



Mobility Paulo Freire: internationalization of chemistry teacher training

Movilidad Paulo Freire: internacionalización de la formación del profesorado de química

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Recepción: 14/01/2021

Aceptación: 29/09/2021

Resumen

Este artículo es el resultado del análisis del Proyecto Paulo Freire de Movilidad Académica para Estudiantes de Programas de Formación Docente Universitaria con un enfoque en la reflexión sobre las carreras de Química, para tal fin el presente autor utiliza su experiencia e informe para desarrollar la escritura mientras participa de este programa, estando vinculado a la Universidad Federal del Triângulo Mineiro (UFTM) en la carrera de Química. En este trabajo pretendemos abordar cuestiones que involucran problemas que están asociados a la relación entre Ciencia, Tecnología y Sociedad (CTS) y la indispensabilidad de esta dimensión para ser parte del proceso de internacionalización de los cursos de Ciencias de la Naturaleza y de la Tierra, principalmente en lo que se refiere al curso. Licenciada en Química. La estrategia metodológica utilizada para el análisis del documento fue Análisis de Contenido (AC) y Análisis Textual Discursivo (ATD), en la etapa de análisis se utilizó el software *Atlas.ti*, que permite el uso de la función Word Count, en la que se pretende trabajo facilitando el análisis a nivel textual. en la búsqueda de comprender los conceptos involucrados y empleados en el documento y el núcleo de las propuestas que atraviesan las especificidades de la carrera de Química. De esta manera, este estudio aporta elementos para reflexionar sobre el actual proceso formativo de los estudiantes de pregrado en Química y sobre la necesidad de introducir dispositivos educativos para una formación amplia e integral de los docentes en el proceso de internacionalización de los cursos de pregrado.

Palabras clave

Internacionalización de la Educación Superior 1, Formación del profesorado 2, Enseñanza de la Química 3.

Abstract

This article is the result of the analysis of the Paulo Freire Project for Academic Mobility for Students of University Teacher Education Programs with a focus on reflecting on Chemistry degree courses, for this purpose the present author uses his experience and report to develop writing while participating of this program, being linked to the Federal University of Triângulo Mineiro (UFTM) in the degree course in Chemistry. In this work we intend to address issues that involve problems that are associated with the relationship between Science, Technology and Society (CTS) and the indispensability of this dimension to be part of the internationalization process of the courses in Nature and Earth Sciences, mainly regarding the course degree in Chemistry. The methodological strategy used for the analysis of the document was Content Analysis (AC) and Discursive Textual Analysis (ATD), in the analysis step the *Atlas.ti* software was used, it allows the use of the Word Count feature, in which it is intended work facilitating analysis at the textual level. in the search to understand the concepts involved and employed in the document and the core of the proposals that go through the specificities of the Chemistry degree course. In this way, this study brings elements to reflect on the current formative process of undergraduate students in Chemistry and on the need to introduce educational devices for a broad and integral formation of teachers in the internationalization process of undergraduate courses.

Keywords

Internationalization of Higher Education 1, Teacher Training 2, Chemistry Teaching 3.

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Initial discussions

This investigation is the result of the analysis of the Paulo Freire Project of Academic Mobility for Students of University Teacher Training Programs with a focus on reflection on the Chemistry degree course and seeks to analyze the formation of teachers specifically in Chemistry, whose main objective is, through the comparative study, working on aspects of the curriculum and training of these professionals in Brazil and Colombia, discussing issues about the teaching professional identity, teaching knowledge and teaching profession in educational practice scenarios; taking as referent Brazilian, Colombian and other foreign authors (such as Tardif, Perrenoud, Pimenta and Brzezinski, Gil-Pérez).

