EDUCAÇÃO EM FOCO
PROGRAMA DE PÓS-GRADUAÇÃO EM EDUCAÇÃO | UNIVERSIDADE DO ESTADO DE MINAS GERAIS

Grande Hera! Os Heróis Chegaram na Sala De Aula: Uma Revisão Sistemática De Literatura[1]

Mônica Gabrielly Teixeira de Barros BOANAFINA[2]
Regiane Sbroion de CARVALHO[3]

RESUMO
O estudo teve como objetivo investigar o uso de super-heróis nas práticas pedagógicas por docentes em sala de aula em diferentes níveis de ensino por meio de uma revisão sistemática de literatura. A pesquisa abrangeu bases de dados em língua portuguesa e inglesa, resultando na seleção de oito trabalhos para análise quantitativa e qualitativa. Os resultados indicam que as práticas elaboradas com super-heróis ocorreram no Ensino Médio e Superior, principalmente na área de Física, assim como nas áreas de Biologia e Sociologia. A maior parte das publicações concentra-se na última década, predominantemente nos Estados Unidos e nos Países Baixos. Encontramos, nos trabalhos analisados, propostas de atividades e práticas realizadas por docentes em sala de aula, o que demonstra que mesmo as publicações não se referem às ações efetivamente implementadas, mas propostas. Concluímos que a utilização de super-heróis nas práticas pedagógicas representa uma oportunidade promissora para a aprendizagem significativa, embora ainda esteja em estágio inicial.

PALAVRAS-CHAVE: Super-Heróis. Revisão Sistemática de Literatura. Práticas Pedagógicas. Sala de aula.

[1] Reference to the expression used by the character Wonder Woman in the character's first comic books.

[2] Master's Degree in Science, Technology and Health Communication from the Oswaldo Cruz Foundation (FIOCRUZ/COC). Pedagogue from the State University of Rio de Janeiro (UERJ) https://orcid.org/0000-0003-2479-6587
E-mail: monica.gabrielly@gmail.com
[3] PhD from the Faculty of Philosophy, Sciences and Letters of the University of São Paulo (FFCL/USP/RP), lecturer in the Department of Subjectivity Studies and Human Formation of the Faculty of Education of the State University of Rio de Janeiro (DESF/EDU/UERJ). https://orcid.org/0000-0003-2241-1970.
E-mail: resbroion@yahoo.com.br

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Great hera! The heroes have arrived in the classroom: a systematic literature review[4]

Mônica Gabrielly Teixeira de Barros BOANAFINA
Regiane Sbroion de CARVALHO

ABSTRACT
The study aimed to investigate the use of superheroes in pedagogical practices across different levels of education through a systematic literature review. The research encompassed databases both in Portuguese and English, resulting in the selection of eight works for quantitative and qualitative analysis. The findings indicate that superhero practices are more common in High School and Higher Education, particularly in the field of Physics, with proposals also present in Biology and Sociology. Most publications are concentrated in the last decade, primarily in the United States and the Netherlands. The conclusion highlights that the use of superheroes in pedagogical practices represents a promising opportunity for meaningful learning, although it is still in its early stages.

KEYWORDS: Superheroes. Systematic Literature Review. Pedagogical Practices. Classroom.

[4] Reference to the expression used by the character Wonder Woman in the early comics of the character.

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Gran Hera! Los héroes han llegado al aula: una revisión sistemática de la literatura[5]

Mônica Gabrielly Teixeira de Barros BOANAFINA
Regiane Sbroion de CARVALHO

RESUMEN
El estudio tuvo como objetivo investigar el uso de superhéroes en prácticas pedagógicas en diferentes niveles educativos a través de una revisión sistemática de la literatura. La investigación abarcó bases de datos en portugués e inglés, lo que resultó en la selección de ocho trabajos para análisis cuantitativo y cualitativo. Los resultados indican que las prácticas con superhéroes son más comunes en la Educación Secundaria y Superior, principalmente en el campo de la Física, con propuestas también presentes en Biología y Sociología. La mayoría de las publicaciones se concentra en la última década, predominantemente en Estados Unidos y los Países Bajos. La conclusión destaca que el uso de superhéroes en prácticas pedagógicas representa una oportunidad prometedora para el aprendizaje significativo, aunque aún se encuentra en sus primeras etapas.

PALABRAS CLAVE: Superhéroes. Revisión Sistemática de la Literatura. Prácticas Pedagógicas. Aula.

[5] Referencia a la expresión utilizada por el personaje Mujer Maravilla en los primeros cómics del personaje.

Introduction

This article presents a Systematic Literature Review aimed at understanding how and whether superheroes are employed by teachers in their pedagogical practices across all educational levels: Early Childhood Education, Elementary Education, Secondary Education, and Higher Education.

In this study, pedagogical practices are understood in dialogue with Franco (2016), Libâneo (2017), Ausubel (1980), and Moreira (1995; 1999) as the actions carried out in the classroom that are designed by the teacher to support and/or foster the teaching-learning process of their students, as well as the production of new knowledge, reflections, values, and practices.

Educational institutions are privileged spaces for pedagogical practice. When seeking to organize and structure a space for integration between teacher and student in the promotion of learning, it is essential that the school be conceived as a dynamic and welcoming environment, capable of stimulating students' curiosity, inquiry, creativity, and interests. In this context, the teacher's role goes beyond the mere transmission of knowledge. The teacher's function is to mediate the relationship between students and historically constructed knowledge. It is up to the teacher to identify the knowledge and experiences that students bring into the classroom and to channel this potential toward the production of new understandings (Libâneo, 2017).

This is a process marked by numerous challenges, both for teachers, who strive to mediate the teaching-learning process, and for students, who are increasingly immersed in multiple media environments that often provide questionable information or, at the very least, fail to meet the basic criteria necessary to support their knowledge construction.

In the words of Libâneo (2017, p. 81), “the teacher plans, directs, and manages the teaching process, with a view to stimulating and eliciting the students’ own activity in learning.” This means that it is the teacher’s responsibility, within their pedagogical practice, to identify and, whenever possible, make use of the necessary means to explore students’ interests in order to generate engagement with learning and foster their autonomy.

