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Dossier Ludwik Fleck

The growing presence of Ludwik Fleck's epistemology in science education research in Brazil

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Abstract:
This study centers on the reception of Ludwik Fleck's epistemology by Science Education research in Brazil. Eighty-nine dissertations and theses from 1995 to 2015 have been analyzed, thirty-seven of which discuss Science Education. The data point to Fleck's epistemology as the preferred theoretical reference for the most diverse fields of knowledge. The first studies came about in the 1990's and there is a concentration of works on Science Education at the Federal University of Santa Catarina. A more specific investigation has been carried out on thirty-four works which discuss Science Education. These papers have been analyzed from six angles and the greater volume focuses on "the training of teachers" and "scientific fact emergence". The significant contribution of the epistemological categories "thought style", "thought collective", "intracollective and intercollective circulation of ideas" are highlighted in the process of producing knowledge in the area of focus.

Keywords:
Fleck's epistemology; state of knowledge; science education; theses and dissertations

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Introduction and contextualization

The present article reports a study which is part of a broader interinstitutional project and aims to accomplish permanent statements on academic production in Science Education in Brazil, in different thematic and temporal divisions. Studies of this nature, which perform critical reviews of scientific production are greatly relevant to the area, given their contribution to the systematization of what has been produced previously,

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as well as the identification of gaps and new demands, contributing to guiding the development of research in the area. Soares and Maciel recommend that such studies are uninterrupted, given their contribution:

> [...] identification, characterization, and analysis of the 'state of knowledge' regarding certain subject is essential for the continuous movement of Science throughout time. Thus, the same way science keeps constructing itself along time, sometimes focusing on one or another particular aspect, methodology and theoretical referential, also the analysis in the 'state of knowledge' produced along time must be simultaneously constructed, indentifying and enlightening the ways of science, so that the process of building knowledge over a specific subject is revealed, in order to attempt the integration of results and also identify duplications, contradictions and, above all, lacks, which are yet unstudied or scarcely studied aspects and roughly explored research methodologies. (Soares; Maciel, 2000, 6)

Another important contribution from bibliographical studies of an inventorial nature refers to the amplification of the data produced (Soares; Maciel, 2000; Ferreira, 2002; Romanowski; Ens, 2006; Gamboa, 2008). Every time an area of knowledge registers expressive development, which includes a quantitative growth rate of studies, ordering production is necessary as a means of creating "integrative syntheses" (André, 2002) of the several studies and thus offering greater support to future research.

In Brazil, socialization of produced knowledge in the form of theses and dissertations is still incipient, especially given the on-going expansion of postgraduate *stricto sensu* observed in the past few decades. This factor has been contributing to the quantitative growth of studies as well as the diversity of focuses taken by research in science education. Dissemination mechanisms follow patterns inaugurated decades ago.

The initial draft of the reported research resulted in a first article (Lorenzetti; Muenchen; Slongo, 2013) which analyzed the presence of Fleck's epistemological matrix (1979; 1986; 2010)[4] in science education research developed in Brazil, from 1995 to 2010. Five years later, a second draft of that study is presented, incorporating new data to the previously analyzed period, enhancing the time frame up to 2015. Therefore, when it comes to analizing production in this more recent period the goal is to establish some sort of continuum with the previous stage in a cohesive way. Consequently, results announced in this article refer to the period between 1995 and 2015, covering two decades of academic production on theses and dissertations in science education, supported by Ludwik Fleck's theory of science (1979) and developed in national postgraduate programs. An attempt is made to explicate how the major area Science Education has been dialoguing with that epistemological reference. It is, however, important to state that the present study did not have Fleck's epistemology as an object, as it did not have the goal of making a comparative analysis between different epistemological approaches which have been influencing research on science education in Brazil. The undertaking was to explicate the importance and the impact that Fleckian epistemology has generated on academic production (theses and dissertations) in Science Education in Brazil.

Because of the current stage of the study, more generic data of the academic production analyzed are presented. The goal is also to amplify the dissemination of these studies through their identification and ordering, according to the chosen criteria. In this sense, the complete references of theses and dissertations are presented containing the following data: year of defence, author, work title, academic affiliation, adviser, higher education institution and postgraduate program.

We introduce initially an overview of research which utilize Fleck's epistemological contribution, particularly production in Science Education, aiming to explicate at what moment it was established as a reference for research in the area, the objects, programs and researchers who have sought this epistemological dialogue, the justification given for using this epistemology and the contributions which the approach has brought to the area, according to the authors of these studies.

[4] Until the Brazilian Edition of Fleck's book (2010) the American edition (1979) and mainly the Spanish edition (1986) – due the similarity of Spanish and Portuguese – were largely read and quoted in Brazil.

Methodological procedures and initial panorama

The reported study is configured as bibliographical research, from the "state of knowledge" (Ferreira, 2002) type, and aims to analyze the presence and reception of Ludwik Fleck's epistemology (1979) in Science Education research in Brazil. For that reason, theses and dissertations developed in national postgraduate programs from 1995 to 2015 and have had Fleck's epistemology as a basis for analysis and interpretation have been analyzed. The time frame presents a historical justification, once the defense of the first dissertation identified in the databases utilized in this study is dated 1995.

The data were collected in the first semesters of 2011 and 2016. Theses and dissertations available in the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) theses bank[5] and in the Biblioteca Digital Brasileira de Teses e Dissertações[6], using the following search expressions: "Ludwik Fleck", "Fleck" and "thought style". Thus, the sample comprises eighty-nine works that utilize Fleck's epistemology as a theoretical reference. Furthermore, abstracts in every dissertation and thesis were carefully read, in order to verify the relevance of each work for the present study.

First, the studies listed generated tables which identified the volume of works developed in the period and the concentration of works by knowledge areas, higher education institutions, postgraduate programs where they were created and respective advisers.

Through the mapping, it was possible to identify that Fleck's epistemology guided the first studies in the mid 1990's, having, up to 2015, supported the development of eighty-nine studies, of which forty-nine were dissertations developed in academic Masters (MA) degrees, two were dissertations in professional Masters (MF) degree[7] and thirty-seven were theses (T) produced in doctoral programs; a predominance of dissertations in comparison with theses. Considering the goal of this work, which is to analyze academic production that utilizes Fleck as theoretical reference, works focused on Science Education were analyzed. The data are presented in Table 1:

Table 1 – Number of works mapped

Period	Diverse Areas				Science Education			
	MA[1]	MF[2]	D[3]	Total	MA	MF	D	Total
1st: 1995 a 2000	4	-	2	6	2	-	-	2
2nd: 2001 a 2005	8	-	10	18	-	-	4	4
3rd: 2006 a 2010	17	-	7	24	3	-	4	7
4th: 2011 a 2015	20	2	19	41	9	1	14	24
Total	49	2	38	89	14	1	22	37

1. Academic Masters Program; 2. Professional Masters Program; 3. Doctoral Program.
Source: The Authors (2016).

The presence of Fleckian studies through the period is observed to be regular, with a tendency to growth. Probably due the Brazilian edition of Fleck's book, the last five years show a higher volume, overtaking production in the first fifteen years.

Through the reading of the abstracts, it was possible to identify the area of knowledge encompassing these works, demonstrating that the Human Science area contributed thirty-two works, followed by Health Science with twenty-five and the Engineering area with one.