In this work, we understand that all the functions (co) related to improvements in educational sectors that aim to leverage the social, political, economic, and intellectual development of a country must have the teacher training process as one of its priorities and attention. In this sense, it is observed, however, that in the Brazilian scenario the teaching profession is not associated with this idea and in view of this we can verify direct impacts on the demand for undergraduate courses and this way it is verified in the Higher Education Census, made available by the National Institute of Educational Studies and Research Anísio Teixeira (INEP), where there is an increase in demand for different segments of courses in Higher Education Institutions (HEIs) and in contrast to this is looking for careers that are for teacher training not increased in the same intensity. In the period from 2011 to 2012, there was a 4.4% increase in the number of enrollments in undergraduate courses, however, teacher training courses grew by 0.75%, considered low when compared to the growth of undergraduate courses. University graduate. (TORRES et al., 2013, p. 3)

In addition to this scenario, we can list numerous factors that show the devaluation of the teaching career, among these we can use the candidate / vacancy ratio in the admission processes in undergraduate courses in undergraduate courses, which is among the least competitive. Some issues that permeate this lack of interest in this profession emerge in the study carried out by Caldas (2007), presenting issues such as: low remuneration, lack and precariousness of the infrastructure to exercise their professional activity, high rate of violence in the school environment, different devices demands and repression that are mainly guided by the demand for results, the development of physical and psychological problems, and the devaluation of the profession by different institutions of society.

In this context, it is necessary to incorporate different strategies for valuing the teaching career and among these, partnerships, and expansion of international academic mobility in the training process of teachers in the country are pointed out as a need and alternative, thus encouraging more and more the elaboration and implementation of different measures that seek to enhance and improve the status and conditions of teaching work. According to Santos and Almeida Filho (2012, p. 145), the internationalization process should be the university's fourth mission, in addition to teaching, research and extension, based on this premise and the need for a comprehensive and broad teacher training expanding their experiences and learning to mobilize strategic, cultural and scientific resources in the act of teaching, we can think of the teacher's internationalization process as an axis as important as the others that support the university, in this way we can think according to scheme 1 of how can we think about the internationalization process in teacher education.

We can consider that there is a presence of these axes in the teacher training process and in the university, it allows the development of activities and projects more integrated with the contemporary and globalized reality, enabling training spaces for the training of qualified professionals and able to deal with the changes and world trends, mainly in the that disrespects the teaching process. To this end, the internationalization process must be a priority in educational policies for emerging countries such as Brazil, thus making the University a central point among educational institutions so that it must be able to establish partnerships to be able to incorporate this dimension mainly in teacher training.

Therefore, the purpose of this text is to highlight the need to materialize the dimension of internationalization in Brazilian educational public policies aimed at training teachers that encompass the mobility of both undergraduates and teachers who are already trained. In this study, we aim to point out through the "Paulo Freire Project of Academic Mobility for Students of University Teacher Training Programs", presenting partial results obtained through the Discursive Textual Analysis (ATD) and the experience report the possible items that can be present in academic mobility for the formation of Chemistry teachers that aim at the professional and dimensional development of the licensee that is based on the relationship between Science, Technology and Society (CTS) and that seeks to develop the investigated dimension (IV) in this subject. Regarding the perspective on CTSA, Hoffmann (2011, p. 194) approaches that, "[...] is in view of the need to include ethnic-environmental aspects of science and technology that the CTSA concept emerges, which has as its main challenges the approach of socio-environmental issues in the light of its relations with science and technology."

In Brazil it is known that in the documents the investigative approach was incorporated in the National Curriculum Parameters (PCN) to,

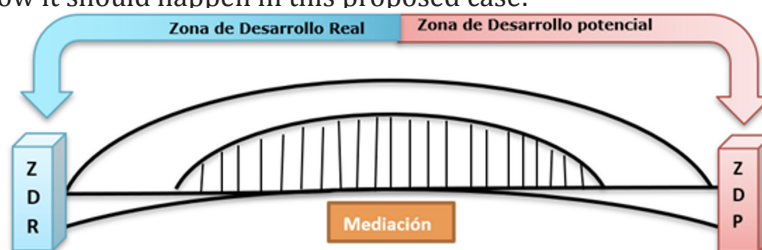
[...] developing attitudes and values is as essential as learning concepts and procedures. In this sense, it is the responsibility of the school and the teacher to promote questioning, debate, and investigation, aiming at understanding science as a historical construction and as practical knowledge, overcoming the limitations of passive teaching, based on the memorization of definitions and classifications without any meaning to the student. (Brasil, 1998, p.62)

Over time, it was built and (re) signifying the understanding of what would be Teaching by Research (EI) in the science area, considering the dominant ideologies and thoughts at a given moment. Nowadays it is considered that the use of EI as an important resource for the development of skills such as interpretation, reflection, works aspects of rhetoric and argumentation among other possible competencies. (Carvalho, 2011, 2013; Sasseron; Machado, 2012; Crawford, 2012; Allchin et al., 2014; Bellucco; Carvalho, 2014).