According to the author:

> the pedagogical nature of educational practice is evidenced as a conscious, intentional, and planned action within the process of human development. It is guided by objectives and means defined according to socially determined criteria, which indicate the type of individual to be formed, for which society, and with what purposes. (Libâneo, 2017, p.25)

For the teaching-learning process to be more effective and closer to the students, learning must be meaningful. According to Ausubel et al. (1980), the teacher should seek strategies that are

connected to students' prior knowledge, beginning with general concepts and working through them progressively to facilitate knowledge construction. In this process, from a cognitive perspective, the teacher makes use of advance organizers, understood as "cognitive bridges" (Moreira, 1999), whose aim is "to manipulate cognitive structure in order to facilitate meaningful learning" (Moreira, 1999, p. 155).

However, the challenge for the teacher lies in understanding how the new content that is, the new concept to be taught is associated with prior content, or with relevant concepts that Ausubel, according to Moreira (1999), refers to as "subsumers." In this case, learning becomes meaningful when new concepts are integrated into the learner's existing cognitive structure; otherwise, learning remains mechanical, unstructured, and is easily lost (Moreira, 1999). In other words, meaningful learning consists of new knowledge that relates to elements already present in the student's cognitive structure. This process of construction requires stimulation in order to occur; without it, progressive connections between the new material and the existing cognitive structures fail to form.

It is also the teacher's role to provoke students to think, reflect on their own reality, and critically analyze the context in which they are situated an endeavor that presents challenges, as it requires the teacher to draw closer to the students' lived experiences. To this end, differentiated approaches may be valuable, such as the use of characters and films, comic books, and animations in the classroom to mediate the construction of new knowledge. From this perspective, superheroes can be considered a potential tool in the teaching-learning process.

We understand a superhero as a

> fictional character endowed with superhuman powers, originally created in comic books and more recently popularized by cinema, typically portrayed as fighting for good against evil, helping the vulnerable, and protecting society from dangerous individuals or situations (Super-Herói, 2023).

As well-known characters from popular narratives, superheroes reach a wide audience through cinema, television, and comic books. For example, in 2019, Marvel concluded a decade-long story arc with memorable characters in *Avengers: Endgame*, which grossed $2.797 billion at the box office (Gomes, 2019). With Disney+, Marvel launched popular series such as *WandaVision* and *Loki*, along with others like *What If...*, *Hawkeye*, and *The Falcon and the Winter Soldier*, expanding the Marvel Universe and introducing new stories and characters.

The figures mentioned above demonstrate how deeply superheroes are embedded in society and in the imagination of people of all ages. This cultural presence can be reflected in schools, as students bring their favorite stories and characters into the educational environment—whether in the classroom, in conversations, or during play. As such, daily life is surrounded by these characters, who, by engaging with real-world themes, create opportunities for teachers to spark interest, foster student participation, and promote learning.

Methods and Procedures

The research presented in this article is characterized as a Systematic Literature Review, a research method that, according to Cordeiro, Oliveira, Rentería, and Guimarães (2007, p. 429), aims "to answer a clearly formulated question using systematic and explicit methods to identify, select, and assess relevant research, as well as to collect and analyze data from the studies included in the review".

In the present study, we started with a specific research question aimed at understanding "Whether and how Marvel and Detective Comics superheroes are used in teachers' classroom pedagogical practices as reported in the scientific literature." To this end, we adopted rigorous, pre-established procedures, which will be presented in detail below.

Search Terms

In mid-2020, an exploratory study was conducted with the aim of identifying relevant databases and determining the most effective search strategies. In the first phase, three initial terms ("Education," "Pedagogy," and "Classroom") were combined with four additional terms ("Superhero," "Comic Book," "Superheroes," and "DC Comics Heroes")[6]. Given the low number of studies found in the initial searches, it became necessary to include additional terms in order to encompass a broader range of studies, pedagogical practices, and modes of using these characters. Furthermore, the terms "Educational Practice(s)," "Instructional Practice(s)," "Didactics," "Methodology/Methodologies," and "Teaching Method(s)" were incorporated into the search strategy, as these expressions are sometimes used in scientific texts as synonyms for pedagogical practices. As a result, a revised list of search terms was compiled, as presented in the table below:

Table 1 - List of Terms Used in Portuguese.

[6] We would like to thank the librarian from the CEH/A - UERJ Library: Education, Communication, Psychology, and Nutrition, who assisted us with the initial selection. Following her guidance, we consulted the descriptors proposed by the Brazilian National Library.

Prática Educativa	Filme
Práticas Educativas	Filmes
Prática Educacional	Super-herói
Práticas Educacionais	Super-heróis
Prática Pedagógica	Herói
Práticas Pedagógicas	Heróis
Ensino	História em Quadrinhos
Didática	Histórias em Quadrinhos
Metodologia	Desenho Animado
Metodologias	Desenhos Animados
Método de Ensino	
Métodos de Ensino	
Sala de aula	
Educação	

Source: Prepared by the authors.

All terms from the first column were combined with those from the second column, totaling 140 combinations, which were applied across each of the Portuguese-language databases.

In the international database, terms in English were used. The number of terms was reduced, as some of them shared the same meaning once translated, resulting in a total of 110 combinations. The table below lists the terms in English.

Table 2 - Relação de termos utilizados em inglês.

Educational Practices	Film
Pedagogical Practice	Films
Pedagogical Practices	Superhero

Teaching	Superheroes
Didactic	Hero
Methodology	Heroes
Methodologies	Comic
Teaching Method	Comics
Teaching Methods	Cartoon
Classroom	Cartoons
Education	

Source: Prepared by the authors.

All terms from the first column were combined with those from the second column.

The next step consisted of defining the number of texts to be analyzed as a result of the combinations in each database and journal. We set a limit of 300 results, reviewing their titles and abstracts. When the number of search results exceeded this limit, a third term was added depending on the main combination, always ensuring that among the three, one referred to educational aspects, one to the medium of dissemination, and one to the topic addressed.

