

The use of Content Analysis in scientific production of Brazilian Physical Education

Os Usos da Análise de Conteúdo na produção científica da Educação Física brasileira

Los usos del Análisis de Contenido en la producción científica de la Educación Física brasileña

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Keywords:

Content analysis;
Physical Education;
Methodology;
Scientific field.

ABSTRACT

This research aimed to analyse the use of Content Analysis (CA) in scientific publications by journals in area of Physical Education in Brazil. The method was exploratory and descriptive; and analysis was carried out in an empirical *corpus* of 222 articles published between 2007 and 2017. Main results suggested a growth in the use of that technique, i.e., being Laurence Bardin the principal reference, as well as low rate of explanation attributed to chosen methodological technique. Therefore, CA has gained space in Physical Education field throughout years, as research has presented its practice in a brief form and it has used software support into the stage of analysis, even though it shows low representativeness.

Palavras-chave:

Análise de conteúdo;
Educação Física;
Metodologia;
Campo científico.

RESUMO

Objetivou-se com esta pesquisa analisar o uso da técnica de Análise de Conteúdo nas produções científicas veiculadas em periódicos da Educação Física brasileira. Recorreu-se a uma pesquisa exploratório-descritiva, que teve como corpus empírico de análise 222 artigos publicados no período de 2007 a 2017. Os principais resultados indicam crescimento no uso da técnica, Laurence Bardin como principal referência e poucos índices de explanação da técnica metodológica. Conclui-se que a Análise de Conteúdo ganhou espaço no campo da Educação Física ao longo dos anos, as pesquisas apresentam a técnica de forma breve e têm incorporado o apoio de softwares nas análises, mas ainda com pouca representatividade.

Palabras clave:

Análisis de contenido;
Educación Física;
Metodología;
Campo científico.

RESUMEN

El objetivo de esta investigación fue analizar el uso de la técnica de Análisis de Contenido en producciones científicas publicadas en revistas brasileñas de Educación Física. Se utilizó una investigación exploratoria-descritiva, con el corpus empírico de análisis 222 artículos publicados de 2007 a 2017. Los principales resultados indican un crecimiento en el uso de la técnica, Laurence Bardin como principal referente y pocos índices de explicación de la técnica metodológica. Se concluye que el Análisis de Contenidos ha ganado espacio en el campo de la Educación Física a lo largo de los años, las investigaciones presentan brevemente la técnica y ha incorporado el soporte del software en los análisis, pero aún con poca representatividad.

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INTRODUCTION

As socio-cultural and pedagogical researches become a consolidated approach in the field of Brazilian Physical Education (PE), it has been noted there is investigative engagement by its professionals with meta-research. This type of investigation is considered by Bourdieu (2004) as one of the social uses of science, consisting in rendering science to the service of science itself, for its own development. Some studies of that nature are noteworthy, then including theories and authors such as Bungenstab (2018), Lazzarotti Filho et al. (2014), and Medeiros and Godoy (2009); whereas other studies on research-worthy methodology of note include Benites et al. (2015), Souza Júnior et al. (2010).

This research is interested in comprehending how Content Analysis (CA) has been used in Brazilian PE as a methodological technique for data analysis. This type of research has been used in diverse fields of knowledge, such as in the works by Alves (2011) associated with Accounting, Castro et al. (2011) in Psychology, Ramos and Salvi (2009) for Mathematics, Silva et al. (2017) in Management, Camprubí and Coromina (2016) in Tourism and Schäfer and Vögele (2021) in Sports Communication. Concerning Brazilian PE field, it could not be found any published work on that theme; thus, this was one of the reasons for carrying out this research.

In fact, CA was developed in the United States of America (USA) in early 20th century, when scientific rigour was measure of quality and the analysed material was essentially composed of journalistic texts (Bardin, 2010). Later, after both World Wars I and II, research interests turned to the study of propaganda (Campos, 2004), especially with the work investigated by political scientist Harold Dwight Lasswell, considered one of the most important names of CA. Lasswell contributed to solidify field of communication and research on mass communication (Varão, 2016) under a social perspective in diverse scientific fields in second half of the 20th century.

