

20 years of scientific production (2001-2021) assessment in Physical Education degree: challenges for the Northern Region

Nayane Moia de Freitasⁱ

Wagner dos Santosⁱⁱ

Marciel Barcelos Lanoⁱⁱⁱ

Abstract

The objective of this paper is to understand the nature of the scientific production on assessment in physical education degree, especially in the Northern Region of Brazil. We used the Systematic Review method, covering the period 2001-2021. The studies were mapped within the following indexing services: SciELO, EBSCO, LILACs, DOAJ, PubMed, Latindex and CAPES Journal Portal. The research shows a growing number of results in relation to academic production on assessment in higher education, but which is concentrated in one national region, although there are indications of an increase in production on the subject in the Northern Region. With this, we conclude that the debate about assessment in physical education degree has been expanding due to a group that has discussed the subject in recent years.

Keywords: assessment; physical education; Northern Region.

20 anos de produção científica (2001-2021) sobre avaliação na formação inicial em Educação Física: desafios para Região Norte

Resumo

O objetivo desta pesquisa é compreender a natureza da produção científica sobre a avaliação na formação inicial em educação física, particularmente na Região Norte. O método utilizado foi a revisão sistemática, no período de 2001-2021, os estudos foram mapeados dentro dos seguintes indexadores: Scielo, Hbisco, Lilacs, Doaj, Pubmed, Latindex e o Portal de Periódicos da Capes. A pesquisa evidencia uma crescente de resultados em relação às produções sobre a avaliação na formação inicial, mas que se encontra concentrada em uma região nacional, embora haja indícios de aumento na produção sobre o tema na Região Norte. Com isso, conclui-se que o debate acerca da avaliação na formação inicial em educação física vem se expandindo em função de um grupo que tem discutido o objeto nos últimos anos.

Palavras-chave: avaliação; educação física; Região Norte.

ⁱ Master in Education – Universidade Federal do Tocantins (UFT), Teacher at Casa Familiar Rural de Cametá - PÁ. Cametá, Brazil. Nayanemoia03@gmail.com. <https://orcid.org/0000-0003-0866-0057>

ⁱⁱ Doctor in Education (UFES), Professor at Departamento de Ginástica e do Programa de Pós-Graduação em Educação (PPGE/UFES), Universidade Federal do Espírito Santo (UFES), Vitória, Espírito Santo, Brasil. wagnercefd@gmail.com. <https://orcid.org/0000-0002-9216-7291>.

ⁱⁱⁱ Doctor in Physical Education (UFES). Professor at Departamento de Educação Física e Desportos (DEFD), Universidade Federal Rural do Rio de Janeiro (UFRRJ), Seropédica, Brasil. marcielbarcelos@gmail.com. <https://orcid.org/0000-0003-1181-8724>.

20 años de producción científica (2001-2021) sobre evaluación en la formación en Educación Física: desafíos para la Región Norte

Resumen

El objetivo de esta investigación es comprender la naturaleza de la producción científica sobre evaluación en la formación inicial en educación física, especialmente en la región norte. El método utilizado fue la Revisión Sistemática en el período 2001-2021, los estudios fueron mapeados dentro de los siguientes índices Scielo, Hbisco, Lilacs, Doaj, Pubmed, Latindex y el Portal Capes. La investigación muestra un número reciente de resultados en relación a las producciones sobre evaluación en la formación inicial, pero que se concentra en una región nacional, aunque hay indicios de un aumento de la producción sobre el tema en la región Norte. Con esto, concluimos que el debate sobre la evaluación en la formación inicial en educación física se ha ido ampliando debido a un grupo que ha discutido el objeto en los últimos años.

Palabras clave: *evaluación; educación física; Región del Norte.*

1 INTRODUCTION

What is the nature of scientific production about assessment in physical education degree? Which authorized voices stand out in the scientific research on evaluation in higher education? What is the periodicity of scientific production on the subject? Which journals give visibility to the theme? Which productions have higher education institutions in the Northern Region as their research object?

These questions have been the object of research in recent years on the national scenario (Mendes, 2006; Santos *et al.*, 2018a; Santos *et al.*, 2018b; Vieira, 2018; Stieg, 2016; Carneiro *et al.*, 2020; Frossard *et al.*, 2022). However, the sources focus on the national institutions located in large urban centers, where there are more postgraduate programs and researchers. Thus, the Northern Region of Brazil is relegated to second place, sometimes due to its distance from major centers, which impacts the mobility of researchers and the need for funded projects to make research feasible, and sometimes due to the lack of interest in conducting scientific research on the subject in the region, thus leaving a gap in the scientific field. Therefore, this study adopts the rationale of undertaking in-depth research, focusing its discussions on the aforementioned region.

To this end, the Systematic Review is a method that enables one to gain knowledge about the debate on a given object of investigation by analyzing publications of scientific

studies, allowing multiple interpretations to be inferred (Schütz; Sant'ana; Santos, 2011). It is a method with specific procedures, which seek to provide logic within locating and grouping the body of documents, according to criteria for research, data selection, search strategy and data production (Galvão; Ricarte, 2019).

In the context of scientific productions about evaluation in physical education, the study analyzing scientific production conducted by Santos *et al.* (2018a) mapped 18 papers in the physical education degree category out of 56 studies found. In turn, Santos *et al.* (2018b) found 14 studies about evaluation in initial training out of 32 catalogued articles.

The authors point out that studies on assessment in physical education degree are limited, since not even half of the articles they found related to initial training; this concern is even greater when considering the Latin American context (Santos; Paula; Stieg, 2018).

Specifically regarding the Northern Region, the study conducted by Santos *et al.* (2018a) did not find documented research on evaluation in physical education degree, reinforcing the need to fill this gap in the scientific field. In this case, the absence of scientific production located in the Northern Region hinders the understanding of the phenomenon and the different ways of doing (Certeau, 1994) assessment in teacher training spaces and, consequently, the way they unfold regarding doing evaluation in everyday school life.

As highlighted by Charlot (2000, p. 9), “[...] it is not enough just to collect data; one must also know exactly what one is looking for”. In this sense, we sought to glimpse the “invisible”, which seems to be hidden when only one or two texts are analyzed, but which through greater investigative effort using a set of data, enables us to understand the way studies on educational evaluation in higher education course have been done in recent years, specifically in the Northern Region of Brazil.