Accordingly, the term “Superhero” was selected when the main combination involved a term from the field of education (e.g., “education,” “classroom,” “teaching,” etc.) combined with a medium of dissemination (e.g., “movie,” “comic book,” “cartoon,” etc.). Conversely, the terms “movie,” “comic book,” and “cartoon” were used as the third term when the primary combination included educational terms (e.g., “education,” “classroom,” “teaching,” etc.) and “hero/es” or “superhero/es”.

Inclusion and Exclusion Criteria

With regard to the established inclusion criteria, the selected texts were those that:

- Addressed the use of superheroes in the school context;
- Employed films, comic books, or cartoons with superhero themes;
- Made use of Marvel and/or DC superheroes;
- Focused on pedagogical practices proposed by teachers in the classroom;

- Were articles, theses, or dissertations.

The exclusion criteria used were:

- Texts that discussed superheroes outside the school context;
- Texts that addressed the use of comic books, cartoons, series, or films in the school context but that did not involve Marvel and/or DC superheroes;
- Texts featuring superheroes that did not fit the definition proposed in this study;;
- Texts in which the use of superheroes in the school context was not proposed by the teacher;
- Any other type of text/work that was not an article, thesis, or dissertation;
- Texts not written in Portuguese or English.

Databases and Journals

The selected databases and journals were: Scientific Electronic Library Online (Scielo), CAPES Journals, Brazilian Digital Library of Theses and Dissertations (BDTD), Redalyc Scientific Information System, and the Education Resources Information Center (ERIC). The first three searches were conducted in Portuguese, and the latter two in English. These databases were chosen because they are open-access (free of charge), host various types of academic work (theses, dissertations, and articles), and include both national (CAPES, Scielo, Brazilian Digital Library of Theses and Dissertations) and international platforms (ERIC and Redalyc). Additionally, they encompass interdisciplinary studies and works in the field of education.

At Scielo, the search was conducted between March 31, 2021 and April 1, 2021, and again between February 17, 2023 and February 18, 2023. The 2023 search aimed to include publications from 2021 and 2022. All terms were cross-referenced using “AND,” a function available within the database itself. Texts were selected based on the reading of their titles and abstracts.

The search in the CAPES Journals database was conducted between April 9, 2021 and April 12, 2021, and again between February 19, 2023 and February 20, 2023. All terms were cross-referenced using the “advanced search” option. Filters provided by the platform were applied to obtain more precise results. These filters included: “is (exact),” which ensured that only exact matches to the search terms were displayed; “AND”; and “exclude books.” In some cases, it was necessary to

include a third term when the number of results exceeded the limit set for analysis. Texts were selected based on the reading of titles and abstracts. At the end of the description of procedures conducted across the databases, we present a table showing all combinations in which a third term was required.

The search in the BDTD (Brazilian Digital Library of Theses and Dissertations) was carried out between April 15, 2021 and April 18, 2021, and again between February 21, 2023 and February 22, 2023. The terms were cross-referenced using the database's own "advanced search" function, with each word inserted into the designated search fields, without the use of filters. As with other databases, a third term was added when the number of results exceeded 300. Texts were selected based on the reading of titles.

The search in the Redalyc database was conducted between May 31, 2021 and June 3, 2021, and again between February 23, 2023 and February 25, 2023. All terms were cross-referenced using quotation marks and the "AND" operator, along with the "Portuguese" language filter. Although this database contains texts in both Portuguese and Spanish, only texts in Portuguese were included. When searches exceeded the 300-result threshold, a third term was added. Texts were selected based on the reading of titles, abstracts, and short excerpts from the full text.

The search in the ERIC database was conducted between June 8, 2021 and June 10, 2021, and again between February 28, 2023 and March 2, 2023. All terms were cross-referenced using quotation marks and the "AND" operator. This database contains texts in English only. As with the other databases, it was necessary to include a third term in some searches that exceeded the 300-result limit. Texts were selected based on the reading of titles and abstracts.

Below, we present a table with the databases and the search queries that involved three terms:

Table 3 - List of Databases and Third Search Term.

Database	**Cross-references in which the use of a third term was necessary**
CAPES	Methodology x Movies x Superhero Methodology x Movie x Superhero Methodologies x Movie x Superhero Methodologies x Film x Superhero Classroom x Movies x Superhero Classroom x Movie x Superhero Education x Movies x Superhero Education x Movie x Superhero Education x Hero x Movie Education x Hero x Comic Book Education x Hero x Cartoon Education x Heroes x Movie Education x Heroes x Comic Book Education x Heroes x Cartoon
BDTD	Teaching x Movies x Superhero

	Teaching x Movie x Superhero Education x Movies x Superhero Education x Movie x Superhero
Redalyc	Educational Practice x Movies x Superhero Educational Practice x Movie x Superhero Educational Practices x Movies x Superhero Educational Practices x Movie x Superhero Teaching x Movies x Superhero Teaching x Movie x Superhero Teaching x Hero x Movie Teaching x Hero x Comic Book Teaching x Hero x Cartoon Teaching x Heroes x Movie Teaching x Heroes x Comic Book Teaching x Heroes x Cartoon Teaching x Comic Book x Superhero Teaching x Comic Books x Superhero Teaching x Cartoon x Superhero Teaching x Cartoons x Superhero Didactics x Movies x Superhero Didactics x Movie x Superhero Didactics x Hero x Movie Didactics x Hero x Comic Book Didactics x Hero x Cartoon Didactics x Heroes x Movie Didactics x Heroes x Comic Book Didactics x Heroes x Cartoon Didactics x Comic Book x Superhero Methodology x Movies x Superhero Methodology x Movie x Superhero Methodology x Comic Book x Superhero Methodology x Comic Books x Superhero Methodologies x Movies x Superhero Methodologies x Movie x Superhero Methodologies x Hero x Movie Methodologies x Hero x Comic Book Methodologies x Hero x Cartoon Methodologies x Heroes x Movie Methodologies x Heroes x Comic Book Methodologies x Heroes x Cartoon Methodologies x Comic Book x Superhero Methodologies x Comic Books x Superhero Teaching Method x Movies x Superhero Teaching Method x Movie x Superhero Teaching Methods x Movies x Superhero Teaching Methods x Movie x Superhero Classroom x Movies x Superhero Classroom x Movie x Superhero Classroom x Hero x Movie Classroom x Hero x Comic Book Classroom x Hero x Cartoon Classroom x Heroes x Movie Classroom x Heroes x Comic Book Classroom x Heroes x Cartoon