Development of CA under a methodological perspective can be identified through a positivist, quantitative stage, and a late stage in which qualitative studies sought their own space. In the early 1940s, Bernard Berelson presented a definition based on cartesian model of research: "The CA is a research technique that aims to describe a manifest content of communication in an objective, systematic and quantitative manner" (Campos, 2004, p. 612). For Bardin (2010, p. 21), these criteria display "[...] the period's concern to work with samples gathered in a systematic fashion, to question the validity of due process and its results, verifying the fidelity of codes and even measuring productivity of analysis".

Regarding qualitative research, emphasis goes to Laurence Bardin, Professor at Paris V, in France. In the late 1970s, she published the book "Content Analysis", which was introduced in Brazil and later became main scholarly reference for that technique. Bardin (2010) could set CA

as a group of techniques for analysing communication that uses systematic procedures and description of objectives for message content.

New researchers discuss CA techniques by incorporating elements into it and advancing its development. Amado et al. (2017) understood this technique as a flexible and adaptable process that allows for a rigorous and objective representation of message contents through logical processes for coding and categorising. For most recent authors, such as Amado (2017), the use of technology is seen as essential for support and methodological rigour in data analysis. Specific softwares, like Nvivo and WebQDA, have been developed to support qualitative research; whereas WebQDA uses as its basis CA techniques themselves (Souza et al., 2010).

In that sense, this article could tackle the following research question: how did the use of CA techniques in scientific publications in Brazilian Physical Education journal take place?

This research is to analyse the use of CA in scientific publications by journals in the area of PE in Brazil, regarding a quantitative amount of articles published in specific journals, i.e., main CA references mobilized, most recurring forms of use, main themes/objects to be investigated and incorporation of technologies for support.

METHODOLOGY

This research had an exploratory-descriptive character, aiming at studying characteristics of a phenomenon and its relationship within composing variables, to establish a general view of theme. These investigations have been used when the object has not been widely explored in a specific field, which hinders the process of elaborating hypotheses (Gil, 2008).

Empirical material for analysis was composed of scientific articles published in Brazilian PE journals between 2007 and 2017 that employed CA techniques. Journals were selected according to the following inclusion criteria: a) Journals that had been assessed by Qualis Capes 2013-2016, a national parameter that evaluates a journal's adherence to proper procedures. To be included in *corpus*, these journals should have been classified between A1 and B3 levels, in the field of "Physical Education"¹; b) Journals about Brazilian PE that met their submission and publication deadlines, with focus and scope on publication of articles that presented a dialogue with the Human and Social Sciences. By the end of that process, following journals were selected, as stated in Chart 1.

¹ Procedure was carried out in September 2017. We also counted all published articles in these journals between 2007 and 2017 to compare the number of articles recovered by searches according to the totality of articles that had been published in that period.

Searches for articles could be done by searching the the journals websites² through following procedure: 1) Search keywords: “análise de conteúdo”, inserted between inverted commas in advanced search engine, after limiting results between 2007 and 2017. For journals publishing articles in English, the equivalent “content analysis” was used. 2) Article selection: while in the journal websites, articles that were filtered by results from a keyword search had their titles, abstracts and methodologies read by researchers. Selected articles were included in a shared Microsoft Excel spreadsheet. 3) In that folder, information regarding year, authorship, references to CA and technology use in data analysis was gathered. Each article found was, then, registered in a line within that “general spreadsheet” and was given a unique code (ID) that became its identification.

By the end of that process, 232 articles were registered. They underwent a second stage of analysis, which was done by four researchers split into pairs (A, B) that read and analysed articles in order to structure and define *corpus* for analysis. At end of that process, in turn, 10 articles were excluded according to the following criteria: 1) Three articles had not done empirical research with CA as an analysis technique, two of those had CA as a theme or object of study in itself and one merely used CA to validate a questionnaire; 2) Seven articles listed CA usage in their abstracts, reason why they were selected for this study, but they did not provide other indicators, inside text itself, of its actual use and were therefore excluded. Finally, the *corpus* for analysis in this study totalled 222 articles.

