

The curriculum and the textbook of basic education: contributions for the formation of undergraduates in Biological Sciences

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Abstract

This investigation-formation-action has been carried out in a licentiate's degree in Biological Sciences in the curriculum component Teaching Practice in Science / Biology II. The studies focused on the relationship between the curriculum development and basic education textbooks used to the Biological Sciences teachers' formation. The formative movements experienced by undergraduate students at the Teaching Practice subject were recorded as written narratives in logbooks. Fifty-four undergraduates have participated in the research, along with the head and research professors. In this study, the analysis of the fourth reflective spiral, evolution and meaning of the curricular conceptions of Biological Sciences undergraduates in the process of initial formation, was performed through the Text Analysis Discourse in signaled movements, emerging from the analysis of the keywords, which characterized the description given by the undergraduates in the narratives written in the logbooks. In the investigation-formation-action were made reflections that led to formative problems, what allowed situating the contexts in different themes and situations of initial formation in Biological Sciences Teaching Degree. It was possible to identify and analyze the conceptions of curriculum of the undergraduates that have been modified and signaled four reflective cycles by the formation processes which allowed the movements of the reflective spiral.

Keywords: Teaching Practice; Initial formation; Curriculum; Textbook.

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Introduction

This research aimed to contribute to the undergraduates' training in Biological Sciences, to study the relationship between curriculum development and the use of textbooks in basic education.

Investigation-formation-action is the proposal adopted in initial teachers' formation, based on the literature that points the research as essential for the constitution of the researcher teacher. The discourses of Elliot (1998) and Carr and Kemmis (1988) on action research, Alarcão (2010) on research-formation-action, and Güllich (2013) on investigation-formation-action add to the supporting references of the development of the trajectory of teaching and pedagogical studies of the curricular component "teaching practice" for the formation of a "reflective teacher" (Alarcão, 2010). Perceptions about relations of the inseparability between action research and curriculum support the idea of research-training-action as a proposal of curricular innovation.

In McKernan (2009), the proposed research is in agreement with the idea that curriculum can be understood as an action research process and not as a product resulting from the technical rationalists elaboration.

The curriculum is a continuous educational experience. A process and an attempt to communicate the basic principles and the characteristics of an educational proposal transparent and open to criticism, aiming at the action. This process includes teacher and students as curriculum researchers; both find in this involvement a force capable of creating new social practices.

The strong public policy of Brazilian school education, which guarantees the textbooks distribution through the National Textbook Program (NTP), imposes, in a certain way, the need to consider its role in understanding the curriculum and the choices made by future teachers of basic education. Thus, from the reading of Lopes (2007) and Martins (2006), we realized that the textbook can reinterpret meanings and senses, producing culture. In addition, it guides the pedagogical process (Gerald, 1993) and, according to Sacristan (2000), presents a pre-prepared curriculum for teachers.

The guiding problem was: "what are the indications of the constitution of the curriculum conception by the undergraduates in Biological Sciences that characterize the process and identify the association or not to the use of the didactic book as the organizing source of this curriculum?" The hypothesis proposed was: the initial formation processes, mediated by investigation-formation-action, in the context of a curricular component of teaching practice, enable the undergraduates to have critical dialogues that (re)mean the textbook use and

the complex network of relationships between teachers in formation and the curriculum in action.

The objective was to know the constitutive character of curriculum, from the understanding of the Biological Sciences undergraduates on the relationships between curriculum conceptions and textbook of basic education.

Methodology: the context and the research path

This qualitative research on curriculum and its relations with the textbook, as well as its implications in the process of Biological Sciences teachers' initial training, has occurred from the intervention in the Biological Sciences Teaching Degree course. The intervention has occurred in the curriculum component Teaching Practice of Science/Biology II, which focused in the discussion of the curriculum and teaching of Science/Biology.

The formative movements experienced by undergraduates in Teaching Practice discipline were recorded as written narratives (Carniatio, 2002; Chaves, 2000; Reis, 2004, 2008) in logbooks (the research participants were: fifty-four undergraduate students, full professor and research professor). The records in logbooks are a strategy that facilitates the reflective process (Alarcão, 2010; Zabalza, 1994; Porlán, Martín, 1997; Reis, 2009).