[5] Collected on the website http://www.capes.gov.br/servicos/banco-de-teses

[6] Through the address http://bdtd.ibict.br/vufind/

[7] In Brazil there are two categories of master degree: the academic (MA) and the professional (MF). The MA prepares the researcher as well as the teacher to continue the career with the PhD. Differently, the MF emphasizes studies and techniques directly aimed at the development of a high level of professional qualification. This emphasis is the only difference in its relation with the MA. Therefore, it attributes the same degree and prerogatives, including for the exercise of teaching, and, it has the same national validity of the MA. (BRASIL, 2002)

The area of Human Science involves postgraduate programs in Education, Philosophy, History, Psychology, and Political Sociology. In the Multidisciplinary area are courses focused on the *Teaching*, featuring programs on Scientific and Technological Education, Teaching of Science and Mathematics, Science Education, Teaching of Science, Teaching of Science and Technology, among others. In the Health Science area are the Programs of Health, Collective Health, Public Health, Nursing, Physical Education, among others. The Environmental Engineering program comprises the area of Engineering. Table 2 identifies the programs in which the eighty-nine works were developed.

Table 2 – Number of works by program and Higher Education Institution

Program	Higher Education Institution	Number
Education	**UFSC** (Universidade Federal de Santa Catarina), **UFPR** (Universidade Federal do Paraná), **UnB** (Universidade de Brasília), **UNIJUI** (Universidade Regional do Noroeste do Estado do Rio Grande do Sul), **UFSCar** (Universidade Federal de São Carlos), **UNIPLAC** (Universidade do Planalto Catarinense), **UNESC** (Universidade do Extremo Sul Catarinense)	20
Scientific and Technological Education	**UFSC** (Universidade Federal de Santa Catarina)	16
Collective Health	**UERJ** (Universidade do Estado do Rio de Janeiro), **UFSC** (Universidade Federal de Santa Catarina), **UFRJ** (Universidade Federal do Rio de Janeiro), **UNICAMP** (Universidade Estadual de Campinas), **FIOCRUZ** (Fundação Oswaldo Cruz)	13
History	**UFRN** (Universidade Federal do Rio Grande do Norte), **UFMG** (Universidade Federal de Minas Gerais)	5
Philosophy	**UERJ** (Universidade do Estado do Rio de Janeiro), **UFSC** (Universidade Federal de Santa Catarina), **USP** (Universidade de São Paulo), **UEL** (Universidade Estadual de Londrina)	4
Health	**UNIVALI** (Universidade do Vale do Itajaí)	4
Education in Science and Mathematics	**UFPA** (Universidade Federal do Pará)	3
Physical Education	**UFSC** (Universidade Federal de Santa Catarina)	2
Nursing	**UFSC** (Universidade Federal de Santa Catarina)	2
Public Health	**UFSC** (Universidade Federal de Santa Catarina), **FIOCRUZ** (Fundação Oswaldo Cruz)	2
Education in Science	**UNIJUI** (Universidade Regional do Noroeste do Estado do Rio Grande do Sul)	2
Science and Health History	**FIOCRUZ** (Fundação Oswaldo Cruz)	2
Others	**UFSM-FURG-UFRGS**, (Universidade Federal de Santa Maria, Fundação Universidade do Rio Grande, Universidade Federal do Rio Grande do Sul), **UFMG** (Universidade de Minas Gerais), **UNIFESP** (Universidade Federal de São Paulo), **UFRGS** (Universidade Federal do Rio Grande do Sul), **UNESP** (Universidade Estadual Paulista "Julio de Mesquita Filho"), **UFSC** (Universidade Federal de Santa Catarina), **USP** (Universidade de São Paulo), **UEL** (Universidade Estadual de Londrina), **UTFPR** (Universidade Federal Tecnológica do Paraná), **UFBA** (Universidade Federal da Bahia), **FIOCRUZ** (Fundação Oswaldo Cruz), **UFSC** (Universidade Federal de Santa Catarina, **UNIVALI** (Universidade do Vale do Itajaí), **UNIPLI** (Centro Universitário Plínio Leite).	14
Total		**89**

Source: The Authors (2016).

In a survey conducted from 1995 to 2010 Lorenzetti, Muenchen e Slongo (2013) observed the predominance of research focused on the Health area, whereas in the time frame from 2011 to 2015, a significant amplification of works in Human Science and Multidisciplinary areas was identified, with a majority of studies in the Science Education area. However, when the specificity of the priority themes was analyzed, it was possible to observe forty-three works involving Education and Teaching, forty works in the Health area and six in Philosophy. This may be explained by the fact that works in the Health area were developed in other programs. Such data exemplify quite well the intercollective circulation of ideas in the process of knowledge production, as Fleck argued (1979; 2010). This important dynamic is exemplified by Da Ros's (2000), Cutolo's (2001) and Pfuetzenreiter's (2003) theses, which even though focusing on specific objects from the area of Health, were generated in the Postgraduate Program of Federal University of Santa Catarina (UFSC).

A survey conducted by Lorenzetti (2008) indicates the presence of study centers in Brazil using Fleck as a reference, showing that the citation of his work in national surveys presents a trajectory and an application in different contexts. These centers are located in UFSC, involving the Education programs, Nursing, Public Health, Philosophy, Political Sociology and Scientific and Technological Education. In Rio de Janeiro state, the production involving Fleck's epistemology is concentrated in the Collective Health Program of Oswaldo Cruz Foundation (FIOCRUZ) and in the Public Health and Philosophy Programs of the University of the State of Rio de Janeiro (UERJ). In the Federal University of Minas Gerais (UFMG), Fleck's epistemology was utilized in the History Program.

In this study, it is quite clear that Fleck's epistemology is being used in twenty-five different Higher Education Institutions: UFSC (n = 40), UERJ (n = 7), UFMG (n = 5), UNIVALI), FIOCRUZ (n = 4), UFPA (n = 3) and UEL, UFPR, UFRN, UNB, UNIPLAC, USP, with two works each and thirteen institutions contribute one work each, which demonstrates the dissemination of Fleck's epistemology in the academic community, according to Table 2.

With regard to the supervisors of theses and dissertations, the data indicate the leadership of Demétrio Delizoicov (UFSC), who guided eleven studies; Kenneth Rochel de Camargo Jr. (FIOCRUZ), seven studies; Marco Aurélio da Ros (UFSC) with six; Carlos Alberto Marques (UFSC), Edel Ern (UFSC) and Luiz Roberto Agea Cutolo (UNIVALI), with four studies each; Maria Helena da Silva Carneiro (UnB), Mauro Lúcio Leitão Condé (UFMG) with three each; Arden Zylbersztajn (UFSC), Araci Asinelli da Luz (UFPR), José Andre Peres Angotti (UFSC), Lucia Ceccatto de Lima (UNIPLAC), Maria Cristina Pansera-de-Araujo (UNIJUÍ), Maria de Fátima Vilhena da Silva (UFPA) Nadir Ferrari (UFSC) and Walter Antonio Bazzo (UFSC), two studies each. With just one orientation, we locate more than eighteen different advisors. This data, while suggesting a certain dispersion, may also reflect an important development phase of a national community of researchers, who have been seeking in Fleck's epistemology an approach of analysis and interpretation of the scientific facts that they study.

An element that seems to justify such inference is the fact that PhD students who utilized Fleck in their theses continue use Fleck's epistemological matrix as they pass on to guide researches in postgraduate programs. For example, Marcos Aurélio da Ros, Luiz Roberto Agea Cutolo, Lucia Ceccato de Lima and Cristiane Muenchen, strongly used the Fleckian categories in their theses and now use them with their students, in the studies analyzed here.