Aiming to establish a proportion between the number of recovered articles through searches and total number of published articles, all research articles published by nine journals listed in Chart 1 were counted, with a total of 5786 articles.

Number of main references to CA mobilized was identified by comparing the citation entries within the text to the reference sections of those same articles, which were in turn counted and inserted in a specific spreadsheet, to be grouped afterwards according to author and work.

To identify the most recurrent forms of using CA, the themes and objects of study, categorical analysis was used, which is characterized as “[...] text dismemberment operations, in categories according to analog regroupings [...]” (Bardin, 2016, p. 201), bringing together a group of elements under a generic title, based on characteristics that are similar in each data analysed (Bardin, 2016). From this technique, the articles were, once again, analysed by four researchers divided into pairs (A, B) and analytical categories were elaborated and inserted

into a new spreadsheet on the use of CA and themes and objects. At the end of this process, pairs (A, B) compared their analyses and discussed differences, which were decided by the research coordinator.

Lastly, in yet another spreadsheet, all software supporting CA were listed and organized according to software name and article year of publication. The methodological scheme for this research summarizes this process, as displayed in Figure 1.

Chart 1. Brazilian PE journals selected for analysis.

Journals	Classifications according to Qualis Periódicos 2013-2016
Revista Movimento	A2
Revista Motriz	B1
Revista Brasileira de Ciências do Esporte (RBCE)	B1
Revista Brasileira de Educação Física e Esporte (RBEFE)	B1
Revista da Educação Física UEM (Journal of Physical Education)	B1
Revista Pensar a Prática	B2
Revista Motrivivência	B2
Revista Brasileira de Ciência e Movimento	B2
Licere	B2

Source: Authors.

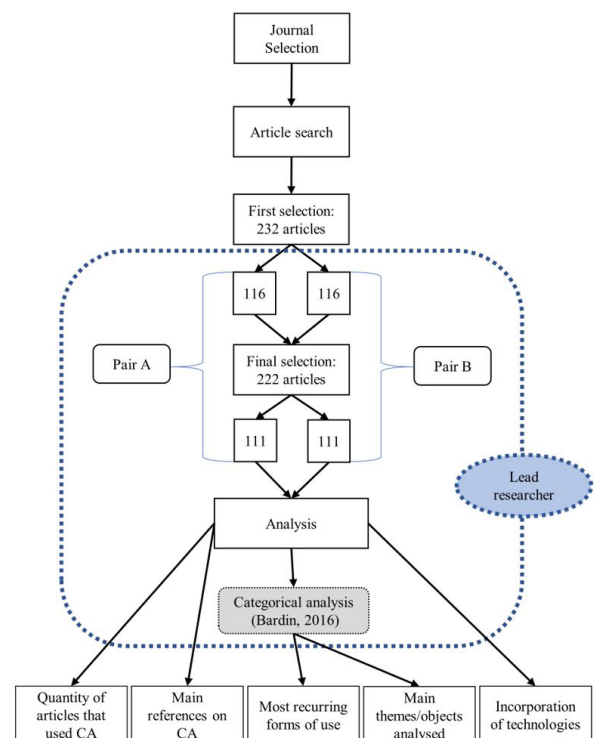


Figure 1. Methodological research schematics.

Source: Authors.

² Except RBCE, which had two types of search engine that were different and incompatible. For that journal, SciELO searches was used (SciELO, 2021), filling out the search terms with “ANÁLISE” and “DE” and “CONTEÚDO”.

RESULTS AND DISCUSSION

According to the period selected for study, which encompassed 2007 through 2017, 222 articles were selected out of nine Brazilian PE journals. In this scientific field, CA techniques have grown over the last few years: in 2007, five articles that used it represented 1.5% of total production within the analysed journals; in 2017, rate grew to 5%, with 33 articles. There was some degree of oscillation across years regarding expansion of CA usage, with emphasis for 2009 (17 articles) as opposed to 2008 (seven articles). That year displayed a raised both in total number of articles published and in those using CA techniques, as identifiable in data distribution for Graph 1.