Thus, we felt the need to reveal this research over the last 20 years of production (2001-2021), verifying whether there has been progress or backsliding in the scientific field of evaluation in undergraduate courses in physical education.

We highlight that the intention of this work is not to present concrete evidence, but rather to understand the debate on assessment in the period of production analyzed, through bibliometric indicators that allow us to follow the scientific field of production, especially considering what is produced in the Northern Region of Brazil.

2 METHODS

We used the Systematic Review method, which is characterized by mobilizing techniques that help to synthesize existing productions in a particular field of research (Machado; Zafalon, 2020). Thus, the Systematic Review is crucial to this research, in order to indicate the way in which educational evaluation in physical education degree has been treated in the scientific field, the problems, the hypotheses, the meanings attributed by teachers and students to their learning, the content of publications, the authorized voices, the paths that evaluation has been following and, in particular, whether the Northern Region has been part of this debate since the last mapping conducted by Santos *et al.* (2018a).

We used the bibliometric indicators technique (Mugnaini, 2003) to produce our sources. Bibliometric indicators allow us to organize and understand the characteristics of academic production on evaluation of the physical education degree over the last 20 years.

Therefore, as we adopted this rationale (Mugnaini, 2003), we mapped scientific production on evaluation in professional qualification based on bibliometric indicators, namely: a) year of publication; b) authorship; c) institutional affiliation; d) region of authorship; e) journal. We emphasize that this research will not represent all aspects of productions on evaluation in physical education degree, due to the inclusion and exclusion criteria and selection of sources.

As such, Box 1 below explains the methodological steps used in this research. As there are several different steps, they are presented in table format to facilitate the reader's understanding.

Box 1 – Methodological steps used in this research

Methodological Steps	
Time period	2001-2021
Indexing services	DOAJ (Directory of Open Access Journals), Latindex (Regional Cooperative Online Information System for Scholarly Journals from Latin America, the Caribbean, Spain and Portugal), LILACS (Latin American and Caribbean Health Sciences Literature), EBSCO (Information Services), CAPES Journal Portal, PubMed (National Library of Medicine), SciELO (Scientific Electronic Library Online).
Inclusion criteria	1- Studies produced in the Portuguese language; 2- Studies published between 2001 and 2021; 3- Studies containing the word “ <i>avaliação</i> ” (evaluation) and/or “ <i>formação inicial</i> ” (initial training) in their titles and/or abstracts.
Exclusion criteria	1- Studies published in foreign languages; 2- Studies outside the 2001-2021 time period; 3- Studies about everyday school evaluation, Institutional evaluation, Large-scale evaluation.
Descriptors	“ <i>Avaliação</i> ” (Evaluation), “ <i>Educação física</i> ” (Physical education), “ <i>Formação inicial</i> ” (Initial training).
Organization of the sources	The sources were organized using a Microsoft Excel spreadsheet, distributing the information in columns, as follows: author, journal, year of publication, article title, article link, abstract and indexing service.

Source: Data from this research (2022).

The choice of the period analyzed is justified by our understanding that there was a need to assess the state of scientific production on evaluation in physical education degree within this time frame, beginning at the turn of the century in 2001 and ending in 2021. Furthermore, we felt the need to update the studies of Santos *et al.* (2018a; 2018b), focusing on the Northern Region.

Considering the inclusion and exclusion criteria, the mapping began with effect from September 30, 2021, and ended on January 1, 2022. Table 1 below shows the number of mapped articles and the final sample. It should be noted that, when the descriptors were used to search the indexing services, articles covering a variety of themes appeared, so that we had to analyze them one by one in order to achieve the proposed objective.

Table 1 – Summary of the studies mapped

Indexing Service	Descriptors	Studies mapped	Final sample
DOAJ		6	2
Latindex	<i>“Avaliação” (Evaluation)</i>	13	5
LILACS		3	0
EBSCO	<i>“Educação física” (Physical education)</i>	0	0
CAPES Journal Portal		30	15
PubMed	<i>“Formação inicial” (Initial training)</i>	0	0
SciELO		8	3
TOTAL		60	25

Source: Data from this research (2022).

With regard to the LILACS, EBSCO and PubMed indexing services, we did not find texts about evaluation in initial training, or they did not appear in the search engines after applying the descriptors mentioned above. The data analyzed in our study were produced with the aid of Microsoft Excel and Tableau Public.

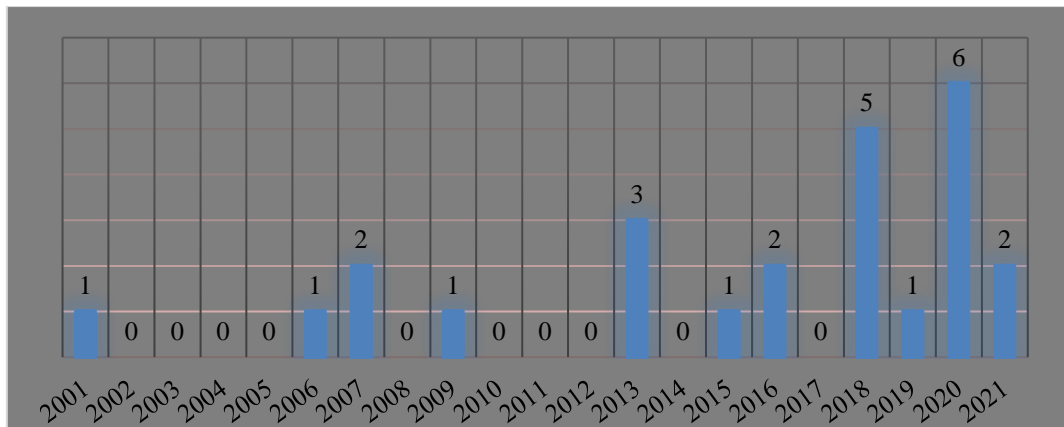
3 ASSESSMENT IN PHYSICAL EDUCATION DEGREE: PERSPECTIVES AND CHALLENGES

At this point, two movements that enable the discussion of the mapped data will be presented and discussed. The intention is to highlight how the scientific field has been constituted nationally, both in relation to the pace of production and the mobilization of researchers.