Queirós and Nardi (2008) present an academic production overview which uses Fleck's epistemology as a theoretical approach and which was published in national periodicals of Education in Sciences area and in the minutes of the National Meeting of Research in Education in Sciences, carried out from 2002 to 2007. With this focus, the authors located thirteen articles and highlighted the predominance of objects linked to the area of Health and Biological Sciences. Furthermore, they have classified these studies into four main categories: 1) History of Scientific Facts; 2) Conception of teachers about the nature of science; 3) Health Teaching; 4) Analysis of research in Science Teaching in Brazil.

From another point of view, Lorenzetti's (2008) work located 20 studies, involving dissertations and theses developed in postgraduate programs, from 1995 to 2006. This academic production, which is based on Fleck's epistemological ideas, was categorized by the author in five axes: 1) Teacher formation; 2) Studies on the curriculum; 3) Analysis of the emergence of a fact; 4) Fleck's relationship with other authors; 5) Analysis of academic production.

After this survey and initial analysis of the eighty-nine theses and dissertations which used the epistemological contribution of Fleck, a specific study was performed involving thirty-four of the eighty-nine

works, whose investigated problems belong to the area of Science Education.[8]

Using the Discursive Textual Analysis methodology (Moraes; Galiazzi, 2013), focusing mainly on the abstract, introduction, methodology, final considerations and references of the texts in the theses and dissertations, the following elements were computed: postgraduate program, Higher Education Institute (HEI), content area, axes, research problem / objectives, justifications given by the author for using Fleck's epistemology, Fleckian categories used, references to Fleck's works and the studies that used Fleck and contributions of the epistemological frame for research in Science Education, pointed out by the study. These data and their analysis are listed below.

Fleck's epistemology and research in science education

From thirty-seven studies analyzed, twenty-two are theses, fourteen are dissertations developed in academic Masters programs and one dissertation was produced in a professional Masters program. The data are shown in Table 3.

Table 3 - Volume of works by HEI/Program

HEI	Program	Dissertation	Theses	Total
UFSC	Education	2	4	**6**
	Scientific and Technological Education	3	11	**14**
	Environmental Engineering	-	1	**1**
UNIJUÍ	Education in Science	2	-	**2**
UFPR	Education	1	1	**2**
UFPA	Education in Science and Mathematics	2	-	**2**
UEL	Philosophy	1	-	**1**
UFRGS	Education in Science, Life Chemistry and Health	-	1	**-**
UFMG	History	1	-	**1**
UFBA	Teaching, Philosophy and History of Science	1	-	**1**
UFRN	Education	1	-	**1**
UFSCar	Education	-	1	**1**
UFSM/FURG/UFRGS	Education in Science, Life Chemistry and Health	1	-	**1**
UNESP	Education for Science	-	1	**1**
UTFPR	Teaching of Science and Technology*	1	-	**1**
USP	Science Teaching	-	1	**1**
Total		**16**	**21**	**37**

* Professional Masters Program
Source: The Authors (2016).

[8] It must be mentioned that three documents were not analyzed because they were not available at the time the survey was performed.

The data show significant production of dissertations and theses within the Education and Scientific and Technological Education program of the Federal University of Santa Catarina, with fifty-four percent of the works. The predominance of doctoral theses is also observed, equivalent to seventy-one percent of the works concentrated in this institution.

Considering the content area of the thirty-seven analyzed studies, it was observed that twelve works involve Biology, eight refer to Teaching of Sciences, five to Chemistry, four to Physics, two to Professional Education. The Science and Biology, Environmental Education, and Health Education disciplines each involve one work. It was also identified that one study analyzes research on textbooks and in another all of High School disciplines are analyzed.

The works were compounded around six axes, five of which were defined by Lorenzetti (2008), namely: Teacher Training, Curriculum, Emergence of a Scientific Fact, Analysis of Academic Production and Fleck's relation with other authors. In the research development, we have identified an emerging axis called Didactic Material Analysis. A characterization of each axis is presented below:

Teacher training: the studies analyzing the teaching work from an investigation of the discourses, knowledge and effective practices, involving both initial and continued training, focusing on the identification of collective thought, thought styles and circulation of ideas among thought collectives.

Curriculum: the works analyzing the curricula of Basic Education and Higher Education, focusing on its components, professional practices and theory and practice articulation. They analyze the epistemological, educational and curricular conceptions present in the curricular proposals, mapping styles and thought collectives.

Analysis on the emergence of a scientific fact: works that review and present discussions about the emergence of certain scientific facts, the process of knowledge production, the context and conditions of production, the historical and social dimension, the ways of interpreting and understanding a phenomenon, involving the use of the establishment categories, extension and transformation of thought styles and the role of intracollective and intercollective circulation of ideas.

Fleck's relation with other authors: works that use Fleck as reference, establishing relations with other authors, discussing the science conception, culture, method of science, social motivations, among others.

Analysis of academic production: works analyzing the scientific production in a certain area of knowledge from dissertations and theses in postgraduate programs, studies presented at events or published in journals. Studies which explain the constitution of the area under study, the thought collective and the thought styles that developed the area of knowledge.

Analysis of didactic materials: works analyzing the structure and content of didactic material, identifying elements that characterize thought styles, thought collectives, knowledge circulation and practices.

According to these categories, the thirty seven studies that covered the Science Education knowledge area were analyzed, fourteen of which discuss Teacher Training, ten studies incorporate the Emergence of a scientific fact axis, seven involve analyses on Academic Production, five perform Studies on the Curriculum and an Analysis of Didactic Materials work. Fleck's relation with other authors was not evidenced in the analyzed period. More specific data on these categorizations are given below.

In the Teacher Training axis, thirteen studies of the following authors were compounded: Delizoicov (1995), Lambach (2007), Muenchen (2010), Oda (2012), Queirós (2012), Niezwida (2012), Souza (2013), Brandao (2013), Gonçalves (2014), Leonel (2015), Souza (2015) and Macedo (2015).

Delizoicov's (1995) study identifies Thinking Styles of Elementary Science teachers in analyzing their interaction with textbooks. Lambach (2007) identifies Thought Styles of Chemistry Teachers who work in Youth and Adult Education programs in public schools in Paraná. The Muenchen study (2010) seeks to characterize the investigative processes which culminated in the proposition of a didactic-pedagogical structure to the Teaching of Science called "Three Pedagogical Moments" (Delizoicov; Angotti; Pernambuco, 2002). The dissemination process of this dynamic by a group of professors from the Federal University of Santa Maria who work in the training of science teachers was also investigated. The study