Which considers the process of internationalization of teachers through research and Science, Technology and Society as essential aspects regarding the professional preparation to prepare a class, thinking of a globalized world, whose changes occur constantly, so the process to explore what if it is planned to be used from the perspective of Science, Technology and Society (CTS) which allows us, a) to promote the interests of students in relating science with technological and social aspects; b) discuss the social and ethical implications related to the use of science-technology, acquire an understanding of the nature of science and scientific work c) develop critical thinking and intellectual independence, thus requiring methodologies and innovative approaches to teaching Sciences (Oliveira, 2010)

In this sense, the need to train teachers who can reflect on their professional practice is conceptually thought out, thinking not only of regional issues, but of global issues that consider issues that must be overcome in science education that are present as visions. deformed on scientific work Gil Pérez et al. (2001) brings: a) empirical-inductivist and atheoretical conception; b) rigid vision of infallible science; c) peaceful and ahistorical vision; d) exclusively analytical vision; e) cumulative vision of linear growth of scientific knowledge; f) individualist and elitist view of science and g) socially neutral view of science.

In this way, when we use this mechanism, it changes, but this professional is the possessor of knowledge and his main function is to teach what he learned during his training process in a graduation of a specific course that he graduated and enabled him to teach about a career, but its main purpose is for the student to get out of the real development zone and reach the potential development zone, allowing the student to learn from what you know, in this way the teacher becomes a mediator of the process below. in scheme 1 a proposal of how it should happen in this proposed case:



SCHEME 1. work through mediation. Created by the author (2020).

Therefore, it is necessary for the teacher to act as a mediator between CTS, Scientific Research, and students, even if he interferes a little in those magical hours of projection that will confer to the student "A teaching and an apprenticeship more creative, collaborative and interactive" (FARIA, 2001, p.64). Always trying to find out how the social, cultural, and environmental contexts, where science and technology are located, influence the conduct and content of the same; how science and technology, in turn, influence those contexts and, finally, how science and technology have reciprocal effects and their interrelationships vary from epoch to epoch and from place to place (Santos; Mortimer, 2002)

The experiences act in different ways in the learning process of an individual and can be considered from the perspective of grouping of experiences that a subject experience during his/her life (Rosito, 2008). These experiences that go through the individual's daily life contribute to the construction of his identity and his recognition in the world and one can perceive an example in Dewey's works about the important contribution of his experiences to learning:

A tree can be just an object of visual experience, it can start to be perceived in another way between it and the person and other experiences such as utility, medicinal, economic aspects, etc. are processed. This will cause the individual to perceive the tree in a different way. After this experience, the individual and the tree are different from what they were before. (Dewey, 1980, p.114)

The didactic material developed that the cinema used as a reference as one of the main resources to work on skills, contents, and competences in the class in face of current needs, from the CTS perspective considered how difficult it was to work with the cinematographic theme within it. class and search for the introduction of the cinematographic resource and experimentation as teaching methodology since this is a challenging and necessary activity.

The approaches in CTS also claim that literacy contributes to motivating students to search for relevant and important information on science and technologies of modern life, with the perspective that they can analyze and value it, reflect on this information, define the values implied in it and taking decisions thereon, recognizing that the final decision itself is inherently based on values (Cutcliffe, 1990 apud Bazzo et al., 2003, p. 144).

This work is the result of a systematic literature review, also using the educational experiences of a native exchange student from Brazil who participated in the “Paulo Freire Project for Academic Mobility for Students in University Teacher Training Programs” funded by her Organization of Iberoamerican States for Education, Science and Culture (OEI) in Colombia in Bogotá.