Textual Analysis Discourse (Moraes, 2003; Moraes; Galiuzzi, 2007) has been used as a methodological guidance, allowing the researcher to experience an "integrated process to learn, communicate and interfere in speeches" (Moraes; Galiuzzi, 2007, p. 120).

This analysis is structured by: fragmentation of narrative texts through the understanding of the works, with the identification of units of meaning; thematic categories resulting from the grouping of units of meaning according to semantic similarities; communication resulting from the preparation of descriptive and interpretative texts (meta-texts) on the thematic categories.

To organize the analysis, the Excel electronic spreadsheet (Microsoft software) has been used with its filter tool, which allowed to build charts and tables with the data produced. The first step was to transcribe the stories about the curriculum conceptions, demarcate them and characterize each one with keywords (descriptors). The keywords (unigrams) were filtered to register the total number of undergraduates who used it. The meta-texts, prepared from the analysis and dialogue with the theoretical reference, created proposals which constitute the reflective spirals.

The re-significance of curriculum conceptions by Life Sciences undergraduates in the process of initial formation

In this section we describe the reflections from the identified discursive marks and moorings, surrounding the theme of this investigation-action. We situated understandings and theoretical concepts regarding the curriculum and analyzed the processes of conceptual significance of curriculum from the narratives of the undergraduates, what permitted to identify reflective cycles and relations between curriculum and textbook. We demonstrated the curriculum conceptions of undergraduates, and the formative movements that originated the constituent reflective cycles of a spiral in expansion.

Considering that the different approaches, theories or conceptions of the school curriculum imply different pedagogical practices, the relevance of researching the undergraduates' conceptions of curriculum comes from the fact that it permeates all the pedagogical relations when they work as teachers in basic education.

Curriculum

McKernan (2009) presents a research model based on the process, a conception of curriculum elaboration that goes against the view of technical rationalists. The curriculum is an ongoing educational experience: a process rather than a product, an attempt to communicate the basic principles and characteristics of an open educational proposal to critical scrutiny and capable of being transformed into a practice, what launches the teacher and the students in the role of researchers with a view to improve the social practice through the curriculum.

The author describes the curriculum as an attractive task of the human imagination, as an ideal, "the curriculum is not only a theoretical question, but mainly a practical issue, involving human actions that will make a difference" [...] "it is a challenge for the praxis" (MCKERNAN, 2009, p. 34). He states that "curriculum is a proposal to establish an educational plan" (id., p. 32), curriculum is defined by the author as a proposal in the perspective of a hypothesis that invites to a research response.

The action research is conceived by this author "both as a way of learning and a way of knowledge about our practice" (p. 143). It is a proposal that triggers self-reflection, as "there is no curriculum development without teacher development" (Id., p. 148).

The proposed research is in agreement with the ideas of McKernan (2009), who also believes in the curriculum as a process of action research. This way, the author understands curriculum not as a product, "ends-means", based on results, but as an educational process, as quoted by Stenhouse in his

Humanities Curriculum Project. To McKernan (2009, p. 114), "the truth of education is that it is in the process itself," it is the curriculum epistemology, where the teacher assumed himself/herself as an active investigator of his own practice, transforming their conceptions. In this research, they modify their curriculum concepts, from document to action.

Processes of conceptual significance of curriculum

Reading the undergraduates' narratives written in their logbooks, it was possible to identify, collect and analyze their discourses regarding curriculum, which were transcribed producing four reflective cycles. We emphasize that there may still be many cycles, and that the active researcher (in this case, the undergraduate student) may have numerous reflective cycles, but in the relief of the analysis of this research logbooks, we opted for the analysis of the four reflective cycles which had a higher recurrence.

The most frequent characteristic keywords from the descriptions of the undergraduates written in the logbooks were: Document (53), Education (42), Knowledge (39), Identity (32), Practice (20), Action (17) Planning (16), Experience (14), Method (12), Reality (10) Organization (10), Content (8), Knowledge (7).

In the fourth reflective cycle, twenty keywords have been established in a total of 103 registers. The terms Document (15 records), Identity (13 records), Training (10 records), Knowledge (10 records), Action (8 records), Method (6 records), Education (6 records), Experience (5 records), Planning (4 records), Practice (4 records), Content (4 records) and Learning (4 records), although a little different in the previous reflective cycles, they still support this fluctuation in the understanding of the curriculum. With only one register, were identified these words: theory, discipline, evaluation and concept.