makes significant use of the categories intracollective and intercollective circulation of ideas. Oda (2012) researched the constitution and pedagogical practice of university professors for the teaching activity in Microbiology and Parasitology, investigating how this activity could contribute to reducing health damage caused by parasitic organisms. Queirós's thesis (2012) performs the reading of James Prescott Joule's work, showing possible contributions of this reading in the articulation process of scientific and humanistic cultures, focusing on the university professors training from a transformative perspective. The didactic strategy construction points to the effectiveness of intercollective and intracollective circulation, which is associated with the "awareness" of the complications present in the scientific knowledge construction of Joule by a group of teachers. Niezwida (2012) investigates how the teacher training processes in the area of Technological Education can provide the transformation in this education. For the author, the convergence of the transformative assumptions of Freire and Fleck allow indication of the necessity and the possibility of transforming the dominant Thinking Style into Technological Education, through processes of continuous training of the teachers, as well as of the agents that educate new teachers. Souza (2013), in his Master's dissertation, identified and problematized understanding about Environmental Sustainability of a group of chemistry teachers of the Public Teaching Network of the city of Florianópolis - SC, evidencing the way of organizing the teaching, aiming for the approach of Environmental issues in this discipline. Lambach (2013), in his thesis, highlights the implications that ongoing training, based on the Freirean dialogical-problematizing principles, bring to the teaching practice of chemistry teachers in the Education of Young and Adults (EJA) and discusses the contributions of the epistemology of Science in the proposition of a dialogical-problematizing methodology based on the Freirean pedagogy in order to overcome the recurring difficulties in the natural sciences area. Brandão's study (2013), based on the teacher's discourse, identifies possible pedagogical models and characterizes thinking styles present in the degree course in physics of the IFRN. Gonçalves (2014) analyzes how the circulation of ideas about biodiversity occurs in the pedagogical practices of Science and Biology teachers based on the Science, Technology, Society and Environmental Patrimony approaches. Leonel's thesis (2015) reflects on what contributions a methodological proposal, in the context of continuing education for physics teachers can offer in order to meet the demands of teacher training and practice in the context of state public schools of Santa Catarina. From the categories of thought style, thought collective, intracollective and intercollective circulation, and complications, physics teachers are seen as a collective that can be formed by distinct groups and which relates to other collectives. Souza (2015) discusses the possibilities that Fleck's Epistemology can bring to addressing the gaps present in the Initial Training of Science Teachers, situated socio-historically in a context with fragmentation of knowledge and that does not contribute to the development of critical thinking in students. Finally Macedo's thesis (2015) sought to answer how the conceptions about the nature of science, the learning and teaching that professors licensed in Physics by the UFBA have and transmit, influence the application of the foundations of Science Teaching by Research to the their teaching activities. These research projects seek, each in its own way, to identify Thought Styles from the analysis of educational conceptions and pedagogical practices.

In the Analysis on the emergence of a scientific fact axis, ten studies were classified: Leite (2004), Delizoicov, (2002), Scheid (2006), Lima (2007), Bertoni (2007), Tomio (2012), Tréz 2012), Chaves (2015) and Luiz (2015).

Leite's thesis (2004) identified and analyzed the scientific view and the historical dimension present in the genetic books used in the Biological Sciences course at UFSC. An epistemological analysis of a historical episode (Mendel's case) was performed to counter and overcome the predominant empiricist view in books and in scientific education in general. Delizoicov's study (2002) analyzed the knowledge about the movement of blood in the human body, considering the contexts of its production and its dissemination. Scheid (2006) investigated epistemological aspects present in the history of a scientific fact and the contributions provided by the discussion of these aspects in the teaching and learning process of Biology, particularly Genetics, in the initial training of Biological Science teachers. Lima (2007) analyzed the planning and implementation process of the Municipal Nature Park of Lages - SC, with emphasis on the Conservation of Water Resources and the perception of the community. Bertoni (2007) identified and grounded biological thought styles which historically predominated in the way of interpreting and understanding the life phenomenon, an object of Biology study. Tomio (2012) investigated which scientists production of writing conditions can be constitutive of the development of scientific knowledge and how its determinants can guide the functioning and/or analysis of students' writing in science classes in school. Tréz (2012) identified and characterized in his thesis the thought styles regarding the use of animals as a model by the biomedical

sciences, the potentially innovative or traditional profile of teachers and students working in the Biological Sciences and Health areas, in relation to the use of animals in teaching and research, the thought styles which operate among teachers linked to IFES, working in the Physiological and Pharmaceutical Sciences areas and also characterized possible relations between the thought style found among teachers, with potentially innovative or traditional profiles of postgraduate students and Science Biological and Health Sciences students. Bertoni (2012) investigated which thought styles have historically prevailed and contributed to the emergence of historical conceptions of life. Chaves (2015) had as a question responding to how new health definitions impact the health education field, highlighting the interference and insertion of collectives in health education. Finally, Luiz's dissertation (2015) analyzed a History of Science episode, the double helix.

These studies, in their distinctive fields, give a review and a historical-epistemological analysis of the production process of certain knowledge. In doing so, these authors explain thought styles and collectives, especially the Leite and Scheid (2006) study, which add to this focus the challenge of identifying, in the knowledge production trajectory, elements that enable for teachers in training a more adequate understanding of the nature of science.

In the analysis of academic production axis, six studies were incorporated; Slongo (2004), Lorenzetti (2008), Mezalira (2008), Emmel (2011), Hoffmann (2012) and Milaré (2013). Slongo's thesis (2004) analyzed the Brazilian academic production in Biology Teaching developed from 1972 to 2000, seeking to locate groups and research trends which marked that period, as well as the circumstances under which these tendencies predominated, were developed and transformed, taking the area to the current state of knowledge. Lorenzetti's study (2008), using the Fleckian categories as an instrument of academic production analysis of in Environmental Education developed in the postgraduate programs in Brazil, characterized the Thought Styles of the members of the esoteric and exoteric circles of Environmental Education. Mezalira's research (2008) focused on investigating and characterizing thought researchers collectives on *Science, Technology and Society* referenced in Brazil. Emmel (2011) analyzed theoretical axes which are reflected in the research on the didactic book and which styles and collective of thought constitute these works. Hoffmann's dissertation (2012) sought to characterize Brazilian works which deal with analogies and metaphors in biology teaching, identifying collectives of researchers who dedicate their research to the study of the subject. Milaré (2013) sought to highlight the characteristics of the research in chemistry teaching produced between the years 2006 and 2009 in the postgraduate programs of USP in the education, chemistry and science teaching areas.

Such works are characterized as historical-epistemological studies which, when analyzing the academic production in respective knowledge areas and specific time frames, identify thought styles and Collectives. This is especially true in the Slongo (2004) and Lorenzetti (2008) studies, which, in explaining the thought styles and collectives, describe their establishment, extension, and transformation process. In addition, the categories of intracollective and intercollective circulation of ideas were widely used in all studies of this axis.

In the studies on the curriculum axis four works were classified: Leal (2013), Alves (2014), Nonenmacher (2014) and Giacomini (2014).

Leal's thesis (2013) discusses the limits and possibilities of knowledge and practices disseminated by chemistry teachers, in the training processes of the technicians, regarding the professional education, environment, sanitation and teaching of chemistry, with a view to adopting a critical-transforming training perspective. Nonenmacher (2014), analyzing a chemistry course, within an integrated curriculum proposal, seeks to understand that "teacher knowledge" some curricular components (Integrated Professional Practices) provides its graduates. Reflecting on thought styles of the graduates, it identifies nuances of these, in the constitution of the research and collaborative teacher perspective. Giacomini (2014), emphasizing the relevance that new curricular configurations, based on the critical perspective and the social context, have to trigger a process of profound transformations, disrupting the current linear curricular thinking style, analyzes the advances achieved by teachers in curricular implementations of Regular High School and EJA, from the thematic approach perspective. These studies seek to discuss curricular projects and training practices which contribute to professional training in a critical curriculum perspective.

In the analysis of didactic materials axis, a single study was classified, by Yamazaki (2015). The author investigates the didactic structure of basic physics textbooks of higher education or manuals of basic physics, through a detailed analysis of significant examples, with the objective of identifying and discussing a teaching tradition of this discipline. The habitus notions, scientific spirit and style of thought, by Bourdieu,

Bachelard and Fleck, respectively, were used by the author for the thoughts understanding and actions which are legitimized in certain collectives of individuals.

Fleck proposes that the knowledge production process is concretized in this interaction of the subject with the object, mediated by what he calls Thought Style and within a thought collective. According to Fleck, knowledge production is characterized as a process involving the instituting, extension and transformation of styles of thought. The instituting process of a thought style arises from the confrontation of a problem by more than one researcher, that is, by a collective. It is important to emphasize that the identification of a particular thought style, as well as its possible transformations is made with the contribution of historical reviews, as Fleck (1979, 2010) argues.