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ERIC	Teaching x Film x Superhero Teaching x Films x Superhero Teaching x Hero x Film Teaching x Hero x Comic Teaching x Hero x Cartoon Teaching x Heroes x Film Teaching x Heroes x Comic Teaching x Heroes x Cartoon Teaching x Comic Book x Superhero Teaching x Comic Books x Superhero Teaching x Cartoon x Superhero Teaching x Cartoons x Superhero Methodology x Film x Superhero Methodology x Films x Superhero Methodologies x Film x Superhero Methodologies x Films x Superhero Teaching Method x Film x Superhero Teaching Method x Films x Superhero Teaching Method x Comic Book x Superhero Teaching Method x Comic Books x Superhero Teaching Method x Cartoon x Superhero Teaching Method x Cartoons x Superhero Teaching Methods x Film x Superhero Teaching Methods x Films x Superhero Teaching Methods x Comic Book x Superhero Teaching Methods x Comic Books x Superhero Teaching Methods x Cartoon x Superhero Teaching Methods x Cartoons x Superhero Classroom x Film x Superhero Classroom x Films x Superhero Classroom x Comic x Superhero Classroom x Comics x Superhero Education x Film x Superhero Education x Films x Superhero Education x Hero x Film Education x Hero x Comic Book Education x Hero x Cartoon Education x Heroes x Film Education x Heroes x Comic Book Education x Heroes x Cartoon Education x Comic x Superhero Education x Comic Books x Superhero

	Education x Cartoon x Superhero Education x Cartoons x Superhero

Source: Prepared by the authors.

Results and discussions

After the initial selection, we found the following results:

Table 4 - Texts found.

Database	Results	Number of Selected Texts	Selected Texts
Scielo	**349**	0	0
Periódicos CAPES	**3.805**	3	DJOTA, 2006 SILVA, 2012 WESCHENFELDER, 2011
Biblioteca Digital Brasileira de Teses e Dissertações (BDTD)	**9.653**	4	NASCIMENTO JUNIOR, 2013 WESCHENFELDER, 2011 CARNICEL, 2006 WESCHENFELDER *et al.*, 2017
Redalyc	**8.237**	0	
ERIC	**2.662**	8	BURTON, 2008 BROWN et al., 2016 FITZGERALD, 2018 HALL e LUCAL, 1999 FITZGERALD, 2018 ZEHR, 2011 FITZGERALD e PLOTZ, 2020 ZEHR, 2014

Source: Prepared by the authors.

After a full reading of the texts, five were excluded. The table below presents the excluded texts along with the reasons for their exclusion.

Table 5 - Excluded Texts.

Text	Reason for Exclusion
Avengers assemble! Using pop-culture icons to communicate science (ZEHR, 2014)	Activities were carried out in non-formal education settings. Although superheroes are used as a means to communicate science, it occurs outside the school environment. Without proposing a pedagogical practice, the text addresses science communication in its broadest sense and focuses on non-formal education.
From Claude Bernard to the Batcave and beyond: using Batman as a hook for physiology education (ZEHR, 2011)	Aimed at science communication for the general public, without any focus on schools or the proposal of a pedagogical practice. It reflects on the use of characters as tools to communicate science outside the school setting, relating to non-formal education.
Educational aspects of superhero comic books and their importance in the formation of moral consciousness, from the perspective of Aristotelian virtue ethics (WESCHENFELDER, 2011)	The work addresses educational aspects related to superheroes; however, it does not propose practices within the school environment. It discusses the educational potential of superhero comic books but does not mention the teacher as a mediator in this process or suggest any activity that could be applied in the classroom
Superheroes as resources for promoting resilience in children and adolescents (WESCHENFELDER, FRADKIN e YUNES, 2017)	The article presents the characters that is, the superheroes as a source of inspiration for children and adolescents, serving as potential “mirrors” of their behavior. However, it does not discuss or present a pedagogical practice, does not mention teacher mediation, and does not take place in a school setting.
Comics: Superheroes Invade the Classroom (CARNICEL, 2006)	It is an interview in which the central discussion focuses on the potential of using comic books in the classroom. However, it does not address a pedagogical practice directly related to superheroes. Although the title suggests a connection between superheroes and the classroom, the interview discusses the use of comic books in general, rather than those specifically dealing with superhero themes.

Source: Prepared by the authors.

Thus, we arrived at eight analyzed texts, which are briefly presented in the table below:

Table 6 - Selected Texts.

Text	Brief Description
Superhero as Metaphor: Using Creative Pedagogies to Engage (BURTON, 2008).	**Level of Education:** Higher Education **Context**: Undergraduate course in Applied Sciences **Article Content**: Describes an activity involving the analysis of scenes from the X-Men film, aiming to help students identify key elements of ethical leadership.

