

## 69 - DEVELOPMENT OF INTERDISCIPLINARY ISLANDS OF RATIONALITY IN INITIAL TEACHER EDUCATION

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### Abstract

The objective of this article is to suggest a proposal for development of Interdisciplinary Islands of Rationality (IIR) as a teaching strategy to promote students autonomy in initial teacher education, through issues related to social context. The methodology consisted in describing all eight steps of the IIR, proposed by Fourez (2005), with the corresponding activities formulated in this proposal to development in initial teacher education's classes, where the professor plans the educational goals. Particular emphasis on preliminary stage to explore the problem situation experienced by the students, carried out through stratification of categories in MAXQda10® program. It is expected the contribution of the proposed IIR to the pedagogical practice, aiming the construction of meanings on teaching and learning process in different educational areas, from deconstruction of limited visions, transcending the universe involved.

Keywords: initial teacher education, Interdisciplinary Island of Rationality (IIR).

### Introduction

The initial teacher education in Brazil has been through many changes in the last decades, with important achievements on official documents reformulations that base curricular guidelines. However, what happens in practice seems to go in a parallel direction, not in a convergent direction as planned by many educators and researchers, suggesting that a historical practice can not be changed exclusively by laws and decrees.

As a result many gaps are still observed in initial teacher education on different areas related to the professional practice, associated to lags in practical classes, insufficient bibliographic archive, relations between teacher and students in classrooms, inadequacy of contents, disarticulation between specific and pedagogical subjects, teaching practice, interdisciplinarity and lack of preparation to teach specific and pedagogical contents.

In this perspective, the actual context of initial teacher education at the large majority of Brazilian universities, on different areas, it is still focused on a limited model of knowledge, which students take a few years on a graduation course, attending classes that value this model of knowledge, reproduces the practice on internship and afterwards on their professional practice, being obliged to build their own pedagogical practice (CAMPOS; VIVEIRO, 2014).

The reproduction of these educational models are not compatible with the reality 21st century society, as a consequence it maximizes the difficulties of the newly qualified teachers when they reach the labour market. Therefore, it is important to improve pedagogical knowledges in the initial teacher education, especially in the interdisciplinary between specific and pedagogical formation.

Accordingly, it is important to promote reflexions that expand views to different teaching and learning theories, whose fundamentals meet pedagogical practices that ensure the knowledge access to students, considering possibilities to think about their personal experiences that promotes relevance to the contents, especially that value and consult students as conductors in the teaching and learning process, in all educational levels.

The intentions that guided the development of the present proposal resulted from reflective analysis researchers' notes about professional teaching practice evaluations in the reality of the actual Brazilian educational context. These reflections were essential for the theoretical foundation search that conducted to better understanding of the different pedagogical practice in the initial teacher education, in the way of strengthening and incorporation in the professional context.

This reflective exercise about the actual scenario of initial teacher education, as well as the study of fundamentals of Interdisciplinary Islands of Rationality (IIR), contributed significantly to the problematic perception applied to teaching formation in different areas. Therefore, it is suggested the development of Interdisciplinary Islands of Rationality, that integrate different contents, subjects, relations between students and teachers, and teachers' research in their professional practice.

### Initial Teacher Education

The initial teacher education in Brazil, starting in the 1960s, was subject of manifestations in different segments linked to education in opposition to the model curriculum used in teachers training courses, as registered on Law of Directives and Bases (LDB) 402/61, starting the demand for a basic curriculum, including cultural and professional subjects focused on teacher education (BRASIL, 2001).

At that moment, it was started a process beyond the curricular restructuring, with the incorporation of pedagogical subjects on the beginning of formation courses. This action promoted a break on the simplistic view of the teaching act and of the technical rationalism predominant at the initial teacher education until this period. Furthermore, there was a occurred a professionalisation of teaching work, nature of scientific knowledge, importance of experimentation, importance of science and scientific education in society, and fundamentals of curricular creation (ECHEVERRÍA; BENITE; SOARES, 2007, p.3).

Although guidelines have been considered to the incorporation of pedagogical subjects on initial teacher education in the decrees 292/62 and 672/69, and Resolution 9/60, as well as orientations to knowledge of the specific areas (BRASIL, 2001), in practice it was not satisfactorily articulate to pedagogical formation and to contents of the specific subjects.