The Fleckian perspective has also grounded contemporary production analyzes. Seventy percent of the analyzed works (Delizoicov, 1995; Slongo, 2004; Lambach 2007; Mezalira, 2008; Lorenzetti, 2008; Muenchen, 2010; Emmel, 2011; Niezwida, 2012; Tréz, 2012; In this study, we present a review of the literature results on 2015, and the results of the study, 2015) encompasses relatively contemporary aspects analyzes compared to the knowledge production which was the object of historical-epistemological analysis of episodes which are already part of the Science History, such as the studies on the Harvey model of blood circulation (Delizoicov 2002), On Mendel's Laws (Leite, 2004), on DNA (Scheid, 2006), on the double helix (Luiz, 2015) or historical rescues, such as the research concerning the writing production of scientists Müller and Darwin (Tomio, 2012), the scientist James Prescott Joule study of the work (Queirós, 2012) and the concept of life emergence (Bertoni, 2012).

The other studies analyzed, based in Fleck's epistemology, although characterized thought styles and implementation dynamics and change regarding the foci they investigated, did not have as their objective, properly, to carry out an analysis on the production of knowledge.

With regard to the justifications which led the researchers to opt for Fleck's epistemological contribution, the studies emphasize which this perspective allowed:

a) identifying the socio-historical-cultural character of the knowledge production (Leite, 2004, Delizoicov, 2002, Scheid, 2006 and Lorenzetti, 2008, Yudi, 2012, Millaré, 2013, Alves, 2014, Souza, 2015, Macêdo, 2015);

b) identifying and characterizing ways of conceiving and acting in research and teaching, according to a historical perspective which includes the present time. In general, the thirty-four studies analyzed attribute this potential to Fleck's epistemology;

c) identifying the need for the epistemological debate in the initial and continuous training of teachers (Lambach, 2013, Souza, 2015, Yamazaki, 2015);

d) understanding the interaction of the collectives of scientists and, in this process, the role of the circulation of knowledge and practices in the knowledge production (Delizoicov, 2002, Slongo, 2004, Leite 2004, Scheid 2006, Lorenzetti, 2008 and Muenchen, 2010; Emmel, 2011; Tomio, 2012; Hoffmann, 2012; Millaré, 2013; Brandão, 2015);

e) understanding the interaction of the collectives of educators and learners, and in this process, the circulation of knowledge and practices and their role in the transformations occurring/necessary in the training and teachers practice in the area and/or in pedagogical practices and curricular structures which favor the dissemination of the scientific culture (Lambach, 2007 e Muenchen, 2010; Emmel, 2011; Niezwida, 2012; Queirós, 2012; Souza, 2013; Gonçalves, 2014; Giacomini, 2014; Nonenmacher, 2014; Brandão, 2015);

f) identifying/knowing and characterizing thoughts/conceptions (educational and epistemological) and pedagogical practices present in the teachers training and action, as well as, in didactic materials for the Natural Sciences teaching (Delizoicov, 1995; Lambach, 2007; Bertoni, 2007 e Muenchen, 2010; Yudi, 2012; Leal, 2012; Leonel, 2015; Macêdo, 2015).

It was observed that Fleck's epistemological categories "thought style" and "thought collective" were used by the thirty-four studies analyzed, however, these categories appear in the research in different ways and

with different emphases. After a decade, in 2004, the first dialogues of these researches appeared with the categories: "esoteric and exoteric circles" and "intracollective and intercollective circulation of ideas". The use of these categories intensifies in the developed productions, in the later period, and approximately fifty percent (eighteen studies) of the works seek to identify the different thought collectives involved in the particular scientific education areas investigated, as well as the communication dynamics between them. Recently, in 2012, the first studies that use the category "complications" appear in their epistemological analyzes. Approximately thirty percent of the analyzed studies (ten researches) investigate the complications faced by distinctive thought collectives in the dissemination of their knowledge and practices. These data show that research has advanced in the use of Fleckian categories and their application in different contexts. The dissemination and use of these epistemological categories to investigate different objects in the area of Science Education reflects their potential.

Working on the assumption of a thought collective shares knowledge and practices, which characterize the current Thinking Style, we have investigated bibliographical references used by the research analyzed and that address the epistemology of Fleck.

This data is relevant insofar as explaining the sharing of theoretical and methodological elements by the research in Science Education. It was identified that Fleck's book in Spanish version (Fleck, 1986) and in the Portuguese one (Fleck, 2010) was cited in twenty-three works each, being verified that from 2010 with a Portuguese book publication there is a reduction in the quotations from the Spanish version, followed by Schaffer and Schnelle's introduction to the author's work, which was also cited in twenty studies. It is observed in the latest works there is a reduction in the use of this reference. The texts by Ilana Löwy (1994a, 1994b, 2004), the great disseminator of Fleck's epistemological thought, were cited by nineteen of the thirty-four studies analyzed. In addition, with seven citations, we highlight the articles organized by Cohen and Schnelle (1986) in the *Cognition and Fact* work. In addition, three hundred and fifty-nine texts referring to Fleck's epistemology (1986; 2010) were identified, of which one hundred and eighteen are theses, dissertations and articles published in periodicals and annals/events.

Da Ros's thesis (2000) was cited by sixteen texts, and those by Cutolo (2001), Leite (2004) in fourteen, Delizoicov's dissertation (1995) in twelve, and Delizoicov's thesis (2002) by ten. With eight citations, we find Muenchen thesis (2010) and Scheid (2006), with six Leite thesis (2004) and Slongo (2004) and Parreira thesis (2006). With five theses Pfuetzenreiter (2003) and Lorenzetti (2008). In turn, the articles by Delizoicov et al. (2002) was cited in twenty-three studies, in Leite, Ferrari and Delizoicov (2001) in fourteen, Gonçalves, Marques and Delizoicov (2007) in nine studies.

Another fact which draws attention is the number of citations present in the dissertations and theses that used Fleck's epistemology, made by the analyzed research authors. The studies of Lorenzetti (2008) and Muenchen (2010), Milaré (2013) located the majority of dissertations and theses developed in the postgraduate programs. Already Lima's (2007), Mezalira's (2008), Ota's (2012) and Souza's studies (2013) cited few works involving Fleckian epistemology.

Analyzing shared references in academic production in Environmental Education, Lorenzetti (2008, 349) identified the "Incipient intra-collective circulation of Ideas", especially in relation to the references of the distinctive dissertations and theses of Environmental Education developed in postgraduate programs studies in Brazil. The author argues that "there is greater knowledge dissemination and practices that are being linked in these studies it is necessary to refer and discuss what has already occurred in the area, broadening the discussions [...]. An intensification in the most shared use of references would enhance the extension of the thought style" (Lorenzetti, 2008: 349). Likewise, as highlighted, it can be verified that some authors of the analyzed studies did not reference similar works, little contributing to the dissemination and expansion of Fleck's epistemology. It is understood that studies which referred to the research already carried out can contribute to the strengthening of the new studies, based on the author's epistemological contributions.

The methodological procedures emphasized in the analyzed studies highlight that the documental and bibliographical analysis, and the application of surveys and interviews have allowed historical reviews as well as analyses that characterized thought styles, thought collective, circulation of ideas, knowledge and practices among esoteric and exoteric circles that comprise the area of Science Education, materialized in the axis teacher education, curriculum, emergency of a scientific fact, academic production analysis, analysis of didactic materials and Fleck's relation with other authors.