The analysis and the interfaces between the training of chemistry teachers in both countries, was the analysis of the study plans and the organizational structure of the higher education institutions (IES), the Federal University of Triangulo Mineiro (UFTM) and the University National Pedagogical. (UPN) belonging to these countries, in the analysis of documents we use Content Analysis (Bardin, 2008) and comparative education methodologies (Bray, Adamson and Mason, 2007; Manzon, 2011) to analyze the data.

The selection of these institutions in the past by chance, UFTM is located in a strategic region in the state of Minas Gerais (MG) in Brazil, located in the Triangulo Mineiro and plays a very important political, social and economic role, this territory is shared for more than 35 municipalities, among these are the majority in the southeastern part of MG, the division takes place in different regions: Araxá, Frutal, Ituiutaba, Patos de Minas, Sponsorship, Uberaba and Uberlândia. In this context, it is observed in the teaching offered by UFTM a great national and international recognition and excellence in the training of different professionals from different fields of knowledge, with a gradual increase over the years in their qualification, investment in research and extension activities, where the latter proposes to work directly with the social demands of the local, regional, state and even national communities.

On the other hand, the National Pedagogical University responsible for the training of educators and accredited in all its programs of education as high quality education, has 87 research groups enrolled in schools, which is in charge of promoting public policies to promote it science, technology and innovation in Colombia, from which 4 group of classes are classified in categories A1 and 18 in The incumbent category of producing products for the generation of new knowledge of quality that fosters technological development and innovation. The National Pedagogical University Mission is framed in the training of human beings in both personal and professional teachers of education and educational actors in the service of the nation and the world, from where it is investigated, produce, and disseminate professional teaching knowledge, in all places. levels and modalities of the education system and for all the population in its multiple manifestations of diversity and Principal Actor in Colombian peace processes.

This studio is divided into three stages: (i) a document analysis (IES), (ii) accompanying a bibliographic investigation on each of the institutions (case study) on the training of chemistry teachers in each country / intuition (iii) and a step on the final considerations of the comparative analysis of the policies for the formation of the chemistry teacher and their impact on the institutions / countries analyzed. The guiding question of this investigation is, the policy of teacher training Paulo Freire as a project for the internationalization of degrees?

Among the different results presented, it was possible to encompass how the universities articulate theories and practices of the training of these teachers in the initial training which in the future will be professionals in basic education, and the main impacts on the type of curriculum adopted by these HEIs with respect to the formation of these professionals. In the following sections, we will address HEIs separately, addressing their contexts, organization, and analysis of the chemistry teacher training curriculum.

Methodology

The writing process of this work was used in addition to the author's experiences and experiences in the international academic mobility relationship Paulo Freire Brazil-Colombia at the Universidad Pedagógica Nacional (UPN) the document they have on this project. To this end, using the ATD in the document on the mobility project Paulo Freire, in its scope of analysis three major stages, these being: (1 °) unitarization; (2nd) description / categorization and (3rd) interpretation, presented in schema 2 below.

We can understand ATD mainly with respect to the stages of description / categorization and interpretation, as being: "[...]In this process, category structures are built, which, when transformed into texts, forward descriptions and interpretations capable of presenting new ways of understanding the investigated phenomena." (Moraes; Galiuzzi, 2007, p. 89).

In this way, a hermeneutic perspective is anchored that enables a (re) construction of senses and meanings, with no specific theory that will be only from the beginning to the end of the works developed, having as one of its justifications the pretension of in large part elaborate a theory during the investigation process, so that it is necessary for that to do, [...] "simplifications, reductions and syntheses of research information, achieved by comparing and differentiating unitary elements, resulting in the formation of a set of elements that have something in common." (Moraes; Galiuzzi, 2007, p.75).

In the analysis stage, the [Atlas.ti](#) software was used, allowing the use of the Word Count feature, in which it is intended to work facilitating the analysis at the textual level. Its use made it possible to observe the frequency of words present in the document and, at the end, generating a table in Excel with a total of 2969 words and the main words being perceived by the elaboration of a cloud with the frequency relations of these words, which made it possible to elaborate the main categories that contribute to textual analysis and argumentative construction removing elements of AZ ascending alphabetical order like the typewriter option: | "() {} [] <> / \ # + -_% \$ & " "' ^ @ ^ ' and others.