How to Teach the Electromagnetic Spectrum with Superheroes (FITZGERALD; PLOTZ, 2020)	**Level of Education:** Secondary Education **Context**: High school Physics class **Article Content**: The authors describe the implementation of an activity on electromagnetism during a Physics class, based on the article "Exploring the Electromagnetic Spectrum with Superheroes." The activity focuses on ionizing radiation and uses characters such as Supergirl, Superman, Hulk, and Captain America for demonstration purposes.
Tapping into parallel universes: using superhero comic books in sociology courses (HALL; LUCAL, 1999)	**Level of Education:** Higher Education **Context**: Sociology class **Article Content**: This article presents an activity using comic books featuring superhero teams such as the X-Men and the Justice League, with the goal of having students analyze representations of gender and social inequality through these characters and their relationships.
Superhero physiology: the case for Captain America (BROWN et al, 2016)	**Level of Education:** Higher Education **Context**: Physiology class **Article Content**: The authors propose a discussion on the effects of Vita-Rays on Captain America's physiology and also suggest an analysis of the character Daredevil.
Using superheroes such as Hawkeye, Wonder Woman and the Invisible Woman in the physics classroom (FITZGERALD, 2018)	**Level of Education:** Secondary Education **Context:** High school Physics class **Article Content:** The study aims to use superheroes to illustrate concepts such as Rectilinear Motion, Energy, and Optics. The author uses scenes from films like Avengers (2012), Wonder Woman (2017), and Fantastic Four (2005), and also suggests that female scientist characters, such as Sue from Fantastic Four, can be used to foster discussions on gender.
Fantastic Four: Teaching Physics, Comic Books, Science Fiction, and Cultural Satisfaction(NASCIMENTO JUNIOR, 2013);	**Level of Education:** From Secondary to Higher Education **Context:** Analysis of comic books **Article Content:** This article presents an analysis based on Marvel comic books. It offers proposals for activities and lessons that can be developed through the use of comics. The author highlights Fantastic Four as the main example, arguing that the story is directly connected to the History of Science and can be used to illustrate the development of technology and science in the world.
Electromagnetism and the Antihero Magneto: A Possible Approach in Secondary Education (SILVA, 2012);	**Level of Education:** Secondary Education **Context:** High school Physics class **Article Content:** The study proposes a specific activity for secondary education, using the trailer of the film X-Men Origins: Magneto as a resource in a Physics lesson, specifically to teach the concept of magnetic field.
Exploring the electromagnetic spectrum with superheroes (FITZGERALD, 2018)	**Level of Education:** Secondary Education **Context:** High school Physics class **Article Content:** Proposes an activity to teach electromagnetism, using the abilities of superheroes such as Superman, Supergirl, Hulk, and Captain America to explain concepts like ionizing and non-ionizing radiation.

Source: Prepared by the authors.

We began the analysis of the texts from a quantitative perspective, presenting and discussing aspects related to the characteristics of the studies – years of publication, levels of education, areas

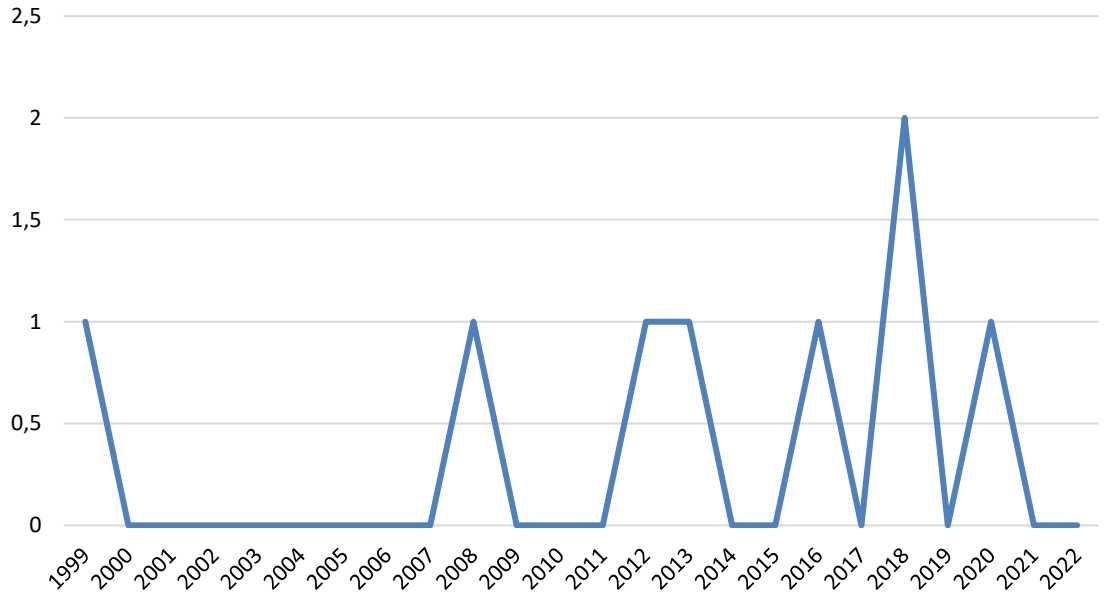
of knowledge, and countries of publication. Next, we conducted a qualitative analysis, examining in greater depth the activities described in the selected works.

Quantitative Aspects

The quantitative analyses are presented in graphs that display the academic productions according to year of publication, area of knowledge, type of publication (theses, dissertations, or articles), percentage distribution by level of education, and countries of publication.

Graph 1 shows the academic productions divided by year:

Graph 1 – Year of Publication.

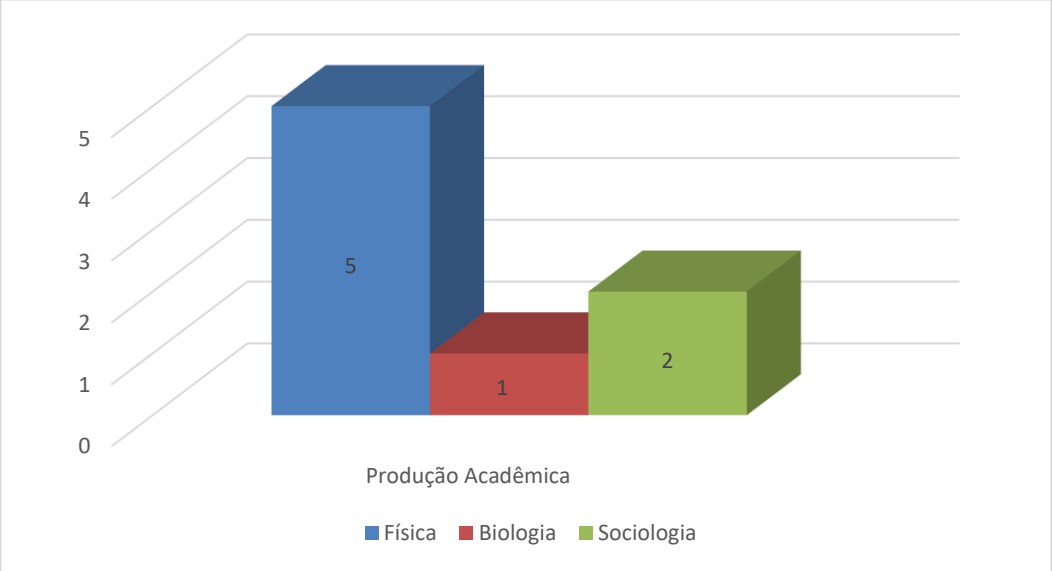


Source: Prepared by the authors.