Regarding Fleck's epistemology contributions to the studies analyzed, according to their authors, the following explanations prevailed: (1) Fleck's epistemology contributes to a better understanding of

production and evolution of knowledge; (2) for an adequate demonstration of characteristics of; (3) for the identification and critical reading of different thought styles and thought collectives present in the history of an area of knowledge or in different curricular and didactic materials, as well as, in different spaces and formative processes, (4) to identify the knowledge and practice circulations in different ambits (intracollective and intercollective), interchanging senses and ways of acting, in addition to explicating complications which need to be addressed for the sake of transformations beyond formative spaces.

Final considerations

The study had the objective of identifying at which moment Fleck consolidated as an important reference for research, particularly in the area of Science Education and what relation the research developed in the area has established with this reference. Considering the subsidiary sources of this study, data have revealed that Fleck's work has expanded in Brazil since the mid 1990's, when the first studies underpinned by this epistemological matrix appeared. Moreover, they have revealed that this expansion reverberates not only in quantitative, but qualitative data as well.

From the quantitative point of view, in the last five years, the volume of studies carried out almost doubled compared to the volume identified in the first fifteen years. Qualitatively, an incorporation of the Fleckian theoretical referential by numerous areas of knowledge has been observed, in addition to the usage of several epistemological categories from the author. Beyond the categories "thought styles and collectives", others emerge: "intracollective and intercollective circulation of ideas", "complications" and "esoteric and exoteric circles". We have also observed that the greater volume of studies inspired by Fleck focus on the axis "teacher education" and "emergency of a scientific fact", followed by studies on the "analysis of academic production", "curriculum" and "analysis of didactic material".

As for the *locus* of this production *stricto sensu*, we have identified that the studies in Science Education come from institutions in the south of Brasil, noticeably in the Federal University of Santa Catarina and in the Science Education area (The main advisors of these researches are: Demétrio Delizoicov, Carlos Alberto Marques and Edel Ern).

Regarding Fleck's epistemology contributions noted by the authors of the studies carried out in the Science Education area, the following reasons have been highlighted: it allows for the comprehension of the constitution of an area of knowledge; explicates the sociological character of production as well as dissemination of knowledge; identifies the conditions for the introduction of thought style connected to science; comprehends the importance of intracollective and intercollective communication for the establishment and transformation of a thought style; analyses the weight of training for entering a thought style; better establishes the relation between theory and practice in the education of teachers; reflects on the teachers' pedagogical practice; develops alternatives for the insertion of science history in graduation curricula. Data show that a thought collective of Science Education investigators has been consolidating in Brazil with Fleck's epistemology as an epistemological basis.

Finally, we stress that this study has not taken Fleck's epistemology as an object of analysis. It intended to dimension the reception and incorporation of Fleckian work in research *stricto sensu* developed in Brazil, particularlyin the Science Education area. Thus, the perspective through which this analysis was carried out aimed, above all, to introduce a panorama that may contribute to future reflection.

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List of dissertations and analyzed thesis

* D: Dissertation; T: Thesis

Year	Author	Advisor	Title	*D /T	HEI	Program
1995	Nadir Castilho Delizoicov	Arden Zylbersztajn	O professor de ciências naturais e o livro didático	D	UFSC	Educação
1996	Lilian Koifman	Jeni Vaitsman	A crítica do modelo biomédico na reformulação curricular do curso de Medicina da Universidade Federal Fluminense	D	FIOCRUZ	Saúde Coletiva
1999	Lucia Ceccatto Lima	Edel Ern	A formação dos professores de ciências: uma abordagem epistemológica	D	UFSC	Educação
1999	Vania Marli Schubert Backes	Edel Ern	Estilo de pensamento e práxis na enfermagem: a contribuição do estágio pré-profissional	T	UFSC	Enfermagem
1999	Ana Luiza Gonçalves Dos Santos	Elizabeth Moreira dos Santos	Uma construção dos saberes sobre Epidemia de AIDS: os formulários de notificação de caos em perspectiva (1982 -98)	D	FIOCRUZ	Saúde Pública
2000	Marco Aurélio da Ros	Demétrio Delizoicov	Estilo de pensamento em educação médica: um estudo da produção da FSP-USP e ENSP-FIOCRUZ entre 1948 e 1994, a partir de epistemologia de Ludwik Fleck	T	UFSC	Educação
2001	Clarisvaldo Jendiroba Neder	Elena Moraes Garcia	Comunidade científica e natureza no pensamento de T. S. Kuhn	D	UERJ	Filosofia
2001	Luiz Roberto Agea Cutolo	Demétrio Delizoicov	Estilo de pensamento em educação médica um estudo do currículo do curso de graduação em Medicina da UFSC	T	UFSC	Educação
2002	Rejane Leal Conceição da Costa Araújo	Nadir Ferrari e Marcos Aurélio da Ros	Doenças construção e realidade na formação dos médicos. Objeto Fronteira como instrumento de interação entre diferentes estilos de pensamento	D	UFSC	Educação
2002	Samuel Macêdo Guimaraes	Elenor Kunz	Educação física, vivência e experiência corporal	D	UFSC	Educação Física
2002	Doris Gomes	Marco Aurélio da Ros; Anselmo Peres	Etiologia da cárie uma construção do estilo de pensamento	D	UFSC	Saúde Coletiva
2002	Nadir Castilho Delizoicov	Edel Ern; Maria Helena da Silva Carneiro	O movimento do sangue no corpo humano: história e ensino.	T	UFSC	Educação
2003	Maria Inês Nogueira	Kenneth Rochel de Camargo Júnior	Entre a conversão e o ecletismo: de como médicos brasileiros tornam-se "chineses"	T	UERJ	Saúde Coletiva
2003	Armênio Matias Correa Lima	Demétrio Delizoicov	Estilo de pensar no ensino de medicina homeopática	T	UFSC	Educação
2003	Marcelo Maravieski	Marco Aurélio da Ros.	Homeopatia: uma desconhecida na região Sul II da Associação Brasileira de Educação Médica	D	UFSC	Saúde Pública

2003	Márcia Regina Pfuetzenreiter	Arden Zylbersztajn; Fernando Dias de Avila-Pires	O ensino da medicina veterinária preventiva e saúde pública nos cursos de medicina veterinária: estudo de caso realizado na Universidade do Estado de Santa Catarina	T	UFSC	Educação
2003	Severina Alice da Costa Uchôa	Kenneth Rochel de Camargo Júnior	Os protocolos e a decisão médica: evidências e ou vivências?	T	UFRJ	Saúde Coletiva
2004	Iône Inês Pinsson Slongo	Demétrio Delizoicov	A produção acadêmica em ensino de biologia: um estudo a partir de teses e dissertações	T	UFSC	Educação
2004	Raquel Crosara Maia Leite	Demétrio Delizoicov	A produção coletiva do conhecimento científico: um exemplo no ensino de genética	T	UFSC	Educação
2004	Charles Dalcanale Tesser	Madel Therezinha Luz	Epistemologia contemporânea e saúde: a luta pela verdade e as práticas terapêuticas	T	UNICAMP	Saúde Coletiva
2004	Adilson Alciomar Koslowski	Alberto Oscar Cupani	Nas origens da estrutura das revoluções científicas: a influência de Fleck, Polanyi e Quine na filosofia da ciência de Thomas Samuel Kuhn	D	UFSC	Filosofia
2004	Mary Ângela Leivas Amorim	Edel Ern	Parâmetros curriculares nacionais para o ensino médio e professores de biologia: dificuldades de interlocução.	T	UFSC	Educação
2005	Silvia Jurema Leone Quaresma	Elizabeth Farias da Silva	A percepção do médico clínico em relação aos pacientes hipocondríacos e poliqueixosos que são atendidos no ambulatório do Hospital Universitário Professor Polydoro Ernani de São Thiago	D	UFSC	Sociologia Política
2005	Marco Antonio Merechia Santos	Luiz Roberto Agea Cutolo	As diretrizes curriculares e o currículo de graduação em medicina da UNIVALI: Construindo a Interdisciplinaridade através dos Objetos Fronteiriços e da Epistemologia de Fleck	D	UNIVALI	Saúde
2006	Neusa Maria John Scheid	Nadir Ferrari	A contribuição da história da biologia na formação inicial de professores de ciências biológicas	T	UFSC	Educação Científica e Tecnológica
2006	Marcos Aurelio Maeyama	Luiz Roberto Agea Cutolo	Estilos de Pensamento em Odontologia Social e Preventiva – Um estudo da disciplina de Odontologia Social e Preventiva do curso de odontologia da UNIVALI	D	UNIVALI	Saúde
2006	Loreci Pereira Durgante	Marco Aurélio da Ros	Expectativas dos indivíduos homeopatas de Itajaí a respeito de sua participação no SUS local	D	UFSC	Saúde Coletiva
2006	Márcia Maria Marins Parreiras	Mauro Lúcio Leitão Conde	Lukwik Fleck e a historiografia da ciência: diagnóstico de um estilo de pensamento segundo as Ciências da Vida	D	UFMG	História
2006	Viviane Gontijo Augusto	Rosana Ferreira Sampaio	Um Olhar sobre a LER/DORT no contexto clínico do fisioterapeuta	D	UFMG	Ciências da Reabilitação
2007	Cesar Augusto Orazem Favoreto	Kenneth Rochel de Camargo, Júnior	A narrativa na e sobre a clínica na atenção primária: uma reflexão sobre o modo de pensar e agir dirigido pelo diálogo, à integralidade e ao cuidado em saúde	D	UERJ	Saúde Coletiva