There are two possibilities for delimiting Categories, one of them may be by deduction in which the Categories start from pre-established theories and the other, it may be by the search for Units of Meaning (Units of Meaning / Units of Analysis), leaving open the process in order that the categories arise from this stage. The research we conducted refers to the latter case, as they do not have a priori categories and thus the curriculum theory and references that refer to the initial formation of teachers in Chemistry listed above, are presented as studies that are intended to support the dialogues and discussions during the analytical texts in the results section. Therefore, these theories constitute a theoretical framework for interlocution that allows the elaboration of arguments that support the sets of meaning, categories and texts emerging from the analysis of textual information.

The construction of categories is also a stage in which (inter) relationships are established between discourses and textual information, with the possibility of sub-categories and, even, relationships between the categories that have been constructed. The categories that emerge from the analysis process have the function of representing the analyzed corpus, however it is important to pay attention to some elements and characteristics of this stage, for example, the criteria that are being used to elaborate the categories, or about the validation process, as highlighted by Moraes and Galiazzi (2011, p. 83) who,

[...] to categorize is to bring together what is similar. In building a set of categories, it is important that the organization is based on a single criterion. The use of a single dimension in the classification of materials leads to homogeneous categories, homogeneity that must be applied to each level of categorization. (Moraes;Galiazzi, 2011, p.83)

Regarding aspects of organization of the corpus / documents to be analyzed, it is possible to assign codes, either letter or numbers, for each text that has information. In this way, during the analysis, a "second number or letter can then be assigned to each of the units of analysis constructed from each text. Thus, text 1 will give rise to the units, 1.1, 1.2, etc. Document 2 will originate units 2.1, 2.2, etc., and so on." (Moraes, 2003, p.195) In this way, the organization of the corpus contributes as it is analyzed,

The description in the qualitative textual analysis is realized from the categories constructed throughout the analysis. To describe is to present the categories and subcategories, basing and validating these descriptions based on empirical interlocutions or anchoring the arguments in information taken from the texts. A dense description, full of quotes from the analyzed texts, always selected with discretion and perspicacity, can give readers a more accurate picture of the phenomena it describes. This is one of the forms of its validation.(Moraes, 2003, p.204)

The third stage (new emergent) seeks to establish new understandings based on the relationships of the procedures performed in the previous stages, thus creating new compressions resulting from the analytical immersion of the materials. In Moraes's words, "[...] This process is essentially unfinished, requiring a permanent criticism of partial products, in the sense of an increasingly complete and rigorous explanation of the meanings constructed and the understanding reached." (Moraes, 2003, p.201)

The communicative interactions between these new understandings and understandings that emerge from the analysis make up a cycle, which is expressed as the dynamic cycle of ATD, as exemplified by it is highlighted that the elaboration of the communication proposed in this cycle goes through the validation and criticism that is foreseen in the last stage of analysis of these new understandings. Thus, in the effort to explain the understandings that have emerged, the metatext has as consequence. This is the result of the combinations between the components of the stages of the cycle. About the metatext, the author argues that, "[...] metatext constitutes a set of descriptive-interpretative arguments capable of expressing the understanding reached by the researcher in relation to the researched phenomenon, always from the corpus of analysis." (Moraes; Galiazzi, 2007, p.87)

In summary, we can understand that DTA mainly with regard to the steps of unitarization, description / categorization and interpretation, as being a "[...]this process, category structures are constructed, which, when transformed into texts, forward descriptions and interpretations capable of presenting new ways of understanding the investigated phenomena" (Moraes; Galiazzi, 2007, p.89)

TABLE 1. Frequency of words in the document

Note: created by the author (2020).