In a country of continental dimensions such as Brazil, this action is a catalyst for efforts to consolidate a particular object of study nationally. Therefore, the data and analyses that follow take the following order: debate concentrated on periodicity and on journals that confer visibility to the theme. Following this, the bibliometric data enable us to discuss the presence/absence of the Northern Region in the debate in question, among other gaps.

3.1 Article distribution by year of publication

Graph 1 shows the temporal distribution of the 25 articles we mapped for the period 2001- 2021:



Graph 1 – Temporal distribution
Source: Data from this research (2022).

Graph 1 shows two distinct movements: the first is marked by low incidence of texts on evaluation in physical education degree; in the second, research on the subject grows exponentially over the period analyzed.

In the first movement, covering the period 2001-2012, there are few mapped studies, with an average of 0.3 articles per year. It seems that in terms of scientific production in the field of physical education, there was little investigative effort on the subject. As a result, there are only isolated initiatives, interspersed between gaps of 4 and 5 years (2006, 2007 and 2009).

In 2001, an article was published by Steinhilber (2001), which discussed evaluation of professional physical education training and the *Exame Nacional dos Cursos Superiores* [National Examination of Higher Education Courses], the “*Provão*”. The article originated from a presentation given at the *II Congresso Internacional de Educação Física e Motricidade Humana e VIII Simpósio Paulista de Educação Física* [II International Physical Education and Human Motricity Congress and the VIII São Paulo Physical Education Symposium], held in the city of Rio Claro, São Paulo, Brazil, from April 28 to May 1, 2001. This article started the debate in the 21st century, but the next study on the subject was only to be published years later.

In 2006, an article was published (Batista, 2006) with the intention of discussing assessment in higher education, taking as its sources teachers working at this level. It gave origin to the work entitled *Fale sobre o texto: a inconsistência e a fragilidade da avaliação*

[Talk about the text: evaluation inconsistency and weakness], which was later also presented at the *I Jornada Pré-Conbrace - regional de Goiás* [I Goiás Pre-Brazilian Sports Sciences Congress Seminar].

Two articles were published in 2007. The first was based on the difficulties of assessment in the discipline of rhythmic gymnastics in a higher education institution, based on 35 students attending the 4th semester at the Universidade Estadual de Londrina (Gorini; Souza, 2007). The second originated from research carried as part of a Master's Degree dissertation^[1] on physical education at the Universidade Federal de Santa Catarina. It was published two years after it was defended at the university in 2005 (Mendes; Nascimento; Mendes, 2007).

In 2009, at the IV Seminário de Estudos e Pesquisas em Formação Profissional no Campo da Educação Física [IV Seminar on Studies and Research into Professional Training in the Field of Physical Education] (NEPEF), held at the Universidade Estadual Paulista (Bauru campus), from November 20 to 23, 2008, (Fuzzi; Souza Neto; Benites, 2009), it was presented a study which gave rise to the publication of a scientific article that had the objective of analyzing the pedagogical project of a physical education degree at a public institution in the interior region of São Paulo state.

This first movement provides few elements for discussing learning in physical education degree. The low rates of publications do not allow us to understand how the scientific field was moving, but rather announce that the theme was beginning to be discussed. They were either scattered initiatives or the result of personal interest in discussing the theme, without clear association with a longitudinal research project.

However, when analyzing those studies it can be seen that the discussion about the assessment process in higher education has little consistency (Mendes, Nascimento, Mendes, 2007), with implications for teacher training processes and practices in everyday school life, contributing to the lack of investments in the object of our research, especially considering the Northern Region, which was left out of the initial movement.

In the second movement, beginning in 2013, there was an exponential increase in research on the subject, with 2.3 articles per year on average, reaching its peak in 2020 when six articles were published, based on the databases analyzed in this study.

When analyzing the block as a whole, we notice two movements that contribute to the increase in research, the first associated with personal initiatives in the year 2013, published in the journals *Coleção e pesquisa em educação física*; *Pensar a Prática*; and *Movimento*, which presented the academic community with three articles (Coelho *et al.*, 2013; Santos; Souza; Barbosa, 2013; Santos; Maximiano, 2013) about assessment in physical education degree.

The second movement seen in Graph 1 is associated with the researcher Wagner dos Santos entering the Postgraduate Program in Physical Education (2012) and the Postgraduate Program in Education (2018) at the Universidade Federal do Espírito Santo (UFES). This researcher has developed studies in the area of educational evaluation since graduating (Santos, 2002). His articles, published in co-authorship with his undergraduate, master's and doctoral students, have had a significant impact on this final cycle of production (2013-2021), increasing the amount of studies published per year on the subject.

The impact of the author in the scientific field is associated with ways of doing (Certeau, 1994)^[2] science. This rationale allows scientific research within the objective from different angles, namely: systems evaluation; standardized evaluation, assessment for/of learning. Figure 1 highlights the investigative movement with effect from 2016.

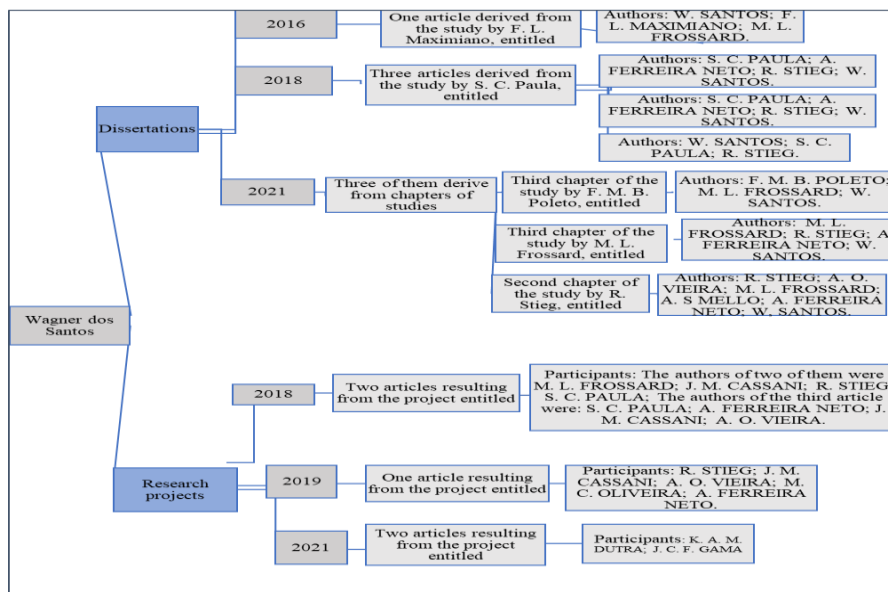


Figure 1 – Studies published by W. Santos
Source: Data from this research (2021).