However, 2010 was the only year to display a decrease in number of articles that employed CA techniques (14 articles), possibly as a result from a significant increase in previous year (17), which can be explained, in turn, by an increase in total number of publications. Years 2015 (29 articles) and 2017 (33 articles) could stand out as those in which CA techniques were employed in the majority of Brazilian PE journal publications, each with a 5% increase in relation to previous year rates.

Out of the 222 selected articles, 208 (93.7%) named some reference to scientific methodological foundations of CA, totalling 246 references. Table 1 presents the five most cited authors from the references of these articles.

Out of 246 references to CA techniques, the significant portion, corresponding to more than half of analysed articles, it could be noted that 165 (67.1%) used different editions of Laurence Bardin's book, titled

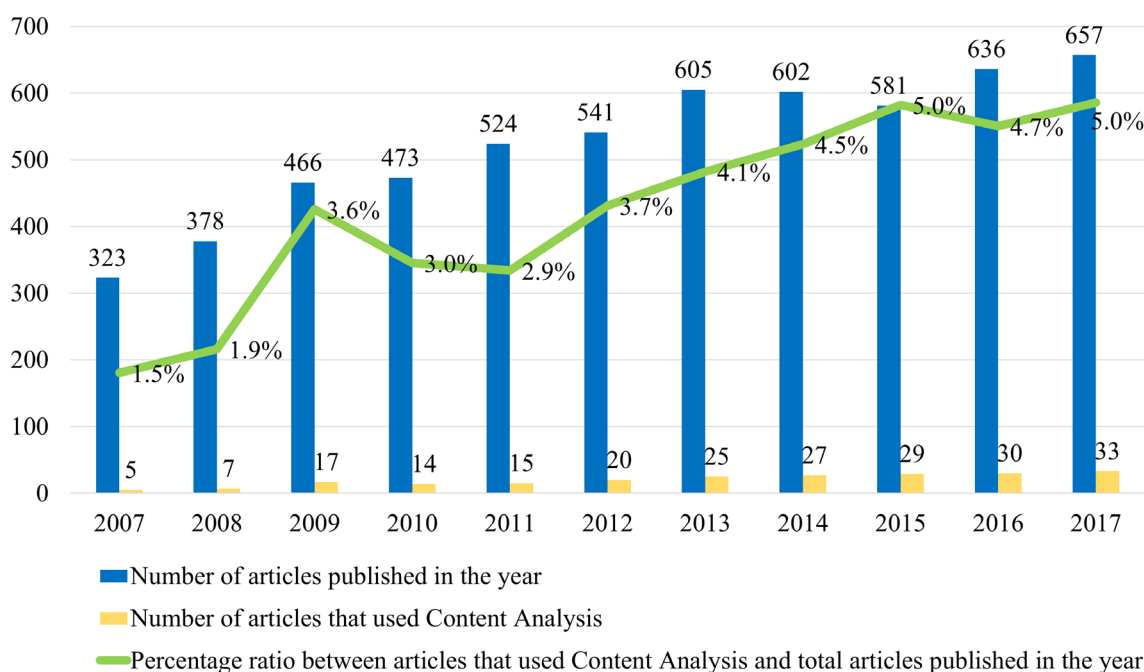
Content Analysis. Second most cited author was Maria Cecília de Sousa Minayo, with 12 (4.9%) mentions. Her lists of works cited by approach methodology as a whole in two books were namely *Pesquisa social: teoria, método e criatividade* and *O desafio do conhecimento: pesquisa qualitativa em saúde*. The same occurred with the fifth most cited author, Augusto Nivaldo Triviños, as he did not publish a specific book on CA but did publish some chapters discussing the technique. Roberto Jary Richardson and Maria Laura Puglisi Barbosa Franco specifically approach CA techniques; their works were used in, respectively, 10 and eight different articles throughout period of research.

One can notice prevalence of references to French authors, such as Bardin, over Anglo-Saxon authors, where CA actually started, such as Berelson and Laswell. That is possible due to availability and wide circulation in Brazil of those translations. Given that no references to

Table 1. Most recurring authors in references regarding Content Analysis (CA).

Authors	Frequency	Percentage
Laurence Bardin	165	67.1%
Maria Cecília de Sousa Minayo	12	4.9%
Roberto Jary Richardson	10	4.1%
Maria Laura Puglisi Barbosa Franco	8	3.3%
Augusto Nivaldo Triviños	7	2.8%
Other	40	16.3%

Source: Authors.