Word	Length	%	Total	%
academic	9	1,01%	30	1,01%
students	10	0,84%	25	0,84%
formation	8	0,98%	29	0,98%
project	7	1,35%	40	1,35%

The categories selected in the document through the analysis were: Academic Mobility, Cooperation, Project, Academy, among others. Because they represent the most significant and most frequent about what the project represents. As each category is taken from the main recurring terms of the Paulo Freire Mobility Project, it is necessary for the analysis of the concepts to use some of the excerpts selected by the author that indicate the lines between what the document proposes and how the theoretical framework supports us. Table 2 shows some relationships between the important and recurring terminologies in the document and the arguments / concepts used about them. It should be noted that there is no rule that limits the number of specific categories to be used, being limited to the corpus of analysis and the treatment that it uses in the process.

TABLE 1. Excerpts of the most frequently used arguments in the text.

Note: created by the author (2020).

ACADEMIC
"To achieve this goal, it is necessary to promote understanding between Ibero-American governments, higher education institutions and teacher training systems in the region, and to develop agreements that facilitate academic certification and guarantee the recognition of subjects, credits or learning units. attended by students because of mobility grants."
"The Paulo Freire project also foresees the creation of an Advisory Board made up of personalities from the academic, scientific and cultural world. Simultaneously with the functions related to academic guidance, the Advisory Board will have the task of promoting greater visibility of the project at national and international levels, in addition to encouraging its dissemination and development."
"Permanent links will be sought with other academic networks operating in the Ibero-American space, such as the Pablo Neruda program (short mobilities of professors and graduate students) and PIMA (four-month mobility of undergraduate students). After a period of stable implementation in which the decision-making bodies in the respective ministries will be shared, during 2016-2017 the merger of all these initiatives and others of a bilateral or sub-regional scope will be studied, within the scope of the Ibero- American Student and Teacher Mobility (projeto Paulo Freire +)."
"The Paulo Freire project is not just a mobility project: it is mainly an Ibero-American technical and educational cooperation initiative. Hence the importance of establishing lines of collaboration with teacher training institutions, so that the networks offer their cooperation to strengthen the institutional and professional capacities of these centers and promote, in their case, concrete projects for academic and institutional improvement."
STUDENT
"In view of the above, the Paulo Freire Project for Academic Mobility for Students in University Teacher Education Programs was developed."
"Its fundamental activity, for the coming years, will be centered on undergraduate and graduate students who are taking programs focused on the teaching profession."
"Students will attend a four-month course at the destination institution, with the guarantee of full academic recognition by their home institution."
FORMATION
"Investing in the formation of a process is an important factor of personal and social development, that is, however, more evident when the training falls on future teachers, whenever it directly benefits dozens of generations of children who passed through their classrooms. "
"[...] teacher training, they lack programs that promote international academic mobility, despite the importance of the contribution of their graduates to the quality of educational systems."
PROJECT
"Within the scope of the project, the formulation of instruments for the recognition of the studies carried out will be encouraged."

Some of the aspects presented in the document regarding the terminology adopted on the word cooperation, it is important to highlight the measure that, through greater cooperation between institutions and countries for the internationalization process, facilitates greater integration even beyond the academy contributing with aspects such as:

The flow of people, technology, and knowledge across borders, as well as economic and cultural integration, requires the instrumentalization of university cooperation mechanisms to enhance and improve the quality of higher education. (Projeto de Mobilidade Paulo Freire, 2014, p.3).

Regarding the mobility approach, "This Project aims to become the main instrument of Ibero-American cooperation to consolidate a stable system of academic mobility in the region." (Mobility Project Paulo Freire, 2014, p.3). So, in this perspective,

[...] it is necessary to promote understanding between Ibero-American governments, institutions of higher education and teacher training systems in the region, and to develop agreements that facilitate academic certification and guarantee the recognition of disciplines, credits or learning units taken by students as resulting mobility grants. (Projeto de Mobilidade Paulo Freire, 2014, p.6).

Among the aspects considered by the author of the article as important and that strengthening the present Mobility project Paulo Freire is,

the permanent articulation with other academic networks that operate in the Ibero-American space such as the Pablo Neruda program (short mobilities of professors and graduate students) and PIMA (four-month mobility of undergraduate students). After a period of stable implementation in which the decision-making bodies in the respective ministries will be shared, during 2016-2017 the merger of all these initiatives and others of a bilateral or sub-regional scope will be studied, within the scope of the Ibero- American Student and Teacher Mobility Program (Paulo Freire + project). (Projeto de Mobilidade Paulo Freire, 2014, p.7).