Based on Figure 1, it can be seen that the author frequently publishes articles on this form of assessment nationally and in recent years has been expanding to international publications as well, as his research projects have gained greater depth.

It can be inferred from the sequence of articles mapped that Santos has significantly impacted the pace of production, especially in the last ten years. It is important to highlight that this contribution is not restricted to the expansion of research on evaluation in Brazil, but also involves the training of new researchers, this being a necessary movement for the continuity of academic studies on the national and international scene (Pinto; Igami; Bressiani, 2010).

We also noticed that the impacts of the group led by Santos have expanded to other regions of the country. This is the case of two articles published by researchers from the Universidade Federal do Tocantins (Costa; Alcântara; Lano, 2020), and another published in partnership with a researcher from the Universidade Federal do Espírito Santo (Costa; Frossard; Lano, 2021).

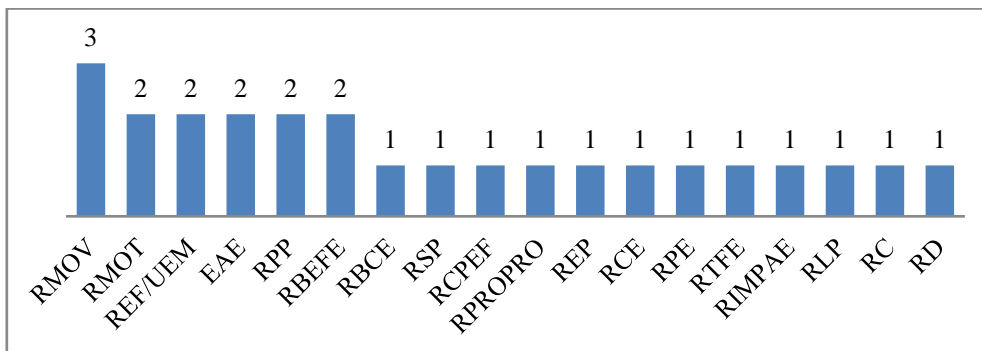
In 2016, in addition to the study by Wagner dos Santos, we also found an article by Carbinatto *et al.* (2016), derived from the research project entitled *Avaliação no Ensino Superior: A experiência de docentes de ginástica* [Evaluation in Higher Education: The experience of gymnastics teachers], carried out between 2014 and 2019, aiming to analyze the assessment process and instruments used by university teachers in gymnastics lessons (FIG program)^[3].

In 2015, an article was published (Zuluaga, 2015) deriving from doctoral research in Motricity Sciences carried out at the Universidade Estadual Paulista (Rio Claro campus), entitled *Orientações Pedagógicas no Estágio Supervisionado de Educação Física na Colômbia, Brasil, Argentina e Chile* [Pedagogical Guidelines in Physical Education Supervised Internships in Colombia, Brazil, Argentina and Chile], defended in the same year the article was published.

As in the previous cycle, there continue to be studies (Bagnara; Fensterseifer, 2020; Cardoso *et al.*, 2020) about assessment in higher education, produced for personal initiatives which at times are not related to research projects but rather to opportunities to disseminate knowledge, through thematic dossiers.

3.2 Article distribution by journal

Graph 2 below shows the number of articles published per journal, corresponding to the 25 articles mapped. They come from a total of 18 journals, namely: *Revista Movimento (RMOV)*, *Motriz (RMOT)*^[4], *Revista da Educação Física/UEM (REF/UEM)*^[5], *Estudos em Avaliação Educacional (EAE)*, *Pensar a Prática (RPP)*, *Revista Brasileira de Educação Física e Esporte (RBEFE)*, *Revista Brasileira de Ciências do Esporte (RBCE)*, *Scielo Preprints (RSP)*^[6], *Coleção Pesquisa em Educação Física (RCPEF)*, *Pro-Proposições (RPROPRO)*, *Espaço Pedagógico (REP)*, *Revista Contemporânea da Educação (RCE)*, *Práxis-Educacional (RPE)*, *Temas em Educação Física Escolar (RTFE)*, *Instrumentos, Modelos e Políticas em Avaliação Educacional (RIMPAE)*, *Revista Lúdica Pedagógica (RLP)*, *Cocar (RC)*, *Desafios (RD)*.



Graph 2 - Number of articles per journal
Source: Data from this research (2022).

Out of the 18 journals used in this study, the RMOV journal published most articles, having published three (Mendes; Nascimento; Mendes, 2007; Santos; Maximiano, 2013; Santos; Maximiano; Frossard, 2016). It publishes sociopedagogical studies in the physical education field and holds an A2^[7] classification according to Qualis-Capes (2013-2016).

Húngaro (2012) highlights that the journal stands out in critical discussions in the areas of education and physical education, in national and international dialogue, articulating these areas with pedagogical, historical, political and cultural debates. In his dissertation, Frossard (2015) also points out that the journal is a privileged forum for dissemination of studies on assessment in physical education.

Coming in second place in the mapping, we found five journals that published two articles in the period investigated (RMOT, RPP, REF/UEM, EAE, RBEF). It is interesting to note that this debate is not very recurrent in the journals, except for REF/UEM, EAE and RBEF, whereby the former gave visibility to two studies in the same year; the second for being a journal that fosters the debate on educational evaluation, although it has given little space to studies that dialogue with the area of physical education; and the latter has given visibility to the theme in recent years.

The RMOT journal, which gave visibility to the studies conducted by Steinhilber (2001) and by Fuzzi, Souza Neto & Benites (2009), holds Qualis-Capes B1 classification, has not moved forward since the mapping conducted by Santos *et al.* (2018a). This is also the case of the RPP journal, which gave visibility to the studies done by Batista (2006) and by Santos, Souza & Barbosa (2013), which holds B2 classification and gives visibility to studies of a transdisciplinary nature^[5].