Based on the graph, it is possible to analyze the temporal distribution of the publications. The first text found was published in 1999, followed by a nine-year gap until the next publication in 2008. This indicates that nearly a decade passed without any studies on superheroes being linked to pedagogical practices in the classroom. After 2008, four additional gaps between publications were identified. One text was published in 2008, with new contributions appearing only in 2012 and 2013. Subsequently, there was another gap between 2013 and 2016, followed by two publications in 2018—the only year with more than one publication. In 2019, no publications were found. The most recent record identified by this study was in 2020, with a single publication, and no further records were found for 2021 and 2022.

Thus, it can be observed that there is no consistent pattern of publication on the topic of superheroes in pedagogical practices. Since the first identified text in 1999, only eight publications have been found over a span of 23 years, indicating that this is a topic rarely addressed in scientific journals. Nevertheless, it is noteworthy that most of the works were published within the last 13 years.

Graph 2 – Distribution of Academic Production by Discipline.

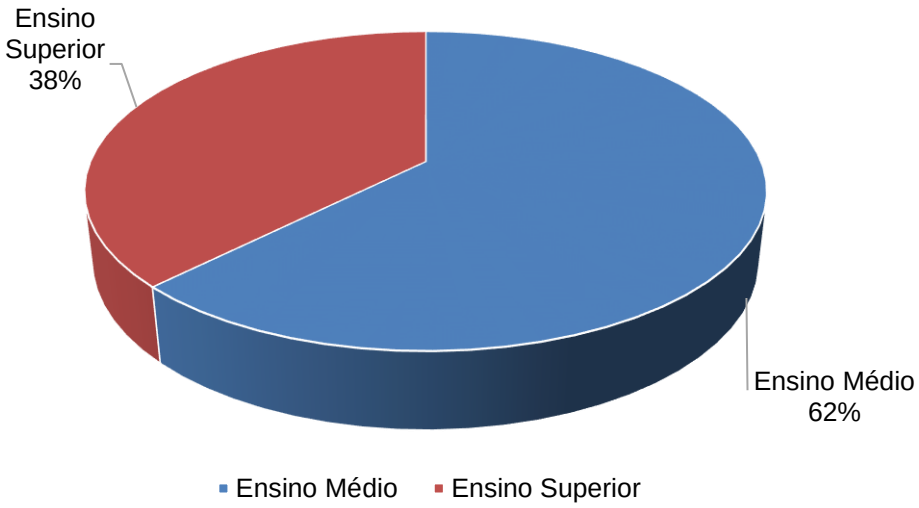


Source: Prepared by the authors.

Graph 2 shows that the field of knowledge that most frequently employs superheroes is Physics, followed by Sociology, which ranks second in its use of the theme. Additionally, Biology appears with a single publication.

From this, we can observe that the use of superheroes in pedagogical practices remains largely confined to the field of exact sciences specifically, the discipline of Physics.

Graph 3 – Percentage Distribution of Academic Production by Educational Level.

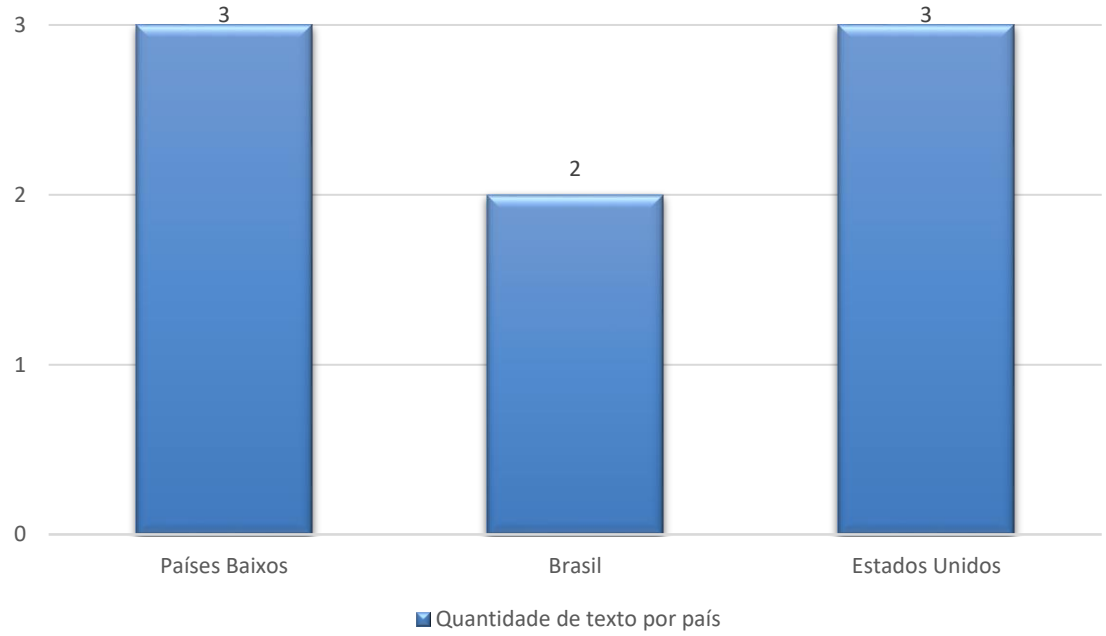


Source: Prepared by the authors.

Graph 3 presents the percentage distribution of academic production by educational level. A total of 62% (5) of the studies focus on the use of superheroes in pedagogical practices at the secondary education level, while 38% (3) are directed toward higher education.