2007	Carla Ribeiro Guedes	Kenneth Rochel de Camargo Júnior	A subjetividade como anomalia: estratégias médicas para lidar com os sintomas vagos e difusos em biomedicina	T	UERJ	Saúde Coletiva
2007	Marcelo Lambach	Carlos Alberto Marques	Atuação e Formação dos Professores de Química na EJA: Características dos Estilos de Pensamento - um olhar a partir de Fleck	D	UFSC	Educação Científica e Tecnológica
2007	Antonio Carlos De Salles	Mauro Lúcio Leitão Conde	Nem gênios, nem heróis: a história da ciência em Ludwik Fleck	D	UFMG	História
2007	Lúcia Ceccato de Lima	Sergio Roberto Martins	Processo de planejamento e implantação do Parque Natural Municipal de Lages – SC com ênfase na conservação de bacias hidrográficas e na percepção da comunidade do entorno	T	UFSC	Engenharia Ambiental
2007	Danislei Bertoni	Araci Asinelli da Luz	Um estudo dos estilos de pensamento biológico sobre o fenômeno vida.	D	UFPR	Educação
2008	Sandra Mara Mezalira	Maria Cristina Pansera-de-Araújo	Enfoque CTS no ensino de ciências naturais a partir de publicações em eventos científicos no Brasil	D	UNIJUI	Educação nas Ciências
2008	Lacita Menezes Skalinski	Charles Dalcanale Tesser	Epidemiologia e epidemiologia crítica: Considerações sobre diferentes estilos de pensamento	D	UFSC	Saúde Coletiva
2008	Leonir Lorenzetti	Demétrio Delizoicov	Estilos de pensamento em educação ambiental: um estudo a partir das dissertações e teses	T	UFSC	Educação Científica e Tecnológica
2008	Nabiha Haddad Simões Machado	Maria Helena da Silva Carneiro	O ensinar e o aprender a fazer pesquisa: o real e o desejado	D	UNB	Educação
2008	Alexandre Cavalca Tavares	Maria Helena da Silva Carneiro	O ensino de patologia humana e suas relações históricas com o estilo de pensamento a partir da análise de livros-texto	D	UNB	Educação
2009	Wellington Barros Da Silva	Demétrio Delizoicov	A Emergência da atenção farmacêutica: um olhar epistemológico e contribuições para o seu ensino	T	UFSC	Educação Científica e Tecnológica
2009	Natália Lupinacci Costa	Luiz Roberto Agea Cutolo	Estilos de pensamento em acupuntura: uma análise epistemológica	D	UNIVALI	Saúde
2009	Luise Lüdke	Luiz Roberto Agea Cutolo	Formação de Docentes para o SUS: um desafio sanitário e pedagógico	D	UNIVALI	Saúde
2009	Henri Fernando Bischoff	Ilton Benoni da Silva	O estilo de pensamento em medicina estética; reflexões sobre as bases epistemológicas da formação médica	D	UNESC	Educação
2009	Cheila Cavalli	Edgard Matiello Júnior	Reflexões sobre a Educação Física no SUS: uma análise a partir das dissertações e teses	D	UFSC	Educação Física
2010	Cristiane Muenchen	Demétrio Delizoicov	Disseminação dos três momentos pedagógicos: um estudo sobre práticas docentes na região de Santa Maria/RS	T	UFSC	Educação Científica e Tecnológica
2010	Mariana Cabral Schveitzer	Vânia Marli Schubert Backes	Estilos de Pensamento em Educação em Enfermagem: uma análise da produção científica das Regiões Norte, Nordeste e Centro-Oeste do Brasil	D	UFSC	Enfermagem

2010	Luciano Marcos Curi	Betânia Goncalves Figueiredo	Excluir, isolar e conviver: um estudo sobre a lepra e a hanseníase no Brasil	T	UFMG	História
2011	Rubia Emmel	Maria C. Pansera-de-Araújo	Estado da arte e coletivos de pensamento da pesquisa sobre o livro didático no Brasil	D	UNIJUI	Educação nas Ciências
2011	Wellington Hermann	Rosana Figueiredo Salvi	Estudo sobre a prática científica de um grupo de pesquisa em educação matemática	D	UEL	Ensino de Ciências e Educação Matemática
2011	Carmem Maria Kligman Barguil	Ana Teresa A. Venâncio; Flavio Edler	O lugar e o valor da fisioterapia na terapêutica médica: a medicina prática nos primeiros trinta anos do século XX	T	FIOCRUZ	História das Ciências e da Saúde
2012	Wellington Pereria de Queiros	Roberto Nadir; Demétrio Delizoicov	A articulação das culturas humanísticas e científicas por meio do estudo histórico sociocultural dos trabalhos de James Prescott Joule: Contribuições para a formação de professores universitários em uma perspectiva transformadora	T	UNESP - Bauru	Educação para a Ciência
2012	Welton Yudi Oda	Demétrio Delizoicov	A docência universitária em biologia e suas relações com a realidade das metrópoles amazônicas	T	UFSC	Educação Científica e Tecnológica
2012	João Alexandre Costa Carneiro	Caetano Ernesto Plastino	A teoria comparativa do conhecimento de Ludwik Fleck: comunicabilidade e incomensurabilidade no desenvolvimento das ideias científicas	D	USP	Filosofia
2012	Marilisa Bialvo Hoffmann	Nadir Castilho Delizoicov; Sylvia Regina Pedrosa Maestrelli	Analogias e metáforas no ensino de biologia: um panorama da produção acadêmica brasileira	D	UFSC	Educação Científica e Tecnológica
2012	Fernanda Schiavo Nogueira	Mauro Lúcio Leitão Condé	Ciência e linguagem: Fleck e o estilo de pensamento como rede de significados na ciência	D	UFRN	História
2012	Daniela Tomio	Suzani Cassiani	Circulando sentidos pela escrita nas aulas de ciências: com interlocuções entre Fritz Müller, Charles Darwin e um coletivo de estudantes	T	UFSC	Educação Científica e Tecnológica
2012	Josete Leal Dias	Francisco Hermes Santos da Silva	Compreensão de professores de matemática sobre números fracionários	T	UFPA	Educação em Ciências e Matemáticas
2012	Nancy Rosa Alba Niezwida	Walter Antonio Bazzo; Demétrio Delizoicov	Educação Tecnológica Com Perspectiva Transformadora: A Formação docente Na Constituição De Estilos De Pensamento	T	UFSC	Educação Científica e Tecnológica
2012	Danislei Bertoni	Araci Asinelli da Luz	Gênese e desenvolvimento do conceito vida	T	UFPR	Educação
2012	Thales de Astrogildo e Tréz	Vivian Leyser da Rosa	O uso de animais no ensino e na pesquisa acadêmica: estilos de pensamento no fazer e ensinar ciência	T	UFSC	Educação Científica e Tecnológica
2012	Inea Giovana Da Silva Arioli	Daniela Ribeiro Schneider; Jadete Rodrigues Gonçalves	Práticas e estilos de pensamento em promoção	D	UFSC	Psicologia