Graph 1. Annual article distribution according to use of Content Analysis (CA) for data processing.

Source: Authors.

Bardin's work were from his original texts, language here remained an element to be highlighted as facilitator for one's choices of references on CA. Minayo, a Brazilian author, is, unsurprisingly, second most cited author, even though her focus was not solely on CA.

That pervasiveness of Bardin's works as CA references is also related to her qualitative approach to technique, considering

As an interpretation effort, CA oscillates between the two poles of objectivity's rigour and subjectivity's prolificacy. It absorbs and cautions the investigator towards this attraction for what is hidden, latent and unapparent, as the potential to the new (the non-said) is retained by any message (Bardin, 2010, p. 11).

Regarding the way CA has been mobilized in analysed works, after categorical analysis (Bardin, 2016), five forms of usage were identified amongst published work as following: Purpose; Conceptual; Types of CA; Research Stages; and Detailed. One article can include more than one form of use (multiple)³, except when classified as "Purpose", as group encompasses works only justify using CA technique without a description or exposition that could support an understanding of analytical process, when an article announced that CA would be applied merely for marking use of some technique, without offering another indication of how those techniques were employed.

We transcribed interviews and treated results, inferences and interpreted material from perspective of CA techniques, establishing thematic categories, as Bardin suggested (1977). The material was registered to a supporting software for qualitative analysis – WEBQDA. (ID 09, p. 04).⁴

Second form of use was Conceptual one, which grouped articles included mention of some CA concepts throughout the text, using specific works and authors on CA as reference.

Main source of data used for analysis and interpretation was set of interviews, which, in a qualitative approach, were treated according to CA techniques, a thematic modality proposed by Bardin (2004). The reason for that choice was justified in its rigorous character as an instrument, that could analyse the vast field of communications and facilitate an exploratory, tentative insight into richer interpretations. For Bardin (2004): CA was a group of analysis techniques in communication that aimed to obtain, through systematic and objective means, a description of message content. (p. 42) (ID 171, p. 66).

³ Articles grouped according to the presence or absence of a given form of use in each work, as most included more than one form.

⁴ Citations were translated into English from their original excerpts in Brazilian Portuguese.

Third form of use, Types of CA, concentrated articles that were explicit about the type of CA they employed, such as categorical CA, thematic CA, among others.

Analysis was based on Thematic CA techniques, which, according to Richardson (1999) and Bardin (2004), represented a methodological instrument to select themes or words that may be more interesting or pertinent to the study. (ID 198, p. 44-45).

Fourth form of use, named Research Stages, grouped articles that, when treating CA, specifically marked its phases, generally referring to stages of data treatment, which varied according to reference that had been used.

Analysis followed a didactic procedure (SOUZA JÚNIOR; MELO; SANTIAGO, 2010), enabling us to organise messages to a certain extent. After that, gathered information was catalogued through written text, speech and other observations noted in a field journey with thematic categories. These categories were structured in context and registry units. At a first moment we built a structuring map for data analysis set by approximating groups. A second stage was identification of speech, written words and observations (SWO). These SWO were characterized as messages that present, in their meanings, relations to TD, PFI's SD and their performances. Finally, these SWO were interpreted, mapped, and correlated to their thematic categories and their catalogued units. (ID 149, p. 85).

Fifth form of use was Detailed one, which grouped articles offering details on the process of using CA in data organization and analysis, enabling reader to visualise analytical elements as categories, registry units and context, along with their own inferences.

In addition, similarly to study developed by Serra and Santos (2003), during process of selecting relevant messages, we elaborated an analytical grid, which considered: a) title of the article, since titles often catch reader's attention and function as marketing, a motivating trait that incentives reading; b) speaker, given that, depending on the social actor to whom speech is attributed, speech can acquire more or less legitimacy and spark identification from reader; c) what is said, with meanings that are explicit or implicit in mediatic discourses on health, beauty and weight loss; d) medium, which enunciated according to an editorial profile one works for, which can be associated to their sponsors' needs; and e) modes of speaking in speech, that is, the way a mediatic message is established in technical-scientific context. (ID 39, p. 06-07).