The findings of this research indicate that there is still a gap in academic production regarding the use of superheroes in pedagogical practices for Early Childhood Education and Elementary Education. It becomes evident that the practices analyzed primarily involve youth and adults as target audiences, rather than children.

Graph 4 – Distribution of Studies by Country.



Source: Prepared by the authors.

Graph 4 presents the distribution of the studies analyzed in this article by country. The publications are concentrated in only three countries: the Netherlands, the United States, and Brazil. It is evident that most of the studies (6) were conducted and published abroad—three in a single European country (the Netherlands) and three in a North American country (the United States). Brazil appears as the only representative from South America, with just one publication fewer than the aforementioned countries. Thus, even though it does not account for the majority of publications, Brazil emerges as an important locus for discussion and publication on the topic.

Qualitative Analysis: Classroom Practices and Suggested Activities Involving Superheroes

The analyzed texts address pedagogical practices that can be categorized into two distinct approaches. The first approach — *proposed activities to be carried out using superheroes* — refers to studies that describe suggested practices which were not actually implemented in teaching and learning processes in the classroom. These remain at the level of untested ideas. This has several practical implications, as the lack of implementation prevents the analysis of students' responses whether youth or adults their potential, limitations, and unforeseen challenges that naturally emerge during classroom dynamics. Furthermore, without being put into practice, the effectiveness of the proposal cannot be evaluated. These texts focus on the description of characters and stories,

highlighting their potential to be used in lessons and activities, but maintain a theoretical character (Brown et al., 2016; Fitzgerald, 2018a, 2018b; Nascimento Junior, 2013; Silva, 2012).

The second approach — *accounts of practices carried out with students* — includes academic texts that describe classroom activities implemented by teachers, emphasizing the potential of these characters and the outcomes observed from these practices (Burton, 2008; Fitzgerald & Plotz, 2020; Hall & Lucal, 1999).

We understand that proposals and practices are of different natures; however, we consider it important to analyze both in order to gain a more comprehensive understanding of the impact of using superheroes in the classroom environment.Reports of proposed activities offer insights and discussions on how theoretical concepts can be envisioned in educational contexts. On the other hand, by examining practices actually carried out with students, it is possible to observe how theory translates into concrete outcomes, highlighting the effectiveness (or lack thereof) of the approach adopted.

Therefore, by analyzing the interaction between theoretical proposals and classroom practices, it becomes possible to gain a more comprehensive and contextualized understanding of the use of superheroes as educational tools in the school setting. This integrated approach allows for the identification of best practices, a deeper understanding of the challenges faced, and the continuous improvement of pedagogical strategies aimed at fostering a dynamic and enriching learning environmen.

Proposed Classroom Activities

Among the texts that discuss and present proposed activities, we find Brown et al. (2016), Fitzgerald (2018a, 2018b), Nascimento Junior (2013), and Silva (2012). In these studies, superhero characters are portrayed as promising instructional tools, particularly for teaching science at the secondary education level. Superheroes are presented as alternative resources to create practices that overcome common challenges encountered in schools.

When addressing Physics teaching, Fitzgerald (2018) points out that the main challenge is the lack of contextualization of content and its practical applicability, as many students have difficulty recognizing the application of physics concepts in familiar environments. This results in a perception that the theoretical content taught in class is disconnected from real-world relevance. According to Fitzgerald (2018, p. 1, our translation), “[...] the communication of difficult concepts in physics class can be negatively affected by the absence of a strong connection between physics content and

students' experiences or interests." Therefore, linking physics principles to superheroes not only makes the content more accessible and aligned with students' interests but also allows them to visualize the practical application of these concepts in both fictional scenarios and real-world contexts.

This issue regarding the disconnection of classroom concepts from reality in Physics teaching is also discussed by Silva (2012), who asserts that the mathematical abstraction present in many topics can intimidate students, particularly those still developing their mathematical skills. Given this reality, Silva (2012) emphasizes that "[...] there is a common perception that physics is merely a collection of formulas through which, after lengthy and complicated calculations, one arrives at a final result—a meaningless number, disconnected from the concrete world." (p. 126, our translation)

To mitigate this issue, the author suggests connecting Physics concepts with scenes already familiar to students, proposing an activity featuring the character Magneto from the *X-Men*.

Similarly, according to Nascimento Junior (2013), questioning and creativity are insufficiently explored in Physics classes. For the author, "leading students to understand and question the world around them through investigation means empowering them to contribute to improving the society in which they find themselves" (p.12, our translation). Integrating superheroes into Physics lessons could thus represent an effective strategy to foster inquiry. This approach not only makes the content more accessible but also stimulates curiosity, as suggested by the author.

The potential of using superheroes to address educational challenges is also highlighted by Brown et al. (2016) when discussing the teaching of natural sciences (Chemistry, Physics, and Biology). They emphasize the use of these characters as a means to make the teaching-learning process more engaging and playful, overcoming inherent challenges in science education. They highlight that incorporating pop culture icons into science classes represents a creative way to engage students, transforming course content into scientific exploration.

These assertions align with Moreira's (2021) observations on meaningful learning, according to whom difficulties in learning science content are associated with a predominantly theoretical approach, excessively emphasizing the memorization of concepts often disconnected from students' everyday reality. This contributes to the perception of Science as a distant and abstract discipline. Thus, employing superheroes could make content less theoretical and more relatable to students, overcoming these learning challenges.

Although these texts do not report on activities actually conducted with students, they demonstrate teachers' acknowledgment of the didactic potential of these characters, highlighting opportunities for educators seeking to promote meaningful learning through connections with popular culture. These proposals also emphasize that it is both possible and beneficial to establish links between school content and students' lived experiences. Nevertheless, as these studies are theoretical in nature presenting proposals and analyses of contexts and potentials without practical implementation we can question whether these observations would indeed materialize in school practice and identify potential challenges that might emerge in this process.