The REF/UEM journal gave visibility to the studies conducted by Frossard *et al.* (2018) and Paula *et al.* (2018), also holding Qualis B1 classification. The EAE journal published the articles produced by Gorini & Souza (2007) and Paula *et al.* (2018). This journal was created in 1990 and is noteworthy for being the journal that most publishes studies on evaluation (Poltronieri; Calderón, 2015; Santos *et al.*, 2018a) in basic education and higher education. It holds Qualis A2 classification. The RBEFE journal published the articles produced by Stieg *et al.* (2020) and Frossard *et al.* (2020). It holds Qualis B1 classification.

The data reveal that in recent years the debate on assessment has been broadened and impacted in a significant way, especially considering the leading journals in the area, which increases the visibility of the studies and their different uses, either as research sources or as teaching support material in higher education courses.

Another interesting fact is the way the scientific field operates, as there seems to be a preference for physical education journals (or journals with an interdisciplinary scope) to publish research on higher education. This movement is due to the very form of organization, classification, and assessment of postgraduate studies in Brazil (Oliveira; Guedes, 2022).

The other journals mapped gave visibility to one article each, namely: RBCE (Paula *et al.*, 2018), RSP (Cardoso *et al.*, 2020), RCPEF (Coelho *et al.*, 2013), RPROPRO (Carbinatto *et al.*, 2016), REP (Santos; Paula; Stieg, 2018), RCE (Santos *et al.*, 2019), RPE (Poletto; Frossard; Santos, 2020), RTFE (Costa; Alcântara; Lano, 2020), RIMPAE (Dutra; Gama; Santos, 2021), RLP (Zuluaga, 2015), RC (Bagnara; Fensterseifer, 2020), RD (Costa; Frossard; Lano, 2021).

This scattered form of movement is known as Bradford's Law. The first journals with the highest number of articles mapped in this section have high Qualis-Capes classification in comparison to the others, so that we can say that the journals we mapped demonstrate a scattering (Araújo, 2006) of articles in the scientific field and that the articles are of a wide-ranging nature, interconnected with various areas of knowledge.

It is considered that these tactics (Certeau, 1994) of producing and conveying research findings provide greater visibility to the theme, expanding the volume of knowledge produced on a particular subject, in this case: assessment. This consideration is extremely important for the scientific field, since journals have different focuses and scopes, allowing this comprehensiveness and providing greater visibility to studies on assessment in physical education degree and, at the same time, producing a movement of reflection in other areas of knowledge, which may take on this specific knowledge as a locus of investigation at the interface with evaluation.

Furthermore, another point that draws attention is that out of the eighteen journals mapped, fourteen are linked to Postgraduate Programs in Education or Physical Education. A further four are edited by private or non-profit institutions, such as the EAE journal, which belongs to the Carlos Chagas Foundation (FCC); by scientific associations such as the RBCE journal, which belongs to the Colégio Brasileiro de Ciências do Esporte [Brazilian College of Sports Sciences] (CBCE); as an integral part of indexing services, serving as a locus where non-peer-reviewed articles are available, as is the case of the RSP journal; or under the responsibility of publishers, as is the case of the RCPEF journal, which belongs to the Editora Fontoura publishing initiative.

It is interesting to note that the scope of most of the journals is intended for research in the area of humanities and social sciences, and that they have interdisciplinary characteristics. However, the exception is the RMOT journal, which covers only the area of

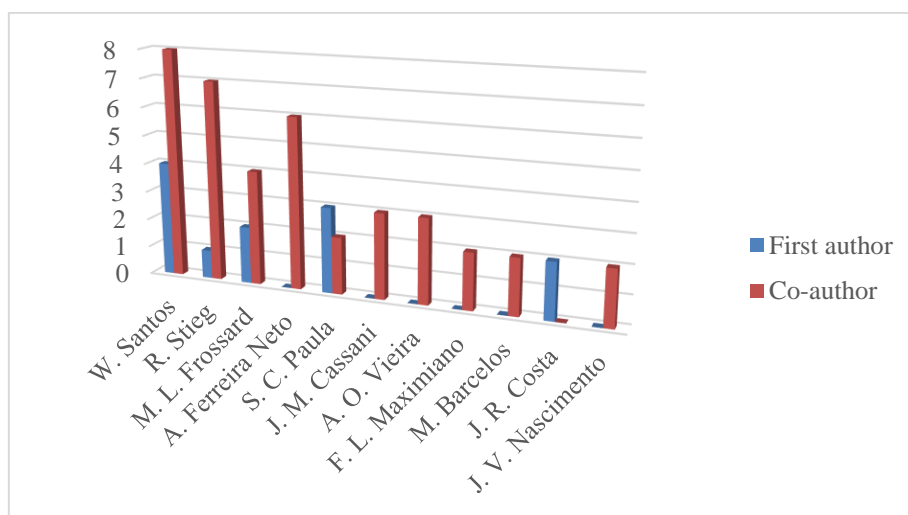
health, on studies of human motricity, although it did publish two articles on assessment in physical education degree.

In this sense, Pinto, Igami & Bressiani (2010) state that journals are an important tool for disseminating research, being the main space for linking information to the scientific community, as well as being the locus of formalizing production in this field.

These means that proliferate articles are associated with the survival of researchers in the area. Considering that the journals may not accept articles from the same author during their publication period, as well as the journals' own delay in releasing their reviewers' opinions about the productions, the journals' analysis criteria, including number of pages and manuscript organization, this results in the scattered movement of articles in the journals, as denoted in Graph 2.

3.3 Article distribution by author and co-author

Among the studies mapped, Graph 3 highlights eleven authors who published more than once on the subject of assessment in physical education degree, becoming voices that stand out in the debate about it in the scientific field.



Graph 3 – Article production per author
Source Data from this research (2022).

The authors who only published once were: A. A. Cardoso; V. Ciampolini; J. Silva; W.N. Salles; W. A. M. Moura; E. H. Mendes; J. C. Mendes; F. M. B. Poletto; F. P. Coelho; R. E.