This fragmentation between pedagogical and specific areas can be observed in the chronological synthesis of teacher education in Brazil, related to values and emphasis, according to the research conducted by Fiorentini, Souza e Melo (2000), presented in Table 1, highlighting the start, from the 1990s, of the emphasis to the pedagogical knowledge and teaching practice.

Table 1 – Chronological overview of teacher about the values in Brazil

Period (Decade)	Valorisation/emphasis
1960	Specific knowledge to be taught
1970	Didactic and pedagogical aspects in teaching technologies
1980	Socio-political and ideological dimensions
1990	Beginning of the teaching practice and pedagogical knowledge

Source: Adapted from Fiorentini, Souza e Melo (2000)

Scientific and technological advances occurred in the last decades have impacts in all sector of society, however, in educational field, especially in teaching practices, traditionally and unequivocally in initial teacher education that values academic theories instead of practices. That means that pedagogical formation is still considered and developed as an appendix of the courses, resulting in insecurity of the real teaching practice. Although the universities are not the only locus of formation, it carries responsibility in theoric and practice basis, related to both contents, specific and pedagogical (CAMPOS; VIVEIRO, 2014).

It is important to note that pedagogical and teaching practices, both in initial and continuing education, in the last decades, have been object of research in post-graduation levels in Brazilian universities. In this context, the concern about the teaching contents must be constructed in a qualitative and innovating way, not as a simplification of the complex contents and resulted from the scientific community (CHEVALLARD, 1986).

The knowledge construction's strategy to Pirola (1999), contribute to the perception of scientific knowledge learned in school by the students, assisting them in the way to interpret the world. However, it is essential to reinforce the knowledge constructed by the science, as draft of the reality, changing into a main objective of the scientific education.

In this perspective, it is feasible to consider the scientific education as a practice restricted to academy, but congruent and the transformations suffered by particular object of knowledge, leaving the scientific environment to become an object of teaching, that is, the passing of a content to know the scientific teaching version of the object to know, named didactic transposition (CHEVALLARD, 1986).

As a result, many authors criticize the decontextualized knowledge and fragmented approach, without dialogue between different areas, and the integration between different knowledge, designed to resolve issues linked to social reality, showing conceptions of interdisciplinarity (PINHEIRO et al., 2007).

In this direction of approach, to solve a problem using conceptions of interdisciplinarity, guided by the context, and by its purpose, without determination by disciplines, it is possible to use a mean to represent and communicate "a theoretical model" that seeks knowledge from different subjects, to explain what and how this problem was solved, called Interdisciplinary Island of Rationality, as used by Nehring et al. (2002).

#### Interdisciplinary Island of Rationality (IIR)

Island of Rationality (IR) is a teaching strategy that aims to promote the autonomy of students through discussions related to issues of social context. An island of rationality is a metaphor used to represent as students develop an opinion about a certain issue, which can be compared to an "island in the middle of the opinions' ocean" in response to a wide question. This metaphor becomes a starting point to the teacher, who can give sequence to the formation of a second stimulus in a sequence of teaching (FOUREZ, 2002).

Thus, IRs are theoretical representations of a given situation taken from the context of the student, where the concrete is taught in a interdisciplinary way, using scientific and technological methods at the same time, acting on the subject through a situation needs.

It is considered a methodology that directs the work to be performed, and the definition of actions present in the activity should not be determined by the various disciplines related to the theme, but by the project, the purpose and the context (PIETROCOLA, 1999).

The construction of an IIR starts from a problem situation, which should involve aspects related to the daily life of the student, aiming to give meaning to teaching learned in schools, involving a context which goes beyond the disciplinary areas and directs to a project completion, elaborating a final product (BETTANIN, 2003).

Pinheiro (2002) underscores the effectiveness of the teaching of subjects through the projects development in theoretical context. The elaboration of projects stimulates the search for knowledge, creativity and independence. Schmitz (2001) states that the scientifically literate person has an understanding and interpretation of information related to science and technology, within a context that you discuss and take position in front of these issues.

Fourez (2005) suggests eight steps to be followed for the development of the IIR:

Step 1 - Cliché of the situation studied, also called brainstorming, which starts after the presentation of the problem situation.

Step 2 – Spontaneous overview that complements the first step and involves the lifting of the main factors to be considered in the development of the IIR.

Step 3 – Consulting experts, where each group consults the experts established in spontaneous overview.

Step 4 – Going to practice through technical visits for deepening the students' knowledge.

