUCACIÓN FÍSICA Y TECNOLOGÍA ASISTIVA PARA LA INCLUSIÓN ESCOLAR DE ESTUDIANTES DE EDUCACIÓN ESPECIAL: UNA REVISIÓN SISTEMÁTICA* 

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**Abstract:** The study aimed to verify the scientific production involving the areas of Physical Education (PE) and Assistive Technology (AT) as a possibility of inclusion in school PE classes. This is a systematic literature review, using the keywords “Physical Education” and “Assistive Technology” to search the CAPES Journals Portal. After applying the inclusion and exclusion criteria, 715 studies were identified in the database and two were added by manual search. A full reading resulted in the inclusion of seven studies. The results indicate that there is a lack of applied research on the subject, with three dealing with products and resources, three with strategies and only one with a teaching program in the school context. It is concluded that there is a need for new applied research using AT concepts to verify its effects in the context of school inclusion in PE classes.

**Keywords:** Special education. Assistive Technology. Physical Education. Inclusion.

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## 1 INTRODUCTION

The process of social inclusion began with the worldwide mobilization of social movements organized by people with disabilities. This led to a number of “bilateral” processes in which society, in partnership with the Target Population of Special Education (TPSE), sought to achieve equal opportunities, in which everyone could enjoy their citizenship, in which differences would be respected and there would be acceptance and recognition of all (Mendes, 2006).

Furthermore, in the face of the bilateral processes arising from social inclusion, the initiative of school inclusion arises, where the school community seeks to develop means and methods to accommodate and allow the TPSE to learn effectively. In this way, the subject of Physical Education (PE) is not left out of this movement, as it is a compulsory curricular component of Basic Education (Pereira, 2018).

As a curricular component of basic education, Physical Education provides the opportunity to experience different bodily practices from the most diverse cultural manifestations present in everyday social life. Games, fights, dances, sports, and gymnastics make up a vast cultural heritage that should be valued, known, and enjoyed (Betti; Zuliani, 2002). Given this context, Rodrigues (2003, p. 69) states that “Physical Education would be a more easily inclusive curricular area due to the flexibility inherent in its content”.

When properly promoted, Physical Education becomes a curricular component with the potential to contribute to the school inclusion process. According to the National Curriculum Parameters (Brasil, 1997), it has the possibility of providing socialization, integration, and cooperation between students, as well as fostering autonomy and knowledge of each one’s potential.

However, for school inclusion to be effective, there are still some obstacles, such as a lack of infrastructure and unprepared teachers, requiring alternative adaptations that can favor school inclusion for special education students (Fiorini; Manzini, 2012; Rossi; Munster, 2013).

Given this context, in order to guarantee equal conditions for students who are the target of special education, the biggest challenge is to make accessibility possible for them. Thus, for both schools and society to be inclusive, according to ITS Brasil (2008), they must meet the six dimensions of accessibility: architectural, communicational, methodological, instrumental, programmatic, and attitudinal.

There are studies in the literature that indicate alternatives and strategies that can help special education students to be included effectively in classes, including Assistive Technology (AT).

According to the National Committee for Technical Assistance with a view to the Brazilian reality, AT is defined as an area of knowledge that encompasses various disciplines, ranging from methodologies, strategies, and practices, to products and resources, and its main objective is to enable people with disabilities to participate in any activities, aspiring to achieve their independence, autonomy, inclusion, and quality of life (Brasil, 2007).

Technology can be considered assistive in the educational context:

when it is used by a student with a disability and aims to break down sensory, motor or cognitive barriers that limit/prevent their access to information or limit/prevent the recording and expression of the knowledge acquired by them; when they favor their access and active and autonomous participation in pedagogical projects; when they enable the manipulation of study objects; when we realize that without this technological resource the student's active participation in the learning challenge would be restricted or non-existent (Bersch, 2017, p. 12).

Many possible resources can be planned, made, and used when thinking about Assistive Technology in the educational context. Peixoto (2018) mentions that there are many possibilities, from walkers, virtual keyboards, and accessibility resources through computerized programs, which make it possible to help students with various disabilities, and in various contexts, such as in aspects related to communication, access to information and means of locomotion and transportation.

