

Motivational aspects in the national curriculum guidelines: focus on the initial training of chemistry teachers

ABSTRACT

This investigation had as objective verifying the representativeness of motivational aspects in teaching guideline documents, especially in Chemistry. To do it, we adopted the sociocognitive perspective of motivation as the foundation of the analysis. In this paradigm, we considered, more specifically, the Self-determination Theory, which presupposes the autonomous quality of motivation results from the balanced interaction between the subject's internal demands and the context in which is inserted, resulting in the well-being, interest in learning and improve in academic performance. In face of this, we analyzed the *Diretrizes Curriculares Nacionais* (DCNs) of Teacher Training and of Chemistry Teachers, and also *Projetos Pedagógicos de Cursos* (PPCs) of Chemistry Graduation of two Federal institutions of Higher Education in Manaus. With this objective, we departed from a protocol of Document Analysis, systematizing the data from the Discursive Textual Analysis. The results demonstrated good representativeness of the motivational aspects analyzed in the DCN/2019, and a lack of socioemotional politics in the DCN of Chemistry teacher training and PPCs. About the latter, there is a pressing need of them being updated and effectively dialoguing with the current needs in Basic Education, presenting guiding principles which involve the motivation and formative needs harnessed to the socioemotional practices. Lastly, we highlighted the relevance of the study, to generate reflections and subsidize understanding about the motivation in the formation of Chemistry teachers, collaborating to the debate about subjects turned to the psychological well-being during the teacher training and actuation.

KEYWORDS: Motivation. Chemistry Teacher Training. Documental Analysis.

João Bosco Paulain Santana
Júnior
junior.paullain@gmail.com
orcid.org/0000-0002-8595-7746
Universidade Federal do Amazonas
(UFAM), Manaus, Amazonas, Brasil.

Sidilene Aquino de Farias
sfarias@ufam.edu.com
orcid.org/0000-0003-3866-207X
Universidade Federal do Amazonas
(UFAM), Manaus, Amazonas, Brasil

INTRODUCTION

Teacher training involves a group of important and needed knowledge for the Professional development. Between this knowledge it is the education articulation, pedagogy and didactics with other fundamentals which permeate the educational phenomena (COSTA; DANTAS; FREITAS, 2022).

In this conjuncture, the teacher training guiding documents present themselves as important components in the proposal and guarantee of formative models which direct the manner and the needs which must be worked and supplied in the teacher's development, establishing competences and skills needed to exercise the profession.

In front of this fact, in this study we are focused in the investigation and discussion of the motivation while guiding principle in the teacher professionalization. This focus appears as a result from the importance of motivation, a psychological factor capable of taking action and permanence in this movement. Therefore, we have the guiding question: which motivational aspects manifest in the official documents and political projects of the teacher training courses, in special in the field of Chemistry? The objective of this study was investigating the motivational formative aspects inherent to the teacher professionalization in the Brazilian official documents and political projects of the courses of Graduation in Chemistry.

THEORETICAL REFERENCE

Teacher training appears as a huge challenge in the Brazilian scenario, which is consequence of the structural difficulties faced by the class which involve problems related to social and Professional devaluation, structural needs, lack of support and crisis originated from the profession (OGO; LABURÚ, 2011; SÁ; SANTOS, 2016). These adversities, associated to challenges of the teaching training itself, increases the chances of promoting adverse emotional states and the demotivation, moving away the youth from the teaching graduations (ADAMS, 2022; COSTA; DANTAS; FREITAS, 2022).

In this scenario, we valued the conceptual and technical knowledge as important and needed part for the teachers to assume their educative task and the challenges which follow the career. However, we also believe it is fundamental working on motivational components and the elements which permeate this variable, not only in the teacher's personal sense, but also endowing of knowledge which make it possible the manipulation of motivational properties in the educative context of actuation. In order to do it, the training institutions must provide a formation which includes dialogicity and synchrony between the cognitive, emotional and motivational skills (CARVALHO; STANZANI; PASSOS, 2017; MONTEIRO et al., 2012).

Shulman (2005), by discussing curricular matters in the teacher formation, highlights the importance of the social, cognitive and motivational characteristics to the students in the evaluation of general principles for an effective teaching. The referred author stresses the transformation of the content understanding by part of the teachers to the mind and motivation of the students, must satisfy the

adaptation and adequation of representation between those who teach and learn (SHULMAN, 2005). In what refers to the Teaching of Science, Carvalho and Gil-Pérez (2011) highlight as fundamental for the learning, for the teacher conceding attention to affective and emotional aspects.

In front of this fact, and as part of the psychological factors which constitute the subjects, the motivation is fundamental in the mobilization of characters involved in the process of teaching and learning. Segundo Oliveira and Gois (2020), a motivated student gets involved in a more active manner in the activities. This does not occur with those who find themselves in a demotivated condition, seen they do not apply effort, or those little motivated students, because they spend a minimal effort and forfeits the activities when they demand more commitment.

In this perspective, it becomes indispensable considering the motivation as part of basic knowledge in the teacher training and in the elaboration and development of didactic proposals which occur in learning situations. This happens because the expectations and motives which mobilize the students are variable, what, by being taken into consideration, optimize environments much more propitious to positive motivational processes, promoting action and engagement from the apprentice to the educative proposals (SHULMAN, 2005; BORUCHOVITCH; BZUNECK, 2009).

In view of this, we corroborate what Davoglio and Santos (2017) discuss, and understood the motivation as a psychological factor of “[...] transitory and fluid state, driven to an objective which may be immediate or future, directly or indirectly reachable, in this last case, the subject will have to move from the closer objectives to the further ones” (p. 783). Therefore, the motivational construct acts as a dynamic factor which might vary according to the person experimenting and living new situations.