For each form of use, their absence or presence was noted as detailed in Table 2.

In fact, 21.6% of articles used CA merely to justify a technique for data analysis (Purpose), it means, no elements were found in text to associate their results

Table 2. Forms of use for Content Analysis (CA) found in analysed works.

Forms of use		Criteria	Indication	Frequency	
Exclusive	Purpose	Article announces CA merely for marking use of technique for data analysis	Presence	48	21.6%
			Absence	174	78.4%
Multiple	Concept	Article defines at least one concept from CA within text	Presence	61	27.5%
			Absence	161	72.5%
	Types of CA	Article states which CA technique was used	Presence	56	25.2%
			Absence	166	74.8%
	Research Stages	Article exposes stages for treating data according to CA	Presence	94	42.3%
			Absence	128	57.7%
Detailed	Article offers details from process of CA usage in organising and analysing data, enabling reader to visualise analytical elements as categories, registry and context units, with their own inferences	Presence	47	21.2%	
		Absence	175	78.8%	

Source: Authors.

to technique of analysis, which demonstrated a certain methodological frailty of those articles, since there is no clear path leading from data to the authors' interpretation in the text. That information is similar to what was found by Ramos and Salvi (2009) in Psychology articles, when only 33% of the collected publications suggested a relationship between logic and technique in their data analysis and following results.

In other 174 (78.4%) articles, there was further elaboration in explaining CA, even though 47 (21.2%) displayed Detailed use, that is, they demonstrated a deeper analytical knowledge in using these techniques and presented elements as registry and context units, categories and inferences.

Only 61 articles (27.5%) directly or indirectly conceptualized CA, and 56 (25.2%) exposed type of CA they employed for data analysis; most common type was categorical analysis, as proposed by Bardin (2010).

Bardin (2010) indicated varieties of CA, such as categorical analysis, assessment analysis, enunciation analysis, propositional discourse analysis, expression analysis and relationship analysis. The author also stated categorical analysis was the oldest of group and, in practical terms, was the most frequently used.

Most common form of use is the exposition of Research Stages, presented in 94 articles (42.3%), which mostly described the stages of pre-analysis, material exploration and treatment of results and discussion, according to Bardin (2010).

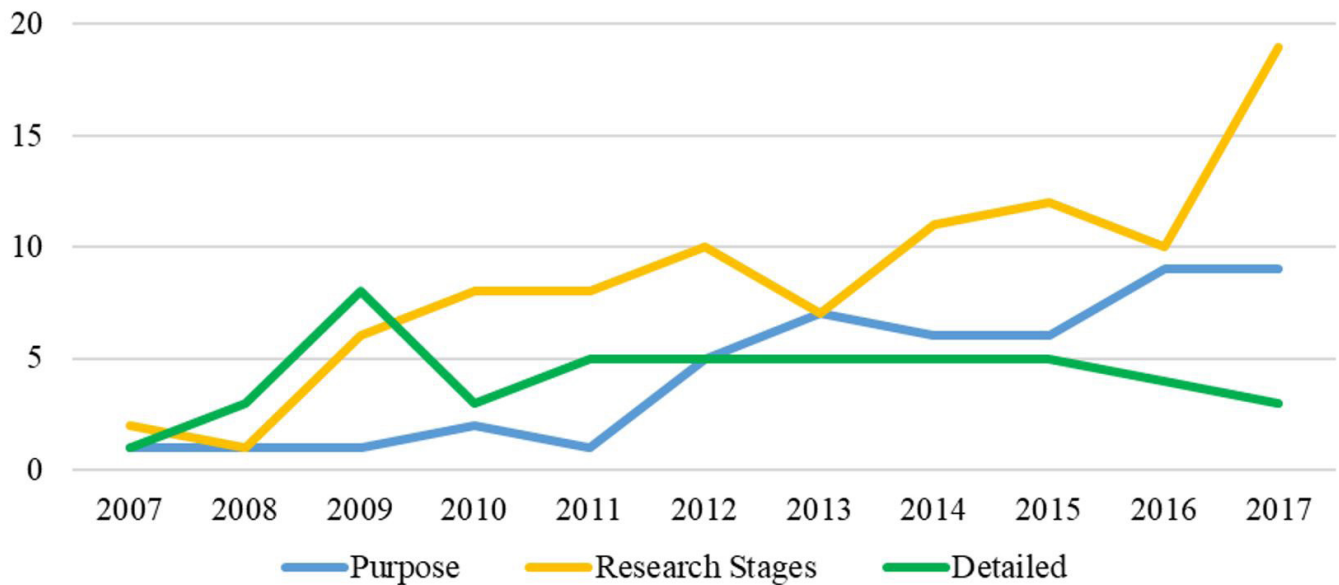
In tracing the movements by least used forms of use (Purpose and Detailed) and the most used one (Research Stages) across years encompassed by this research (2007-2017), it was possible to identify description of CA stages as recurrent in PE field, while Purpose form of use has increased across the period; the process is inverted if compared to behaviour by Detailed form of use, as exposed in Graph 2.