Specifically in the Physical Education discipline, Tolo (2015) considers that the use of Assistive Technology as a teaching strategy and pedagogical resource can be a strong ally to assist in the process of school inclusion for Special Education students.

It is extremely important that the teacher identifies the potential and educational needs of the students, to break down the barriers encountered and favor functional abilities through the implementation of Assistive Technology methodologies, services, practices, strategies, and resources. This will promote accessibility to knowledge and learning for special education students (Borges; Tartuci, 2017).

Given the various possibilities, and considering that AT can help teachers in the school inclusion process, the following question arises: what is the panorama of research on the use of Assistive Technology in contributing to the inclusion of special education students in Physical Education classes?

In view of the above, this research aims to verify scientific production, focusing on Assistive Technology in contributing to the inclusion of special education students in school Physical Education classes.

## 2 METHODOLOGY

This study is a systematic literature review, defined as “a review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically evaluate relevant research, and to collect and analyze data from those studies that are included in the review” (Moher *et al.*, 2015, p. 335).

This systematic review used the recommendations of the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analysis).

### 2.1 PROCEDURES FOR DATA COLLECTION

The information was collected using the online search tool of the Coordination for the Improvement of Higher Education Personnel (CAPES) Journals Portal. Initially, in order to analyze the national and international panorama regarding the

theme involving Assistive Technology and Physical Education, an advanced search was carried out on the portal. The searches resulted in few studies involving AT in the context of sport, only 66 from the association between the keywords “assistive technology AND sport”. The search using the keywords “assistive technology AND leisure” resulted in 30 articles, showing an even smaller number in the leisure context. After reading the title and abstract of these studies, it was noted that four dealt with AT in sport and five used AT in leisure, but none of them were related to the school context, the focus of this work.

In order to find national and international articles relevant to the research, an advanced search of the portal was also carried out using the following keywords: assistive technology AND physical education, which will be detailed in this study. In addition to the database search, references found in the bibliography of the articles analyzed were added, using the same methodology specified above and which met the selection criteria for this study.

The concept of Assistive Technology was implemented in Brazil by the Committee for Technical Assistance through Ordinance No. 142 of November 16, 2006. Given this context, the search for articles in the database was limited to the years 2007 to July 2021, and only peer-reviewed articles were included.

The selection of articles was based on the following inclusion criteria: (a) presenting one of the keywords in their title and/or abstract; (b) being published between January 2007 and July 2021; (c) contained in magazines or periodicals; (d) focusing on AT as a strategy for including special education students in school PE classes; (e) being peer-reviewed. Those that did not meet these criteria were excluded.

## 2.2 PROCEDURES FOR SEARCHING, IDENTIFYING AND SELECTING ARTICLES

To minimize research bias, the search process was carried out by two independent judges in September and October 2021 (Costa; Zoltowski, 2014). At each stage of the study, the researchers held meetings to cross-check and discuss the data obtained by both, to resolve possible differences. During the selection of the studies, disagreements between them were resolved, eliminating the need for a third judge. The concordance rate was 98%, which suggests that the analyses followed the methodological rigor required for the research.

The studies identified in the database searches were exported to the Rayyan application for screening. This software is a free tool designed to help researchers carry out systematic reviews.

The description of the process of searching, identifying, and selecting the articles was organized into stages, which will be presented below:

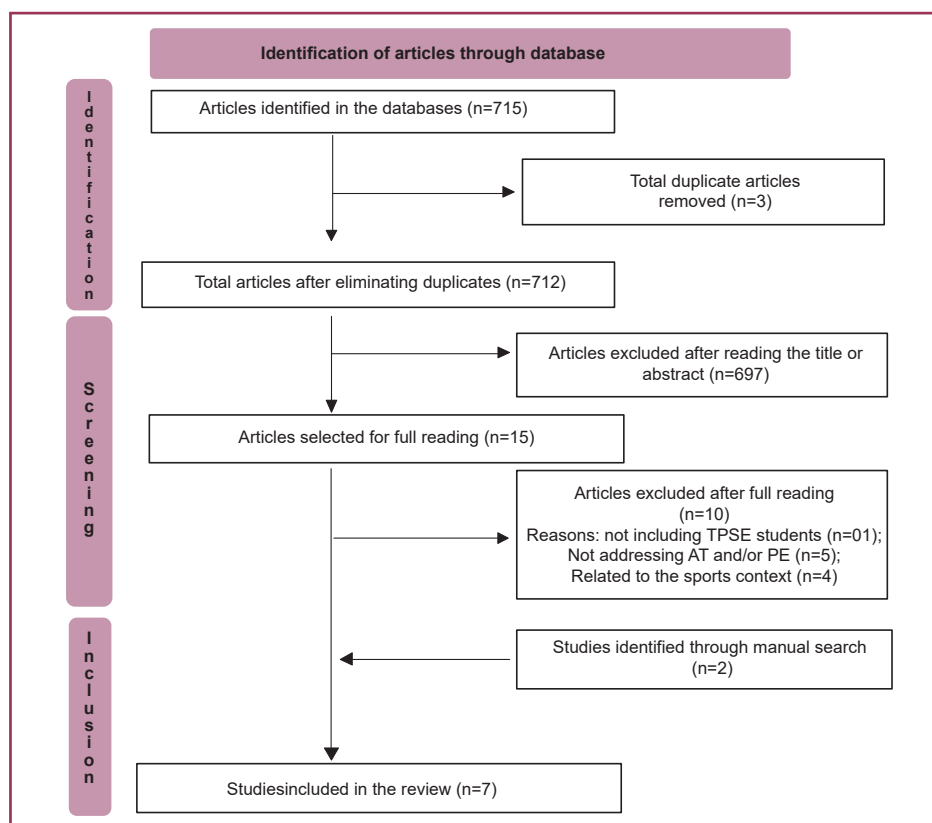
- **First stage** - Search and selection: initially all 715 articles located in the database were extracted into the EndNote tools and then sent to Rayyan.

- **Second stage** - Elimination of duplicate works: all the articles were analyzed using the Rayyan tool, and three duplicate titles were found and excluded.
- **Third stage** - Exclusion by reading the titles and abstracts in full: the titles and abstracts of the 712 articles were read by two authors independently, and those that did not meet the eligibility criteria were excluded (n= 697), resulting in 15 articles.
- **Fourth stage** - Reading the articles in full: after applying the inclusion criteria, 10 articles were excluded, giving a total of five articles that were relevant to the scope of the research.

In addition to the five articles selected in the search carried out on the CAPES Journals Portal, an additional search was carried out on the bibliography of the articles (manual search) by reading the titles and enabling virtual access. Reading the selected articles in their entirety made it possible to identify and add two pertinent articles to the study, as they met the eligibility criteria established. Therefore, a total of seven articles were included in this review.

The study selection flowchart, illustrated in Figure 1, shows the entire process of searching, identifying, and selecting articles, following the PRISMA review recommendation (Moher *et al.*, 2015).

**Figure 1 - Study selection flowchart**



Source: Adapted from Page *et al.* (2021), prepared by the authors.

The main information from each article is presented in Chart 1, in ascending chronological order, to help with the process of systematizing and analyzing the data, and is organized according to: author(s)/year; title (original/translation); objective(s); type of research; and results.

Chart 1 - Description of the studies included in the research.