Step 5 – Opening black boxes with the help of experts through interdisciplinary principles subject.

Step 6 – Scheme of the global situation studied through a summary of the IIR development.

Step 7 – Opening black boxes without the help of experts, characterized by autonomy in the search of knowledge.

Step 8 – Summary of the IIR produced, which summarises the steps and actions developed on the project.

The development of the IIR methodology applied to education has been studied in basic education, however, little noticed in the initial teachers education.

#### Methodology

The methodology for the development of IIR, consists of proposing to students in initial teacher education classes for which plan the educational objectives, following the eight steps proposed by Fourez (2005), with their respective activities designed in this proposal, as presented in the organogram in Figure 1.

In the first step, cliché of the situation studied, the objective is to draft reports of initial teacher education students, leading to exposure of the problem situation, with the intention of showing, based on their experiences, the contents that presents more difficulties, as well as the specific knowledge, pedagogical, or their practices, systematically. This report is held at numbered document previously, anonymous to the teacher, but identified for the rapporteur.

At the second moment, under the professor guidance of professor, the essays are shuffled, evaluated by pairs, which help in categorization of the topics, carried out at the MAXqda10® program, a software used for the analysis of qualitative data and mixed methods research. It is a computer tool that allows encoding with the purpose of giving a meaning to an analysis (VALLES, 2001), therefore, enables the analysis of the researcher in the treatment of content of research data (COSTA, 2013).



Figure 1 – Development of IIR in initial teacher education's classes

Source: Adapted from Fourez (2005)

The procedure consists in transcribing the obtained data to individual Word files encoded in an alpha numeric system (from I1A, .... to I1n). The process of data analysis in the program is started with upload of the individual Word files using the window "variable" in "import" option. From these files is performed the analysis of the content in the responses of students, through stratification of categories and subcategories relating to the themes, linked to a system of codes in the program. Consequently, the theme categories are the requirements for formation of the groups, with a limit of three components to proceed with the investigation.

At the third moment, the teacher guides the development of data collection instruments of the students groups for the lifting of their previous knowledge and its hypotheses on the subject.

In the second step, spontaneous overview is conducted, prioritizing the participant observation for lifting the main factors considered in the development of the IIR.

In the third step, students carry out a consultation with experts, in this case should include professionals in the field of specific knowledge and pedagogical education of the initial education of these teachers, and external educational experts.

The fourth step, going to practice, is performed by students after research, texts Reading and case reports, leading to analytical reflexions about formal and non-formal learning spaces.

In the fifth stage, opening black boxes with the help of experts, students should search interdisciplinary principles and elements of the issue, in the area of specific knowledge and pedagogical education, and external education experts.

In the sixth stage, a global scheme of the situation studied, is presented by students in oral exposure, with the requirements of a synthesis of research carried out so far, pointing to data already raised through conceptual maps.

The seventh step, opening black boxes, students independently and without the help of experts, should develop and solve issues of IIR.

In the eighth step, synthesis of IIR produced, consists in the concrete presentation of what was learned by students in the development of the IIR in response to the problem. In this step, after discussions, it is expected that even in stand-alone situation occur presentation based on pedagogical practices with the creation of a final product, that contributes in different thematic perspective.

#### Final Considerations

It is expected that the development of IIR laid down in this proposal, produce as results effective contributions for pedagogical practice, in the professional teaching, for researchers and subjects of research, on basic and higher education. Enabling from the analysis and discussion of technical and scientific productions results, which could be used for dissemination of IIR knowledge to education professionals at different levels of education, transcending the access of the universe involved.

In general, it is expected that the development of an IIR oportunizes the deconstruction of limited visions, still present in the teachers education, with transposing to expanded views that allow systematizing methodological approaches in different themes and different perspectives, contextualised to the realities that characterize the world of research, the researcher, the subjects involved and all people who have access to the productions created through means of publication, always guided in constructing meanings for the teaching and learning process.