Reports of Pedagogical Practices Carried Out in the Classroom

From this point onward, we will analyze pedagogical practices that incorporated superheroes and were effectively implemented in the classroom, specifically referring to the texts published by Fitzgerald and Plotz (2020), Hall and Lucal (1999), and Burton (2008). Two articles present perspectives on the use of these characters in Sociology classes, differing from the approaches focused on Natural and Exact Sciences discussed in the previous section.

When introduced into Sociology classes, superheroes can serve students as “an illustration of how sociology is applicable even in places where it is least expected to be relevant” (Hall & Lucal, 1999, p. 60, our translation). An example of this perspective is presented in the investigation by Hall and Lucal (1999), in which superheroes played a crucial role as reflective tools. By exploring gender representations in popular culture, the authors designed activities that encouraged students to engage in deep analysis, thus complementing classroom discussions on cultural images of men and women. Their study also addressed themes of social diversity, prompting debates on discrimination and prejudice found in comic book narratives, with a particular focus on the X-Men series. This approach enabled students to absorb and explore relevant social issues through culturally significant tools.

Still within Sociology, superheroes were also employed to explore ethical concepts. From this standpoint, Burton (2008) describes activities related to ethics and leadership, using the *X-Men* film as an instructional tool. Ethical dilemmas frequently depicted in superhero stories provide opportunities for reflection and classroom analysis. By involving students in discussions about how their comprehension of course concepts might change if they imagined themselves as superheroes operating in ethical or unethical environments, the author adopted a practical and reflective approach. This not only strengthened conceptual understanding but also promoted critical analysis and the practical application of ethical principles.

The studies by Hall and Lucal (1999) and Burton (2008), although referring to knowledge areas different from those analyzed by Brown et al. (2016), Fitzgerald (2018a, 2018b), Nascimento Junior (2013), and Silva (2012), support assertions made in studies proposing pedagogical practices. By analyzing the implemented practices, Hall and Lucal (1999) and Burton (2008) highlighted superheroes' potential to promote learning by connecting academic concepts to contexts familiar to and consumed by students. They made the teaching of theoretical ideas more practical and applicable to student experiences, thus confirming the hypotheses initially presented. In Fitzgerald and Plotz's (2020) study, the activity involving electromagnetism stood out for its innovative approach. Students were challenged to create response cards linking physics concepts to the superpowers of well-known characters, such as Supergirl, Superman, Hulk, and Captain America. The relevance of this activity was heightened by the popularity of superhero movies within contemporary popular culture, providing a bridge between fiction and scientific concepts. By integrating superhero entertainment into Physics learning, the activity became more engaging and contextualized, contributing to a deeper understanding of scientific principles.

These studies not only demonstrated positive outcomes and achieved predetermined goals but also reinforced the discussions by Hall and Lucal (1999) on how comic books offer a rich source of creative possibilities for various educational courses and contexts. Burton (2008) emphasizes students' readiness to engage in discussions about their favorite superheroes, facilitating an understanding of ethical implications associated with these characters. The presence of Meaningful Learning is clear in the works of Burton (2008) and Hall and Lucal (1999), as these activities leveraged students' prior knowledge of superheroes, underscoring the importance of incorporating non-school elements into the school environment, thereby enhancing the relevance and integration of classroom exercises from the students' perspective.

Final considerations

The texts identified and analyzed in this study propose the use of superheroes in the classroom, addressing the guiding question that directed our search. The results demonstrate that, in Brazil, these characters have been integrated into the teaching-learning process (Junior, 2013; Silva, 2012); however, there are few records of this practice in the literature.

Although superheroes are not new characters and are consistently present in the daily lives of children and youth, their use as educational tools within teaching-learning processes remains limited.

Even after recent significant film, series, and cartoon releases by Marvel and DC, these characters have not significantly appeared within schools or pedagogical practice settings. This suggests a potential gap between school curricula and themes related to students' lived experiences, as well as a missed opportunity to engage students in critical discussions and reflections about the cultural content they consume.

Another relevant point to highlight concerns the educational levels at which superheroes are being employed. The analyzed articles address Secondary and Higher Education, with a noticeable absence of studies related to Early Childhood Education and Elementary Education, even though these characters are notably popular among children.

An additional insight provided by this research is the need to discover and explore other possibilities for utilizing these characters, both across different knowledge areas and in varied methodological approaches. As observed, superheroes are predominantly employed in Physics and, to a lesser extent, in Biology and Sociology. Thus, it is important that their use extends beyond merely exemplifying concepts. Critical discussions around consumerism, cultural domination, and other themes related to the consumption of superheroes by Brazilian children and youth should be encouraged.

In this context, the systematic literature review presented here suggests that superheroes indeed hold significant educational potential, as evidenced by the initial integration of these characters into school pedagogical practices over the past 13 years. This potential could be explored further in other areas of knowledge beyond Physics, Biology, and Sociology, as superheroes provide an innovative and engaging approach capable of capturing student interest and fostering active participation within the educational environment.

Given these reflections, superheroes can be viewed as valuable educational instruments, as they have yielded positive outcomes in the construction of new knowledge proposed through pedagogical practices (Burton, 2008; Hall & Lucal, 1999). According to Libâneo (2017, p. 54), teaching is “[...] a sequence of activities by teachers and students aimed at assimilating knowledge and developing skills, through which students enhance their cognitive capacities”.

Nevertheless, most (five) of the scientific studies analyzed in this research describe pedagogical proposals, indicating that they were not effectively implemented within the classroom, thus further reducing the actual utilization of superheroes in classroom practices.

Although the objectives of this study have been achieved identifying existing scientific productions addressing pedagogical practices involving superheroes, even if scarce discussions on

this topic should continue and deepen, aiming to uncover reasons behind their limited presence. This article points toward the potential for new research efforts that could expand the scope of analysis.

The present study conducted searches in Portuguese and English within five databases (Scielo, Brazilian Digital Library of Theses and Dissertations, CAPES Journals, Redalyc, and ERIC). Consequently, further research is necessary, including searches in other languages such as Spanish and within additional databases, to identify new possibilities for these characters, conduct more comprehensive analyses of pedagogical practices, and broaden investigations into the educational use of superheroes.

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