The analysis of the keywords' relations led to recognize four thematic groups: 1) Knowledge: knowledge, construction, content, information, concept, theory, knowledge, ideology, discipline; 2) Practice: teaching, practice, action planning, experience, learning, imprisonment, decision, reality, evaluation; 3) Document: document, tool, method, organization; 4) Formation: formation, identity, autonomy, improvement, qualification, complement.

Deeping the analysis: from the document to action, giving new significance to curriculum

We have noted that words such as action, training, knowledge, teaching, practice, method and identity have been influenced more by the training of the graduation curriculum in this component than by the contacts and experiences in basic education schools. However, other words, such as: planning, learning, organization, concepts, content, document

and action, appear to have been influenced by the observations and questionnaires.

Conceiving curriculum as action implies going beyond labels such as "school programs" and "study plans", in other words, the identified keywords mean going beyond the curriculum as a document. According to Sacristán and Gómez (1998, p. 123), "the latest conceptions of curriculum address how the educational project is carried out in class, or incorporates the dynamic dimension of its realization", no longer being only the project important, but also its development in practice.

This view agrees with McKernan's conception (2009), which considers the curriculum as a process. This research aimed to understand the curriculum in action, as an action research. The conception of curriculum developed by the author goes against the technical view of the rationalists, since the curriculum has to be seen as an ongoing educational experience: a process rather than a product.

The curriculum is not only an official document provided by the State. This would restrict the conception of curriculum as a product, but understanding the curriculum as a process would also imply that it consists of official documents, which are part of this process. Therefore, this investigation-formation-action, the undergraduates analyzed the official documents, as well as other documents of the school, what allowed the turns of the spirals, unleashing new reflective spirals and new conceptions, emerged from the undergraduates' analyzes as active investigators.

Stenhouse (1995 apud McKernan, 2009) goes further and proposes that the curriculum requires an aesthetic element of quality, imagination, where "a curriculum, like a recipe for a dish, is primarily thought as a possibility and then as a theme of an experiment" (McKernan, 2009, p. 26).

On the assumption that all pedagogical practices revolve around the curriculum (Sacristán, 2000), understood as a synonym of action, it becomes possible to show the recurrence of keywords: action identified in the curriculum conceptions of the undergraduates.

The theoretical empirical intervention of this research shows the way in the process of investigation-formation-action as a transformation of the curriculum concept, in which this is conceived by the undergraduates not only as a document or planning, but also as practice and action, for example. Sacristán and Gómez (1998) also refer to the understanding of the "procedural approach" of the curriculum in action, investigated by Gerardi (1994) through this question: "What did the productions of undergraduate researchers, with these new conceptual elements, become able to express from the school/class?" (p. 117). It is relevant to understand the curriculum in action, which actually occurs in the classroom, going beyond a prescriptive curriculum. Therefore, during this research, the undergraduates took on the roles of active researchers. They went to the schools to make

observations, apply questionnaires and analyze documents in order to understand the curriculum contexts in action.

By conceiving the curriculum as a process, the definition of "document" is outdated. In other words, the "official curriculum" expressed in the regulating and prescriptive documents needs to be analyzed by the undergraduates in their initial formation, from the perspective of this research, in order to reflect and reframe concepts. By analyzing the textbooks, for example, the undergraduates became closer to the educational reality, as in the Pedagogical Political Project, the Study Plan, the teachers' work and classes observation, having in mind the perspective of curriculum in action. These activities of analyzed teaching practices reflect what Sacristán and Gómez (1998, p. 138) define as "actual content of the educational practice, because it is where knowledge and culture have meaning in interaction and in the daily work." All these parts analyzed in this curricular component were translated into what the authors call a "procedural reality", composed by the interaction of the activities proposed and developed.

The undergraduates, in the context of initial formation, had already proposed a variety of keywords to describe the curriculum, which is the result of the investigation-formation-action process in this curricular component, proposing readings, dialogues and reflections in their formation as a research path.

In the initial formation, the undergraduates visited the school, talked with teachers and made observations, what induced a demand, constituting a dialogical discourse and comparative between old and current knowledge. This demand has allowed to discriminate the asymmetries that articulated the new learning, mediated by the titular and researcher teachers. The undergraduates, in their discourses and ideas about the curriculum, reflect the personal and social realities, communicating the accumulated social practices.