Pizano; M. C. Mendes; T. M. Brito; A. A. Coelho; L. L. Catelan; F. T. Fuzzi; S. Souza Neto; L. C. Benites; I. C. Bagnara; P. E. Fensterseifer; R. L. Alcântara; K. A. M. Dutra; J. C. F. Gama; M. A. G. Gorini; N. A. Souza; M. V. Carbinatto; W. W. Moreira; L. A. Souza; A. D. Chaves; R. Simões; M. C. Ehrenberg; R. G. Santos; A. L. Souza; F. N. M. Barbosa; A. S. Mello; M. C. Oliveira; C. F. A. Zuluaga; J. Steinhilber; M. A. M. Batista.

Before starting the discussion of the data according to authorship, it is important to note that some authors appear repeatedly because they are integrated in a relationship of authorship and co-authorship. That is, of the 25 mapped articles, there are authors who produce together with other authors, increasing their impact on the scientific field.

Graph 3 presents three aspects for discussion of the authorized voices: authors linked by research groups; supervision of scientific initiation, master's and doctorate degree students; relationship with former students. It is also possible to find researchers who are not dedicated to the study of evaluation as an object of research, but who sporadically link articles on the subject.

With regard to the relationship between supervision and research groups^[9], all the authors mentioned in Graph 3 stand out, although at different levels, with the exception of J. Nascimento.

The author who appears most is W. Santos, who has led the Proteoria research group since 2012, when he became a teacher at the Universidade Federal do Espírito Santo. Prior to this, the group was led by its founder, A. Ferreira Neto, since its creation in 1990. W. Santos has over 20 years of experience in conducting research on educational evaluation, as well as having trained researchers who present a formative trajectory of investigation of assessment.

Farias, Jardimino & Silvestre (2017) have pointed out the importance of research and the production of new knowledge both for training of new researchers and also for qualifying the research projects of veterans. This movement is the common thread for the progression of science (Droescher; Silva, 2014), as well as enabling the development of existing lines of research within research groups, strengthening partnerships between researchers and their students.

As such, it is important to give visibility to complementary data, as shown below in Figure 2.

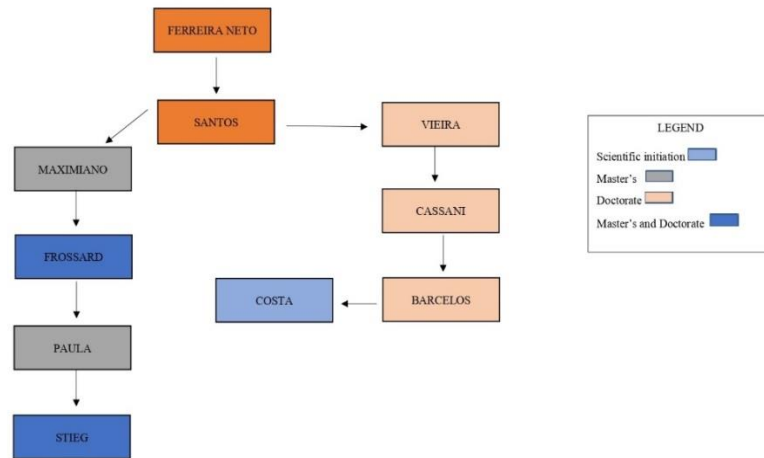


Figure 2 - Flowchart of the relationship between supervisors and their students
Source: Data from this research (2022).

Figure 2^[10] indicates that out of the eleven researchers who published more than once, ten have a supervisor/student relationship and ten come from the research group led by Santos. It is important to highlight the role of Ferreira Neto, recognized by historiography in the scientific field of physical education, who taught Santos and is an important partner, being present in eight articles as a co-author. Ferreira Neto has also taught other postgraduate researchers who are shown in Graph 3.

As such, the scientific process is crossed by different ways of doing things (Certeau, 1994). In the case of the partnership between Ferreira Neto and Santos, one can see the importance of the formation of succession to give continuity to research projects and, also, to the research group itself, thus incorporating new analyses from the different appropriations (Certeau, 1994) that have taken place during the development of the career of researchers who are being formed.

As highlighted by Viana (2010), supervisor and student share a joint journey, and their success will depend on how they conduct the process, whereby their research involves critical and constructive dialogue between them. We can also refer to authoritative voices (Stieg; Frossard; Paula), however, the voices of Vieira and Cassani, who are part of the co-authorship partnership, have resulted in research making progress in different areas. Vieira studied physical education degree in her master's degree and evaluation in her doctorate,

while Cassani researched teaching content in her master's degree and periodical press in her doctorate. Both had W. Santos as their doctorate supervisor.

This joint journey favors a positive evaluation for postgraduate programs, enabling their materialization in the scientific field (Alves; Espindola; Biachetti, 2012), in order to train new generations of researchers and qualify the teaching-learning processes in educational institutions, whether they be basic, technical or higher education institutions.

Focusing on the North Region, it can be seen that the relationship evidenced in Figure 2 also impacts the development of research in that region, to the extent that one of the authors (Lano) is a result of the nucleation process carried out by the Proteoria group, (re)producing the same formative process aimed at investment in scientific initiation, now including the dissemination of results in journals at the Universidade Federal do Tocantins (UFT).

These actions project opportunities for knowledge exchange, enabling visibility for public universities in that region, and therefore the production of strategic actions between research groups (Turnes, 2021), so that there is an expansion of specific debates, in this particular case of assessment for learning in physical education degree in the Northern Region.

Recent studies by Lano and students from Tocantins state engage directly with the Northern Region's context. These studies contribute to the expansion of the nuclearization movement initiated by the Proteoria research group. Consequently, there is long-term planning aimed at addressing gaps in scientific production on assessment in the Northern Region, specifically focusing on assessment for learning in indigenous (Brazilian native), riverside (riverside communities), and *quilombola* schools.

Therefore, one of the main challenges for the Northern Region, which has a lower number of postgraduate programs compared to the other regions of Brazil (we will address this subject in the topic in Table 4), but which is considered to be a reflection of its own population density and the development of work fronts and professional performance, is to invest in research on the subject in order to understand which conceptions are in circulation, which assessment perspectives have been conveyed by higher education courses and the impact on the assessment of the course offered by distance learning

colleges, in addition to encouraging the creation of research groups that promote nuclearization with students from that context.