Author(s)/ year	Title (original/Translation)	Objective(s)	Methodology	Results
Roth (2013)	<i>Adapt with Apps</i>	To describe how to find and use applications that help teachers with school inclusion in Physical Education.	Descriptive	Various cell phone/tablet applications are presented so that Physical Education teachers can use them during their practice to assist in the school inclusion process.
Schultz <i>et al.</i> (2013)	<i>Ensuring the Success of Deaf Students in Inclusive Physical Education</i>	Describe strategies that can help Physical Education teachers ensure the inclusion of deaf students in school Physical Education classes.	Descriptive	Various strategies are presented, and how to implement them, in order to help school PE teachers guarantee access and continuity for hearing-impaired students in their classes.
Brian & Haegele (2014)	<i>Including Students with Visual Impairments: Softball</i>	Describe ideas for equipment modifications and progressions for Softball.	Descriptive	By implementing the changes suggested in the article, PE teachers can take a significant step towards creating an inclusive learning environment.
Ferreira e Ranieri (2016)	O uso da tecnologia assistiva por professores de Educação Física / The use of assistive technology by Physical Education teachers	To investigate the ways in which Physical Education teachers work with students with disabilities and how they adapt their lessons, looking into the use of Assistive Technology.	Exploratory	The analysis of the reports showed that adaptations and improvisations are made in activities involving students with disabilities and that Assistive Technology is little known by the majority.
Fiorini e Manzini (2017)	Formação continuada para professores de Educação Física: a Tecnologia Assistiva favorecendo a inclusão escolar/ Continuing education for Physical Education teachers: Assistive Technology favoring school inclusion	It describes the development of continuing education for Physical Education teachers with a view to incorporating Assistive Technology into lessons and creating favorable conditions for school inclusion.	Exploratory	Assistive Technology was essential, as teaching strategies and pedagogical resources were established to suit the students' needs and potential. In addition, the results indicate that the inclusion of disabled students and students with GDD in schools implies guaranteeing a process of continuous training for teachers.

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Continuation of chart 1.

<p>Laughlin et al. (2018)</p>	<p><i>Assistive Technology: What Physical Educators Need to Know</i></p>	<p>To provide physical educators with a working knowledge of the AT process, highlighting some of the devices and services currently used in Physical Education settings. And to provide recommendations that PE teachers should consider to ensure that students with disabilities maximize their learning potential with increased AT.</p>	<p>Descriptive</p>	<p>The AT process can involve a complex series of actions, but this should not obscure the potential value for students with disabilities. Services exist to ensure that students are fully supported during the selection, acquisition, and use of the necessary devices. In Physical Education, devices are being used by students to increase their functional capacity in order to access and achieve learning outcomes. PE teachers must work closely with all members of the school team so that assistive technology decisions incorporate practical, useful, and individually chosen functionality.</p>
<p>Simpson e Taliaferro (2021)</p>	<p><i>Designing Inclusion Using 3D Printing to Maximize Adapted Physical Education Participation</i></p>	<p>Discuss the capability of 3D printed AT in educational settings, and illustrate how teachers, Adapted Physical Education specialists and other related service staff can utilize 3D printing to aid student success in Physical Education.  In addition to helping professionals locate, upload, and utilize existing collections of 3D TA models from open-source websites.</p>	<p>Descriptive</p>	<p>This article discussed the capability of 3D printing for use in school Physical Education, illustrating how physical educators, Adapted Physical Activity specialists and other related service providers can take advantage of 3D printing technology. The potential of 3D printing has been demonstrated in other areas of education and should be considered for use in Physical Education to promote the inclusion and participation of students with disabilities.</p>

Source: Prepared by the authors.

The seven articles were analyzed using the content analysis technique (Bardin, 2011), in which texts are broken down into units, categories and grouped according to similarities.

### 3 RESULTS

Initially, the papers analyzed were organized according to the year of publication. It was found that the articles were published between 2013 and 2021, with two in 2013, one in 2014, one in 2016, one in 2017, one in 2018 and one in 2021. The results indicate that in addition to the scarcity, there has been no increase in the number of studies involving the theme of Assistive Technology and Physical Education over the years. Of the articles included, five were found in international literature and only two were national, which highlights the need for further study of the subject in Brazil.

Regarding the type of research, four of the studies selected were categorized as descriptive and two as exploratory. This data shows that most of the research on the subject concerns theoretical conceptions, with few studies applying knowledge of Assistive Technology as a possibility in Physical Education classes where special education students are included.

After analyzing the articles in their entirety, it was possible to identify the similarities between them and organize them into thematic categories, according to content analysis (Bardin, 2011). We chose to group them according to the type of Assistive Technology cited in each study, based on the definition of AT proposed by the National Committee for Technical Assistance:

Assistive Technology is an interdisciplinary area of knowledge that encompasses products, resources, methodologies, strategies, practices, and services that aim to promote the functionality, related to activity and participation, of people with disabilities, incapacities, or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion (Brasil, 2007, p. 3, emphasis added).