The undergraduates' discourses on curriculum constituted a particular synthesis of different traditions in ways to understand it, prior or parallel to the fact that they are undergraduate students, who studied in different contexts. All this collectively accumulated cultural baggage merged with the discourses on school curriculum, resulted from the confluence of different discursive traditions of the educational scope.

The pedagogical discourse will merge, somehow, in a common discourse on curriculum. As the undergraduates have passed through a long process of education, we will not fail to notice their already built discourses and impressions. In this sense, we consider the relevance of the initial formation, which can consider and relate to these dilemmas, positively contributing to the formation of a qualified teacher.

Resuming the analyzed narratives of this research, it was found that the undergraduates often remember their teachers, reflect on their school trajectory and also on some characteristics of the

lessons of some of their teachers. When we think about the initial formation and the teachers constitution, there are life stories which must be considered.

Thus, we assume that the conceptions of curriculum are creations rooted in our cultural, discursive and practical realities, which we signify. These concepts and relationships, which seem to be spontaneous in each socio-cultural context (Vigotski, 2002) despite the appearance of being something given, are historical results of accumulations of ideas, values or expectations which are perfected and acquire a persistent characteristic shape.

The context of the relations between the subjects involved in this study has resulted in a nursery of experiences. Experiences that occur in various educational institutions, reflected in individual life stories constituted in different times and spaces. The discourses and practices generated in each context are interconnected with one another.

In the context of analysis of the curriculum conceptions of undergraduates, we draw attention to the last class, when L49 dared to pronounce to everyone in class: "Today as a teacher in initial formation I understand that the curriculum is me, is us, each one of us resignifies it and will resignify it in their context, in their action, and that in this context our conception keeps on changing". At the end of this speech, which was also recorded in his written narrative, we could see in the eyes and faces of each one the expression of acceptance of these statements, some of them even expressing surprise, or a new discovery, agreeing with each other as if they already knew. Many of them have reaffirmed "I am the curriculum." We were very surprised to hear and see what was happening with that undergraduate class, because we realized at this point that, in fact, what makes the reflective spiral wheel spin are the readings, conversations and reflections which allow us to reaffirm: the curriculum is a process. It is not a simple product.

For Lopes and Macedo (2011, p. 37), the curriculum is more than simply a text because "the norm for the curriculum, therefore, is not the consensus, stability and agreement, but the conflict, instability and disagreement, because the process is made of construction followed by deconstruction followed by construction." We recognize this process in the development of the curricular component, where the initial intentionality is dynamically constituted in the sequence of classes, and projects the significance of the curriculum linked to the new learning generated in the reflections that moved the reflexive spirals.

As the curriculum conception of the undergraduates was being rewritten, they started to understand that it is not exclusively a theoretical question, much less a purely practical one. It is a matter of an interweaving of theory and practice where the subjects involved in the process will make the difference.

In this investigation-formation-action in the initial formation context, we realized that the undergraduates have begun to worry about the types of discourses presented in the classroom by the professors of the university and in the basic education school, as well as their discourses in initial formation. Thus, they shifted their conceptions and revealed another view of the curriculum, which no longer seemed to be neutral, ready and uninteresting.

Final considerations

This critical stance taken by the undergraduates on the use of the textbook made possible to splay their thoughts in order to produce meaning in their practices. This attitude causes them to stop being repeaters of curricula dictated by textbooks, to assume a posture of curricula forgers (authors) based on the proposals of the official documents, resignified in the curriculum in action. Thus, we realize that the curriculum is conceived in the process of meaning production resulting from the action, reflection and teaching investigation.

We acknowledge the initial formation as a possible path to study and we identify in the teaching practice the possibility of developing this investigation, because in this research the teaching practice was the space and time of investigation-formation-action, of reflection on the curriculum in action, where undergraduates have constituted critical reflections on textbook and curriculum.

Therefore, the formative value of the reflections in narrated stories showed the need and the importance of the initial formation to reserve a greater time for the discussion about the relations between curriculum and textbook, so that future teachers can choose the appropriate textbook to the classroom of basic education. This is how they take on the role of curriculum authors.

In the initial formation, the action research, the logbook and the narrative writing can provide moments of organization of the activities being carried out in the classes, as well as articulate theory and practice. Thus, the prospect of constituting the reflexive professional, who takes the research as an issue for their process of formation and teaching in Sciences, is effective as an important formative strategy.

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