3.4 Article distribution by institutional affiliation and geographic region

With the intention of presenting the institutions that are linked to the authorized voices, we produced an investigative movement that is presented in Table 3. In this movement; it is important to identify the institutions that were mapped, namely: Universidade Federal do Espírito Santo (UFES), Universidade Estadual Paulista (UNESP), Universidade Federal de Santa Catarina (UFSC), Universidade Federal de Goiás (UFG), Universidade Federal do Tocantins (UFT), Faculdade Maria Tereza (FAMATH), Universidade Estadual do Oeste do Paraná (UNIOESTE), Faculdade de Ensino Superior de São Miguel do Iguçu (UNIGUAÇU/FAESI), Universidade Federal do Triângulo Mineiro (UFTM), Universidade Estadual do Sudoeste da Bahia (UESB), Universidade do Estado de Mato Grosso (UNEMAT), Instituto Federal de Mato Grosso (IFMT), Universidade de São Paulo (USP), Universidade Federal do Triângulo Mineiro (UFTM), Centro Universitário São Camilo (CUSC), Centro Universitário Filadélfia (UNIFIL), Universidade Estadual de Londrina (UEL), Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul (IFRS), Universidade Regional do Noroeste do Estado do Rio Grande do Sul (UNIJUÍ).

As such, Table 3 was produced taking into account the relationship between the authors of the 25 articles we mapped.

Table 3 – Institutional recurrence

INDIVIDUAL INSTITUTIONS	RECURRENCE	REGION
UFES	11	Southeast
UNESP	2	Southeast
UFSC	1	South
UFG	1	Midwest
UFT	1	North
FAMATH	1	Southeast
INSTITUTIONAL PARTNERSHIPS	RECURRENCE	REGION
UNIOESTE UFSC	1	South

UNIGUAÇU/FAESI		
UFTM UESB	1	Southeast
UNEMAT IFMT	1	Midwest
USP UFTM	1	Southeast
CUSC UFES	1	Southeast
UNIFIL UEL	1	South
UFT UFES	1	North / Southeast
IFRS UNIJUI	1	South

Source: Data from this research (2022).

Our data present a portrait of academic production recurring in higher education institutions in relation to assessment in physical education degree, among which the UFES has the highest rate of recurrence. We agree with Nascimento (2016) in taking as a basis what has been happening with the UFES, regarding the impact of its researchers in the scientific field of evaluation in initial training. The institution is home to multiple research groups, which negotiate their spaces through their impact on the scientific field, characterized by applying for funding, which allows them to expand their investigative capacity. This significantly impacts their scientific work and the expertise linked to it, especially considering the experience of the head researcher on the subject in question.

The second institution with most articles mapped is the UNESP, with two studies produced within the Núcleo de Estudos e Pesquisas em Formação Profissional no Campo da Educação Física [Center for Studies and Research in Professional Training in the Field of Physical Education]. The UFSC, UFG, UFT, and FAMATH appear with one occurrence in the articles mapped in the individual aspects, which seek to advance and broaden the debate on assessment in education and physical education.

When looking at this distribution geographically, the impact of the Southeast Region draws attention, especially considering the group of UFES researchers who produced 65% of the total studies in the region. Figure 3, below, shows the distribution of the studies we mapped.

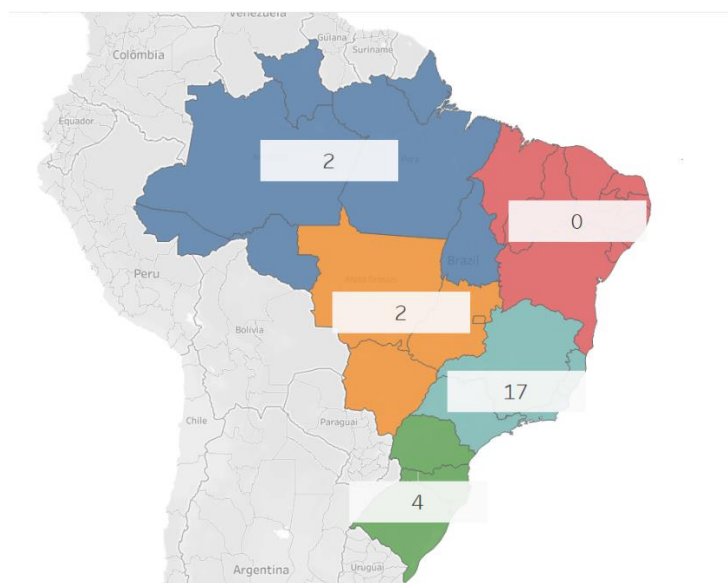


Figure 3 - Article distribution by region^[11]
Source: Data from this research (2022).

Further data that must be considered in order to understand the scenario of research on assessment in physical education degree is the Conselho Nacional de Desenvolvimento Científico e Tecnológico [National Council for Scientific and Technological Development] (CNPq) census^[12]. It provides a list of some 2741 accredited and evaluated education and physical education postgraduate programs, which are arranged in Table 4 below.

Table 4 – Postgraduate programs per region

POSTGRADUATE PROGRAMS
North: education: 16 / physical education: 2
Northeast: education: 38 / physical education: 16
Midwest: education: 20 / physical education: 7
Southeast: education: 71 / physical education: 38
South: education: 46 / physical education: 17

Source: Data from this research (2022).

Table 4 does show the disorderly way these postgraduate courses have expanded in Brazil. What draws attention in the data, however, is that regions such as the Northeast, Midwest and South, even though they are home to more postgraduate programs than the Northern Region, both with regard to education and physical education, did not stand out in the mapping we performed, given the regional distribution presented in Figure 3.

Santos (2019) highlights that this power relationship in relation to the dissemination of research on a given theme may be associated with the lack of scientific, financial and technological resources, more pronounced in regions with low investments. This perspective is confirmed when considering the funded research projects developed by W. Santos^[13], compared to regions such as the South and Northeast, which have consolidated postgraduate programs and are able to raise funds through nationwide calls for proposal, but even so have not stood out in this respect.

Thus, when we extend this scenario to research conducted in the Northern Region, the first obstacle to overcome is the need to foster the creation of research networks that enhance what is produced in that context, both among researchers based in the region and in inter-institutional partnerships. In this regard, Table 3 shows that this movement is still timid, but it is one of the factors that can enhance the quality of products developed in the region.