The studies were divided into three categories of analysis: products/resources, methodologies/strategies, and practices. Chart 2 shows the categorization of the studies analyzed in this review.



Chart 2 - Categorization of the studies analyzed.

Category	Description	Number of articles	Authors/Year
Products and resources	This category includes articles on products and resources for use in PE classes	3	Simpson & Taliaferro (2021), Roth (2013), Laughlin <i>et al.</i> (2018).
Methodologies/ Strategies	This category included articles that addressed inclusive strategies for use in PE classes	3	Schultz <i>et al.</i> (2013), Fiorini & Manzini (2017), Ferreira & Ranieri (2016),
Practices: Teaching program in the school context	This category included articles that addressed inclusive practices in PE classes, specifying the structure of teaching programs.	1	Brian & Haegele (2014)

Source: Adapted from Oliveira *et al.* (2019)

### 3.1 PRODUCTS AND RESOURCES

The aim of the study by Simpson and Taliaferro (2021) was to describe the possibility of using 3D printers as a tool to promote the inclusion of students with disabilities in Physical Education classes, based on the development of highly individualized and low-cost products. The results obtained were the description of products that can be developed in this environment, such as adaptations for bicycle pedals, tactile resources in Braille, and handles that can be added to golf equipment such as clubs and sticks for students with fine motor deficits.

The article by Simpson and Taliaferro (2021) points out that Physical Education teachers and specialists in adapted physical activity can benefit from 3D printing technology, either working independently or in collaboration with AT specialists and designers. Bersch (2017) highlights the interdisciplinary nature of the organization of AT services, with professionals from different backgrounds, including educators, architects, designers, occupational therapists, and psychologists, among others.

Roth (2013) describes the use of iPads, tablets, or smartphones as a possibility of AT for the inclusion of students with disabilities in Physical Education classes. The study aimed to present apps available on free or paid platforms and emphasizes their use as an opportunity to meet the learning needs of students with disabilities in PE. The results obtained in the study were the description of 35 applications that can be integrated into Physical Education classes, as well as providing a table with the value and link of each application.

Laughlin *et al.* (2018) aimed to describe to physical educators a practical knowledge of the AT process, highlighting some of the devices and services currently used in school PE. As a result, the authors define the process of including AT in PE, highlighting the importance of teachers dedicating themselves to exploring the vast collection of AT resources available. In addition, the authors highlight some devices,

such as an iPod Touch, which, with the help of software, can be customized and support language-related specificities, as well as citing simpler examples, such as a baseball with rattles, which can make all the difference in the classroom for visually impaired students.

The three studies aimed to describe products and resources that can help PE teachers in the teaching and learning process of students with disabilities in their classes. The articles highlight the wide variety of possibilities in each area, both in 3D printing and in the use of electronic applications.

The studies by Roth (2013) and Laughlin *et al.* (2018) cite some viable possibilities to be used through digital resources. In the study by Oliveira and Mill (2016), the authors highlight that currently the use of digital AT resources is present in the daily lives of all people, and their use should be explored in the area of education, as they favor independence and quality of access to knowledge, reinforcing the importance of using this type of resource.

In addition, Simpson and Taliaferro (2021) highlight the importance of involving students in the design and selection of Assistive Technology resources to be used, in order to reduce the risk of dropout, and the student's involvement throughout the process is essential.

### 3.2 METHODOLOGIES/STRATEGIES

Schultz *et al.* (2013) aimed to describe strategies for PE teachers to include hearing-impaired students in their classes. The authors cited various strategies, their main concepts and how to apply them. The strategies in the scope of the study were the use of sign language interpreters, visual resources, peer tutoring, as well as other means of communication, such as oral language linked to spelling, and lip reading. During the study, the authors focused on describing attitudinal, conceptual, and procedural guidelines for each strategy to teachers, thus demonstrating a high level of detail.