2013	Tathiane Milaré	Daisy de Brito Rezende	A pesquisa em ensino de química na Universidade de São Paulo: estudo das dissertações e teses (2006-2009) sob a perspectiva fleckiana	T	USP	Ensino de Ciências
2013	Barbara Vieira Souza	Carlos Alberto Marques	A Sustentabilidade Ambiental no Ensino de Química na Compreensão de Professores do Ensino Médio	D	UFSC	Educação Científica e Tecnológica
2013	Carlos Eduardo Camargo Cunha	Antônio Carlos de Miranda	A teoria de William Harvey da circulação do sangue: um traçado histórico do desenvolvimento das concepções, dos conceitos e dos modelos	D	UNIPLI	Ensino de Ciências da Saúde e do Ambiente
2013	Rafael Cezere Celi	Marco Aurélio da Ros	Estudo sobre estilos de pensamento na Educação Física no contexto do SUS	D	UNIVALI	Saúde e Gestão do Trabalho
2013	Marcelo Lambach	Carlos Alberto Marques	Formação Permanente de Professores de Química da EJA na Perspectiva Dialógico-Problematizadora Freireana	T	UFSC	Educação Científica e Tecnológica
2013	Debora Takehara	Claudia Lemos Vóvio	Hanseníase tem cura: Análise dos discursos de pacientes e profissionais de saúde a respeito dos materiais educativos impressos sobre hanseníase	D	UNIFESP	Educação e Saúde na Infância e Adolescência
2013	Adriana Lopes Leal	Carlos Alberto Marques	Relações entre Saneamento-Química-Meio Ambiente na Educação Profissional e Tecnológica numa Perspectiva Crítico Transformadora.	T	UFSC	Educação Científica e Tecnológica
2013	Xenia Silva Gomes Brandao	André Ferrer Pinto Martins	Uma análise da formação de professores de Física do IFRN a partir da epistemologia de Ludwik Fleck.	D	UFRN	Educação
2014	Adriane da Costa Goncalves	Maria de Fatima Vilhena da Silva	A circulação de ideias sobre biodiversidade por professores de ciências e biologia nas abordagens cts e patrimonial ambiental	D	UFPA	Educação em Ciências e Matemáticas
2014	Sandra Elisabet Bazana Nonenmacher	José Cláudio Del Pino	Contribuições da prática profissional integrada na formação inicial de professores	T	UFRGS	Educação em Ciências Química da Vida e Saúde
2014	Raquel Alcides Dos Santos	Kenneth Rochel Camargo Júnior	Estilos de Pensamento da assistência médica aos pacientes oncológicos na rede pública de saúde do Município do Rio de Janeiro	T	UERJ	Saúde Coletiva
2014	Emlly Hanna Souza Da Silva	Maria de Fatima Vilhena da Silva	Estilos de pensamento sobre Biodiversidade em Pesquisas de Educação Ambiental Publicadas no EPEA'	D	UFPA	Educação em Ciências e Matemáticas
2014	Monica De Caldas Rosa Dos Anjos	Walter Antônio Bazzo	Fronteiras na construção e socialização do conhecimento científico e tecnológico: um olhar para a extensão universitária	T	UFSC	Educação Científica e Tecnológica
2014	Alexandre Giacomini	Cristiane Muenchen	Intervenções curriculares na perspectiva da abordagem temática: avanços alcançados por professores de uma escola pública estadual do RS	D	UFSM-FURG-UFRGS	Educação em Ciências: Química da Vida e Saúde
2014	Anai Helena Basso Alves	Antônio Fernando Gouvêa da Silva	Manifestações de obstáculos gnosiológicos para a seleção de conteúdos na implementação de um currículo crítico em Ciências	D	UFSCar - Sorocaba	Educação

2014	Leandro Augusto Pires Goncalves	Kenneth Rochel Camargo Júnior	Medicina e Enfermagem – saberes e práticas incomensuráveis? Uma abordagem à luz da hermenêutica e dos science studies	D	UERJ	Saúde Coletiva
2014	Danielle Souza Fialho da Silva	Dilene Raimundo do Nascimento	O alarme que precisa ser regulado: os debates médicos sobre a fibromialgia na sociedade brasileira de reumatologia entre as décadas de 1990 e 2010	D	FIOCRUZ	História das Ciências
2014	Julia Kleve Berg	Kenneth Rochel Camargo Júnior	Para que serve uma enfermaria de clínica médica?: reflexões a partir de um hospital universitário	D	UERJ	Saúde Coletiva
2015	Marcos Aurelio Maeyama	Marco Aurélio da Ros	A escolha da especialidade médica - Estilos de Pensamento	T	UFSC	Saúde Coletiva
2015	Caio Cesar Malassise Luiz	Marcos Rodrigues da Silva	A história da dupla hélice interpretada a partir do quadro conceitual de Ludwik Fleck	D	UEL	Filosofia
2015	Rodrigo Diego De Souza	Eloíza Aparecida Silva Avila de Matos/ Marcia Regina Carletto	Circulações de conhecimentos e práticas na formação inicial de professores de ciências: complicações, subsídios e possibilidades	D	UTFPR	Ensino de Ciências e Tecnologia
2015	Braulio Silva Chaves	Bernardo Jefferson de Oliveira	Conhecimento, linguagem e ensino: a educação em saúde na história da ciência (1940-1971)'	T	UFMG	História
2015	Alexandre Tripoli Vencao	Lucia Ceccatto de Lima	Estilo de pensamento dos professores da área de matemática no curso de engenharia elétrica	D	UNIPLAC	Educação
2015	Andre Ary Leonel	Jose André Peres Angotti	Formação continuada de professores de física em exercício na rede pública estadual de Santa Catarina: lançando um novo olhar sobre a prática	T	UFSC	Educação Científica e Tecnológica
2015	Ricardo Silva De Macedo	Maria Cristina Martins Penido	O ensino de ciências por investigação e a prática pedagógica de professores licenciados no IF-UFBA	T	UFBA	Ensino, Filosofia e História das Ciências
2015	Cesar Augusto Rodenbusch Poletto	Lucia Ceccatto de Lima	O processo cognitivo evidenciado nos estilos de pensamento revelados nos saberes e práticas de orientação de monografias na área de odontologia Lages	D	UNIPLAC	Educação
2015	Sergio Choiti Yamazaki	Jose André Peres Angotti	Tradição do ensino de física em manuais de ensino superior	T	UFSC	Educação Científica e Tecnológica