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#### DEVELOPMENT OF INTERDISCIPLINARY ISLANDS OF RATIONALITY IN INITIAL TEACHER EDUCATION

##### Abstract

The objective of this article is to suggest a proposal for development of Interdisciplinary Islands of Rationality (IIR) as a teaching strategy to promote students autonomy in initial teacher education, through issues related to social context. The methodology consisted in describing all eight steps of the IIR, proposed by Fourez (2005), with the corresponding activities formulated in this proposal to development on initial teacher education's classes, where the professor plans the educacional goals. Particular emphasis on preliminary stage to explore the problem situation experienced by the students, carried out through stratification of categories in MAXqda10® program. It is expected the contribution of the proposed IIR to the pedagogical practice, aiming the construction of meanings on teaching and learning process in different educational areas, from deconstruction of limited visions, transcending the universe involved.

Keywords: initial teacher education, Interdisciplinary Island of Rationality (IIR).

#### DEVELOPPEMENT ÎLES INTERDISCIPLINAIRES DE LA RATIONALITE (IIR) DANS LA FORMATION INITIALE DES ENSEIGNANTS

##### Résumé

Le but de cet article est de présenter une proposition visant à élaborer des Îles Interdisciplinaires de la Rationalité (IIR), en tant que stratégie d'enseignement pour promouvoir l'autonomie des étudiants en formation initiale des enseignants par moyen des questions liées au contexte social. La méthodologie a consisté dans la description des huit étapes de IIR, présentés par Fourez (2005), avec ses activités conçues dans cette proposition pour développer des cours de formation initiale pour les enseignants, pour lesquels l'enseignant prévoit les objectifs éducatifs. Une mise au point différentiel a été donné à la première étape, la préparation du cliché de la situation étudiée, afin d'explorer le problème de l'expérience des étudiants, menée par stratification des catégories dans le programme MAXqda10®. Il est prévu que le projet IIR contribue dans la pratique pédagogique pour la construction du sens dans le processus d'enseignement et d'apprentissage dans différents domaines et niveaux d'éducation, par moyen de la déconstruction des micro visions systémiques qui transcendent l'univers impliqué.

Mots-clés: formation des enseignants, Îles Interdisciplinaires de la Rationalité (IIR).

#### DESARROLLO DE ISLAS INTERDISCIPLINARIAS DE RACIONALIDAD (IIR) EN LA FORMACIÓN INICIAL DE PROFESORES

##### Resumen

El objetivo de este artículo es presentar una propuesta de desarrollo de Islas Interdisciplinarias de Racionalidad (IIR), como una estrategia de enseñanza para promover la autonomía de los estudiantes en la formación inicial de profesores por medio de cuestiones relacionadas al contexto social. La metodología se basó en la descripción de las ocho etapas de la IIR, presentadas por Fourez (2005), y en la elaboración de actividades en que el profesor planea los objetivos educacionales para aplicación en grupos de formación inicial de profesores. Con énfasis en la primera etapa, la elaboración del cliché de la situación estudiada para explotar la situación problema de las vivencias del estudiante, se realizó una estratificación de categorías en el programa MAXqda10®. Se espera que la IIR prevista contribuya en la práctica pedagógica para la construcción de significados en el proceso de enseñanza y aprendizaje, en diferentes áreas y niveles de enseñanza, a partir de la deconstrucción de visiones microsistémicas, trascendiendo el acceso del universo envuelto.

Palabras clave: Formación de profesores, Islas Interdisciplinarias de Racionalidad (IIR).

#### DESENVOLVIMENTO DE ILHAS INTERDISCIPLINARES DE RACIONALIDADE (IIR) NA FORMAÇÃO INICIAL DE PROFESSORES

##### Resumo

O objetivo deste artigo é apresentar uma proposta de desenvolvimento de Ilhas Interdisciplinares de Racionalidade (IIR), como uma estratégia de ensino para promover a autonomia de estudantes na formação inicial de professores, por meio de questões relacionadas ao contexto social. A metodologia consistiu na descrição das oito etapas da IIR, apresentadas por Fourez (2005), com as respectivas atividades concebidas nesta proposta, para desenvolvimento em turmas de formação inicial de professores, para as quais o professor planeja os objetivos educacionais. Com destaque diferencial à primeira etapa, a elaboração do cliché da situação estudada, para explorar a situação problema da vivência do estudante, realizada por meio de estratificação de categorias no programa MAXqda10®. Espera-se que a IIR prevista, contribua na prática pedagógica, para construção de significados no processo de ensino e aprendizagem, em diferentes áreas e níveis de ensino, a partir da desconstrução de visões microsistêmicas transcendendo o acesso do universo envolvido.

Palavras chave: formação de professores, Ilhas Interdisciplinares de Racionalidade (IIR).