In addition, Schultz *et al.* (2013) emphasize the need for educators to understand what the strategies are and why they are used, as well as the importance of working collaboratively with interpreters — having meetings and clarifications about the content beforehand — and the teacher's duty to learn the best way to communicate with their student.

The study by Ferreira and Ranieri (2016) aimed to investigate how Physical Education teachers work with students with disabilities and the strategies used in their classes, probing the use of Assistive Technology through semi-structured interviews with the six teachers who participated in the study. The results showed that most of the interviewees were not familiar with AT and that the teachers made adaptations and improvisations in activities involving students with disabilities to enable their participation. This corroborates the realities pointed out in the studies by Fiorini and Manzini (2012) and Rossi and Munster (2013), which indicate that teachers are unprepared as one of the barriers to effective school inclusion.

With the results indicating little knowledge about AT by teachers, Ferreira and Ranieri (2016) conclude that during PE training, a solution to change this scenario would be to implement in the disciplines a closer approach to the school reality and the person with a disability, in addition to addressing AT in their curricula.

The article by Fiorini and Manzini (2017) is a field study with practical application, which describes the process of continuing education developed for two PE teachers aimed at incorporating AT to provide favorable conditions for the school inclusion of a student with physical disabilities and one with Global Development Disorder (GDD).

Fiorini and Manzini (2017) developed the training for each teacher individually, intending to target strategies to address each teacher's difficulties. In this way, the strategies used for each student were individualized, ranging from training fellow tutors, adapting materials, offering physical help, as well as establishing rules and limits to improve behavior through visual reinforcement. The results showed that the use of AT was functional, enabling the autonomous participation of the student with a physical disability, as well as the active and autonomous participation of the student with GDD with other classmates. The authors highlight the importance of continuing training to ensure effective inclusion.

In the study by Ferreira and Ranieri (2016), the authors point to teachers' lack of knowledge of Assistive Technology, expressing the need to include content and training strategies on the subject during the initial training of Physical Education teachers. The study by Fiorini and Manzini (2017) develops a proposal for those teachers who are already in contact with the school reality, continuing education, proving to be a viable strategy for strengthening teacher practice and contributing to the school inclusion process.

Although the three studies are in line with the theme of strategies based on the use of Assistive Technology, they all have different designs and objectives. The study by Schultz *et al.* (2013) is aimed at helping PE teachers by presenting various strategies and how to implement them. Ferreira and Ranieri (2016) and Fiorini and Manzini (2017) are applied studies but with different characteristics. The first seeks to understand the knowledge and applicability of AT by teachers in their practices based on interviews, and its results point to a lack of knowledge on the subject; on the other hand, Fiorini and Manzini (2017) developed their study with the aim of changing this scenario by providing practical training with the use of AT for PE teachers.

### 3.3 PRACTICES: TEACHING PROGRAM IN THE SCHOOL CONTEXT

The study by Brian and Haegele (2014) describes ideas for modifying softball. Adaptations to the rules, equipment and venues are described, with the aim of making it a sport that can be played by visually impaired students and enabling their inclusion in school PE by providing the right support to maximize their success. According to the authors, by implementing the suggested changes, PE teachers can take a significant step towards creating an inclusive learning environment.

Softball, as addressed by Brian and Haegele (2014) in their study, helps to remove barriers commonly encountered by teachers when teaching special education students in Physical Education classes, a fact that corroborates the main objective of AT, which is to enable the participation of people with disabilities regardless of the activity they perform, helping them to achieve independence, autonomy, inclusion and quality of life (Brasil, 2007).

It should also be noted that the study by Brian and Haegele (2014) was the only article in this review to provide a detailed description of a teaching program. As this model of approach is important for classroom teachers to have access to more accessible content, it is important to carry out studies involving this type of approach.

Toloi (2015) considers that using teaching strategies and assistive technology teaching resources in regular PE classes can be a path for teachers to take in order to include students with disabilities. Costa, Seabra Junior and Amparo (2018) emphasize the following: for AT to be present in the school routine and collaborate with the inclusion of students, it is necessary to prepare the professionals who work with the TPSE to identify, select, adapt, and implement the knowledge from this area in their classes.