With this, by incorporating programs that already have greater tradition and consistency in disrespecting partnerships and in the regularity of the numbers of people who manage to develop activities outside the country through such programs as Pablo Neruda and PIMA and their merger will contribute to that each more people are able to reach the university's "fourth mission" and can thus go abroad to produce research and provide different social, scientific and political returns.

To be a teacher who experiences the school environment, we know that not everyone has this opportunity, and in this way, it is important to develop spatial and stimuli so that they work effectively during the training process of these professionals, the environment and their development professional based on IV and CTS processes. For this purpose, looking at Gauthier's conception, it is important that the conductor knows the different levels and structures that constitute the school institution, explaining that the conductor

has a set of knowledge about the school that most common and unknown citizens know about. members of other professions. It is a specific professional knowledge, which is not directly related to the pedagogical action, a bell that serves as a basis for both him and other members of his category socialized in the same way. This type of knowledge permeates the way in which the teacher exists professionally. (Gauthier et al,2006, p.31)

In the same way, we can observe that within this perspective one cannot think of different forms and training possibilities that offer conditions for the teacher in training to face the diversities, implications and variables that are present during his practice in the class and / or in spaces . training courses that seek to encourage graduates in this sense during their training course, the habit of planning and developing didactic strategies with autonomy, providing a reflection on their action, and improving their class with the incorporation of different didactic strategies and pedagogical resources . Therefore, in the opinion of TARDIF (2011, p. 54), It is possible to express the "plural knowledge, formed by diverse knowledge, coming from training institutions, professional training, study planes and daily practice".

There are different ways of conceiving what is the knowledge of the teaching and the various relationships that are possible between them, and that also presents Tardif, and this same thought is also evident in Gauthier's speech, although he decides that "it is much more relevant to conceive teaching as the mobilization of various types of knowledge that forms a kind of deposit in which the conductor supplies to meet the specific requirements of his concrete teaching situation " (Gauthier,2006, p.28).

Therefore, it is necessary to work on the study plan for the training of teachers of a title in chemistry in the appropriation of educational concepts and the use of cinema to develop research projects that use didactic strategies of IV and CTS to seek to respond to your questions. orienting, contributing so that when you are in the class you have different knowledge of teaching and can mobilize them in the teaching-learning process. According to Santos, we have the concept of STS for the process of teaching science, "[...] the objective is to teach every citizen what is essential to become a real citizen, taking advantage of the contributions of scientific and technological education." (Santos apud Nascimento and Von Linsingen, 2006) Aikenhead (1994), developed a division that related the activities that are present in an STS teaching, elaborating on each category, observing how these STS perspectives are related and involved in aspects such as: curricular, conceptual, and methodological.

Final considerations

We can thus verify the possibility of establishing the use of the route for analyzing the document that guides the Paulo Freire Mobility Project, going through the three instances as initially proposed, and it is observed that emerges from this analysis with this work the reinforcement of the need to establish even more internationalization devices in the teacher training process, enabling these graduates to have contact with other cultures and educational thinking, enabling them to establish relationships that allow them to observe difficulties that are common to different countries, allowing them to have a multidimensional view, which will help them to seek possible solutions in other educational realities taking into account their context.

Thus, based on the issues raised at the beginning of the text, it is extremely necessary to incorporate internationalization as the fourth mission in the teacher training process embedded in the teaching, research, and extension functions. Specifically in the case of the graduate student in Chemistry, there is a significant gain as he will be able to observe strategic possibilities for teaching (re) thinking about issues that are often almost not present in his training curriculum as cultural issues, social, political, explicitly ends up reflecting in the

current system that has in the teaching of Chemistry in Brazil, so we consider that it can be leveraged even more when it presents investigative questions and CTS as requirements to be developed in the international mobility of graduating in Chemistry.

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