The increase in articles that used CA as Purpose during period can be interpreted as one of the possible effects of changes that occurred in journal guidelines, which reduce or limit article size and, consequently, generate a need to resize texts. That is noticeable as the theoretical review and results would usually occupy majority of the text, which demands deletions from methodology section and from description of data analysis.

It is noteworthy that summarizing the explanation of CA is not exclusive to PE, as articles in the area of Tourism also had some points of attention identified, specifically with regard to the clear exposure of indicators of reliability and replicability of the studies (Camprubí and Coromina, 2016).

For composition of themes and objects, in pairs, titles and abstracts from articles were read (context units), with identification of words or sentences (registry units) that could determine meanings evoked by text. Next, themes (or categories) were defined to encompass texts with similar meanings, even though there were attempts to preserve the individual characteristics of each article. At the end of that process, the pairs compared their analyses; in cases of disagreement, the lead researcher decided towards one way or another.

Next, articles were grouped according to their themes in order to build a general organization on most recurring themes among recovered articles. 35 themes/objects were registered and distributed across several areas of interest within the PE field. These themes/objects were, then, separated into 12 groups according to their similarity or thematic approximations, evidencing plurality within the field and its several relations with other areas of knowledge. Table 3 presents a lack of an absolute majority, despite predominance of Sports as a theme/object of study, with 53 (23.87%) articles.



Graph 2. Comparison between behaviour of forms of use Purpose, Research Stages, and Detailed throughout 2007-2017 period.
Source: Authors.

Table 3. Themes and objects in articles.

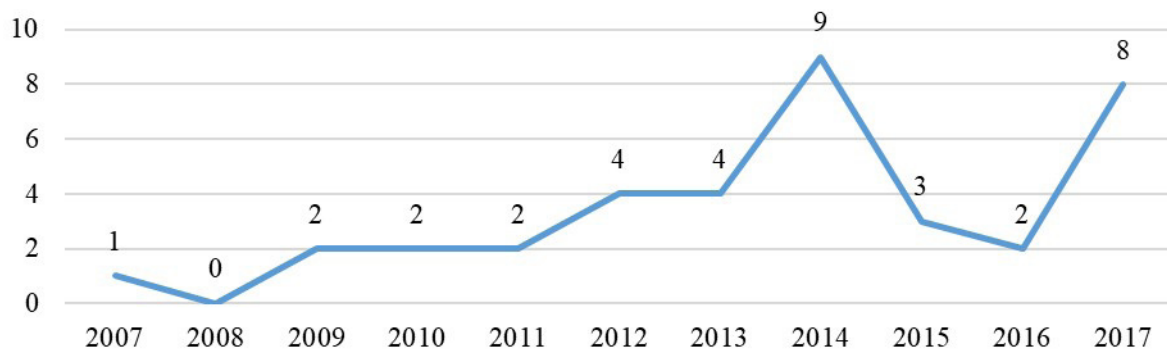
Themes/objects	Frequency	Percentage
Sport	53	23.87%
Higher Education in Physical Education	32	14.41%
Epistemology in Physical Education	21	9.46%
Physical Education in School	19	8.56%
Professional Intervention	17	7.66%
Leisure	16	7.21%
Body practices	16	7.21%
Public Policy for Sport and Leisure	15	6.76%
Physical Activity and Health	13	5.86%
Body	11	4.95%
Other	5	2.25%
Combat	4	1.80%

Source: Authors.