#### **4 FINAL CONSIDERATIONS**

This study sought to verify the scientific production between the areas of knowledge of Physical Education and Assistive Technology as a possibility for inclusion in school Physical Education classes, based on the literature found. Although the search yielded a considerable number of articles in the first stage, when the inclusion and exclusion criteria were applied, the final material compiled was considered small.

Most of the studies take a theoretical approach, providing diverse content that can help teachers in their practice. The diversity of subjects and categories found in the studies corroborates the reflection made in the study by Peixoto (2018), where the author mentions that there are several possibilities to be used when referring to Assistive Technology in the educational context. There were only two contributions from applied studies on AT and PE, and only one applied field study with the aim of understanding AT and its applicability in Physical Education classes.

This review found that there are still few studies that use Assistive Technology as one of the auxiliary resources in school Physical Education classes, aiming at the possibility of including students who are the Target Population of Special Education. Furthermore, in the field studies found here, it was possible to see that Physical Education teachers still find it difficult to include students with disabilities in their classes because they do not feel sufficiently prepared, and continuing training in AT proved to be an alternative way of overcoming this barrier.

The use of Assistive Technology in the educational context is vast, with the power to benefit and facilitate the inclusion of special education students in the school environment, with various possibilities, products, resources, methods, and practices that actually seek access to participation and learning. In this way, it can

be an important ally for Physical Education teachers in the school inclusion process. However, based on the number of studies found and the methods used, it can be concluded that there is a need for further research, especially with objectives related to verifying the effects of using AT in PE classes in the process of inclusion of Special Education students.

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**Resumo:** O objetivo do estudo foi verificar a produção científica envolvendo as áreas de conhecimento Educação Física (EF) e a Tecnologia Assistiva (TA) como possibilidade de inclusão nas aulas de EF escolar. Trata-se de revisão sistemática da literatura, utilizando as palavras-chave “Physical Education” e “Assistive Technology” para busca no portal Periódicos da CAPES. Após aplicados os critérios de inclusão e exclusão, foram identificados na base de dados 715 estudos e adicionados dois pela busca manual. A leitura na íntegra resultou na inclusão de sete estudos. Os resultados apontam que há carência de pesquisas aplicadas sobre o tema, sendo que três tratavam de produtos e recursos, três de estratégias e apenas um de programa de ensino no contexto escolar. Conclui-se que há necessidade de novas pesquisas aplicadas utilizando os conceitos da TA com o intuito de verificar seus efeitos no contexto da inclusão escolar nas aulas de EF.

**Palavras-chave:** Educação Especial. Tecnologia Assistiva. Educação Física. Inclusão.

**Resumen:** El objetivo de este estudio fue verificar la producción científica que involucra las áreas de conocimiento Educación Física (EF) y Tecnología Asistiva (TA) como posibilidad de inclusión en las clases de EF escolar. Se trata de una revisión sistemática de la literatura, utilizando las palabras clave “Physical Education” y “Assistive Technology” en el portal CAPES Periódicos. Después de aplicar los criterios de inclusión y exclusión, se identificaron 715 estudios y se agregaron dos por búsqueda manual. La lectura completa resultó en la inclusión de siete estudios. Los resultados indican que hay una falta de investigación aplicada sobre el tema, con tres que tratan de productos y recursos, tres de estrategias y sólo uno de un programa de enseñanza en el contexto escolar. Se concluye que hay necesidad de nuevas investigaciones aplicadas que utilicen conceptos de TA para verificar sus efectos en el contexto de la inclusión escolar en las clases de EF.

**Palabras clave:** Educación especial. Tecnología Asistiva. Educación Física. Inclusión.



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### CONFLICT OF INTERESTS

The authors declare that this work involves no conflict of interest.

### AUTHOR CONTRIBUTIONS

**Taylor Brian Lavinsky Pereira:** Research, writing — original draft, writing — analysis and editing.

**Aline Basso Braz:** Conceptualization, research, project management, writing.

**Adriana Garcia Gonçalves:** Guidance and supervision.

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### EDITORIAL RESPONSIBILITY

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