Sidone, Haddad & Mena-Chalco (2016) highlight that although the Northern Region has significantly increased scientific production in the 21st century, it still represents a small portion of the studies produced nationally, approximately 9%. This movement is driven by partnerships in all areas of knowledge, with researchers from the Southeast.

The authors also point out that there are impediments in the collaborative networks of researchers, such as the case of the Southern Region, which privileges research among partners of the same institution or of the same region, not contributing to the advancement of science on a large scale in the other regions, even though there is migration of researchers from that region to other regions. (Sidone; Haddad; Mena-Chalco, 2016).

Another point that stands out is the need to strengthen postgraduate studies in physical education in the Northern Region. Currently, there are only two specific programs, which impacts the volume of published studies derived from dissertations and theses developed in the Northern Region. Although this is not a point that can immediately leverage the interest of researchers in producing studies on assessment in physical education degree, reconfiguration of training itself can be a factor to induce research, since professional training has undergone curricular reform (Dias *et al.*, 2019) that has mobilized teachers from all over Brazil to analyze the impacts of the new formative model.

4 FINAL CONSIDERATIONS

The objective of this article was to understand the nature of scientific production on assessment in physical education degree in Brazil, especially in the country's Northern Region, from 2001 to 2021. The bibliometric indicators we used enabled an understanding of how the scientific field of assessment in physical education degree has been structured in recent years.

With regard to the year of publication, it was possible to produce data that demonstrate two movements. The first covers the period 2001-2012, in which scientific production was not concerned with the theme, and as such there were few publications on the subject. The second began in 2013, with an exponential increase in research on the theme, reaching its peak in 2020, with six articles published that year.

Another point that draws attention are publications produced through the relationship between supervisors and their students. This is an element that deserves to be highlighted, since most of the productions point to an increase in this form of research, due to the development of research projects and research at the postgraduate level.

This relationship between supervisors and their students contributes to the formation of research nuclei or groups that dialogue with investigations of different natures. This highlights the importance of the nucleation process in the postgraduate student researchers, thus favoring the growth of collective supervision and publications on assessment.

In this sense, this study highlighted that the UFES, located in the Southeast Region, has dominated the debate on assessment in physical education degree and, in a way, has produced a movement to increase research in other regions, as it trains new specialized staff that are absorbed by educational institutions across the country.

In general, it can be seen that although there is an increase in research on the subject in Brazil as a whole, there are still few researchers discussing the theme outside the research group that has led the discussion in the physical education area. The Northeast Region, for example, had no studies mapped, unlike the other regions for which at least one article was found.

In the Northern region, the focus of this research, there has been a timid advance in production on assessment in physical education degree, encouraging new productions and highlighting the need for new studies to expand the discussion on this theme, especially considering the specificities of the region, permeated by rural, indigenous, riverine and *quilombola* schools.

In this context, gaps that can be explored by future studies include the need to foster research on assessment in higher education courses in the Northeast Region. Our study also highlights the need for greater investment in research funding, institutional and inter-institutional partnerships, in order to expand the contribution of this region in the production of national knowledge.

Moreover, the progress of research on assessment within undergraduate physical education programs could influence curriculum revision. The analyzed scientific literature underscores the importance of ongoing discourse on evaluation practices tailored to the unique aspects of school physical education, potentially enhancing teaching practices within the Brazilian educational system.

This is particularly pertinent in the context of physical education programs in Tocantins state, where curricular documents for the eight educational institutions reveal various shortcomings. Notably, these include deficiencies in teaching assessment for learning (Varão *et al.*, 2023).

Finally, it is worth pointing out that, based on this study, it is necessary to develop research on evaluation in the Northern Region, considering what is materialized in the curricula of the training courses, as well as the need to listen to the agents involved in this process (students and teachers), given the specificity of the educational context of the region.

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NOTES:

¹ The Master's Degree research is entitled *Metamorfoses na Avaliação em Educação Física: da formação inicial à prática pedagógica escola* [Metamorphosis in Physical Education Evaluation: from initial teacher training to school pedagogical practice].

² At this point, this refers to the different ways of doing something in everyday life, where experiences are constituted through an intense movement of appropriation of what permeates people's daily lives, in our case, the exchange of experiences with national and international literature.

³ *Federação Internacional de Ginástica* [International Gymnastics Federation], responsible for the entire organization of this modality.

⁴ The *Revista Motriz* journal publishes articles related to Human Motricity science. In 2001, however, it published a supplement derived from the II International Physical Education and Human Motricity Congress and the VIII São Paulo Physical Education Symposium, in which the article from that year is found. In 2009 it published a dossier on school and non-school physical education, which includes an article on evaluation in initial physical education training. These justifications serve to explain why the journal is included among the periodicals mapped.

⁵ This journal recently changed its name to *Journal of Physical Education*.

⁶ Manuscripts not assessed or already assessed by a journal, but in the process of publication. Information available at: <https://preprints.scielo.org/index.php/scielo>.

⁷ In Brazil a system called *qualis-periódicos* is used to evaluate the production quality indicator. The evaluations relate to Capes Area 21 and use the following concepts: A1; A2; B1; B2; B3; B4; B5 and C. Concept A is the highest, B is intermediate and C is the lowest.

⁸ The *Pensar a Prática* journal publishes articles with interfaces with different areas of knowledge, approaching different themes in physical education, correlating with different areas such as human, social, political, cultural, philosophical sciences, thus characterizing itself as a transdisciplinary journal (*REVISTA PENSAR A PRÁTICA*, access: 8 Mar. 2022).

⁹ An Education and Physical Education research institute located within the *Universidade Federal do Espírito Santo* (UFES) Physical Education and Sports Center. The group carries out research on evaluation in physical education, both with regard to teacher training and also in schools.

¹⁰ Ferreira Neto and Santos are highlighted in the same color, which is different to the colors described in the legend, because they are protagonists of the Proteoria group and work together in the relationship of supervision and co-supervision of the research of their respective students.

¹¹ The first author's institutional affiliation was taken into consideration in order to define the region in which the research was conducted.

¹² Directory of research groups in Brazil.

¹³ The researcher had six research projects approved by state or federal funding agencies.

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