Sport is a multidisciplinary phenomenon, which is not restricted to PE. Dart (2014) showed that research published in three relevant international journals in the field of sociology of sport use CA as an analytical technique, used in the analysis of predominantly desk-top work. Regarding the themes, these articles dialogued with central concepts of sociology such as gender, ethnicity, media, politics and economics, commonly related to soccer and other team sports such as basketball and baseball. Team sports are also relevant in articles published in three relevant international journals in the field of sports communication (Schäfer and Vögele, 2021), which demonstrates that different related areas have close study interests, but there is also an emphasis on massive and hegemonic sports, that already enjoy media prominence.

For CA, its manifest contents, that is, what the data show, are grouped into categories, analysing similarities, and differences. Latent contents, that is, that which is talked about, are expressed through themes – hence the analysis on most approached themes in EF and its importance.

Out of the 222 articles, 36 (12%) used some supporting software for CA; the most common one was Nvivo, used in 21 instances. Graph 3 shows instability in the use of software in articles, as, in first years encompassed by this research, 2007 and 2008, the usage started growing until they reached their peak in 2014 (09), year with the highest number of articles that relied on software support. However, in 2015 (03) and 2016 (02), there was a new drop, which was then followed by another rise in 2017 (08). These numbers did not follow



Graph 3. Annual Evolution of Software Use in Content Analysis (CA) Support.
Source: Authors.

the gradual increase in CA application in publications, as exposed in Graph 1, and they may evidence a relationship of low appropriation of new technologies invented to support qualitative data analyses in research.

In the field of Tourism, similar results were found, 16.5% of the 164 articles use software to support data collection and/or analysis, a number that has been growing despite the predominance of manual collection and analysis. The use of analysis support software allows for greater analytical complexity, expressed by more samples and categories, being processed by a smaller number of researchers, but its adoption in research is still underestimated by a significant part of the articles in the field (Camprubí and Coromina, 2016).

That scenario is similar to one found by Nascimento et al. (2017), who identified 16 articles in PE field that used software for qualitative data analysis. This process highlights an inconsistent incorporation of new technologies to scientific practices. Such an inconsistency might be associated to field's scientific tradition, given these articles dialogue with the Humanities and Social Sciences – their predominating characteristic of qualitative investigations often excludes statistical and software analyses, and their data are not often parametric, nor do they undergo a critical view by researcher who, under their critical perspective, does not elaborate answers for their questions (Costa et al., 2012; Souza et al., 2011).

FINAL REMARKS

Use of CA increased in analysed period, followed by a more general increase in overall production in the field, although in a smaller degree. That demonstrated an appropriation of qualitative methodology research within PE. However, majority of articles did not describe how stages of CA occurred in their research, or the form of development for their category construction.

Use of CA in PE scientific production has occurred in a partial manner, as shown by way analysed articles cited the technique as a form to demonstrate methodological rigour, which is a scientific requirement in that type of text. In these specific articles, no effective application of

CA was found in data treatment, or a clear exposition on how it was used.

Methodological exposition of CA has been increasingly summarized across years, as visible by increased presence of Purpose form of use, along with more detailed usages that included registry, context and inferences registries, which decreased in final years of our research period.

Laurence Bardin was the most cited author on CA in articles. The use of supporting software has been incorporated, although with a low incidence in our corpus.

The article showed how a technique of data analysis widely used in other fields of knowledge was incorporated into the scientific work of Brazilian PE, which adds arguments to the debate on the structuring of this specific scientific field, with the addendum that this article was limited to analyse punctual aspects related to diagnosing and operating CA in PE field, reinforcing the need for new immersions in the data, which might establish relationships between forms of use and their synchrony with CA references – a possibility for future studies.

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CONFLICTS OF INTEREST

We declare no conflict of interest.

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