In this process, there is the influence of cognitive factors, relative and affective which interfere in choices, initiative, directions and qualities of determined action to reach an objective. Therefore, thinking in motivation encompasses different variables of intrinsic nature, involving expectations and internal values, and of extrinsic nature, connected to contextual aspects in which the individual is inserted (TAPIA; FITA, 2003; DAVOGLIO; SPAGNOLO; SANTOS, 2017).

The Sociocognitivist Theories consider the motivation as a dynamic process influenced by interactional and environmental. In educational situations the environmental motivational characteristics, defended by the Sociocognitivist Theories, associate to those supported by the humanist, cognitivist and sociocultural approaches. In what concerns to it, the reflection about the educational approaches aids in the understanding about the “[...] role of didactics for the teacher’s training and its importance in the activities teaching and learning” (SANTOS, 2005, p. 19) and in the identification of assumptions which fundament the teacher’s actions.

The characteristics of the educational environments defended in these teaching approaches, dialogue with the sociocognitivist theories of motivation and provide an insight over the motivational aspects in the formative documents. Furthermore, they subsidize the outlining of proposals which consider the motivation in teacher training. Between these theoretical models, the present

investigation is considering the Self-determination Theory, and more specifically, the sub-theories of Organismic Integration and Basic Psychological Needs, as well as those which have more contribution in the analysis of documental guidelines for the teacher training.

Self-determination Theory: psychological needs in the increment of motivation

Although there are different conceptions about the motivational construct, the Self-Determination Theory (*SDT*) is supported on the self-determined behavior, influenced by contextual aspects which promote the intrinsic motivation (RYAN; DECI, 2000b, 2008; DAVOGLIO; SPAGNOLO; SANTOS, 2017). In this model, the motivation might be regulated in autonomous or controlled manners, in which the autonomous regulation implies in the willing and deliberated action; and the controlled regulation assumes external behavioral control, resulted from rewards and punishments (RYAN; DECI, 2000a).

The autonomous motivations have their largest representation in the intrinsic motivation, characterized by the genuine interest of the subject for an activity, independently of rewards or external valorizing. Motivations from this nature also include some kinds of extrinsic motivation, in which, the subject identifies with the proposed demands and integrate them to their values and principles, experimenting a feeling of volition. On the other hand, the controlled motivations presuppose some kind of regulation external to the behavior, as some approval or disapproval of subject. In this case of regulation, there is pressure to think, act or feel something which does not necessarily corresponds to what the person would really like (RYAN; DECI, 2000a; DAVOGLIO; SPAGNOLO; SANTOS, 2017).

Attached to the comprehension of contextual factors which favor the autonomous motivations, the SDT presumes the existence of basic psychological needs (NPB) and also universal ones, characterized by the autonomy competence and belonging. According to the SDT, when jointly satisfied, these psychological needs promote satisfaction, well-being and healthy work of the human dimensions, acting as fuel for the deliberated action of the individuals (BROECK et al., 2010; DAVOGLIO; SPAGNOLO; SANTOS, 2017). Consequently, there is the strengthening of autonomous motivations, in special the intrinsic, leading to the improvement of cognitive functions, development and satisfaction in the demanded regulations (RYAN; DECI, 2000a).

In the SDT, the autonomy represents the individuals' desire of feeling volitional and experimenting the academic activities with the perception of their own choice and psychological freedom. The satisfaction of competence presupposes the efficiency of the subject in the interaction with the environment, having adaptation to the complex and dynamic environments. This NPB results from pleasant and effective experiences in the domain of certain activity, in a manner which the subject feels efficient in its realization. Lastly, the need of belonging is defined as the people's propensity of feeling connected to others, as the teacher and classmates. This necessity uses to be satisfied when the individual experiences a feeling of communion and proximity in the context in which is inserted (RYAN; DECI, 2000a, 2000b; BROECK et al., 2010).

In this manner, being the motivation a complex and determinant psychological process in the actions and individual choices, it becomes indispensable working it in the formation of new teachers. In this bias, the training institutions must develop concrete actions and strategies which promote the well-being and the satisfaction in the course. In order to do it, it is important the trainer teachers reflect about the course politics, teaching approaches, human dimensions and sociocognitive components, searching for means of aiding in the attribution of sense and meaning to the formative activities.

Motivation in the teacher training

The *Plano Nacional de Educação* highlights the relevance of the education professionals' motivation, so there may be engagement and satisfaction in the exercise of the career (BRASIL, 2014). In this strand, we believe it is primordial and urgent discussing the motivation during teacher training, not only because it presents itself as an indispensable condition to the involvement, but also because few academic discussions about this subject are observed in the Chemistry teacher formation (DAVOGLIO; SPAGNOLO; SANTOS, 2017; PORTO; GONÇALVES, 2017).

Sá and Santos (2016) highlight this fight for survival in determined phase of adult life is one of the strong motives which take people to the teacher training courses. In these circumstances, there is not an effective choice of "being a teacher", but there is the option for a "possible Professional activity", which ends taking to the beginning and permanence in the teaching career. Other factors, as predisposition for the teaching, life opportunities in the teaching career, significant school experiences and the life history of the subjects are motives commonly present in those who opt for staying in the profession.

Considering the contextual factors in the motivational quality, it is important to debate motives which collaborate for the entry and stay of the subjects in the teaching career. In what concerns it, Ursi and Barbosa (2019) describe the relevance of subjects taught and the satisfaction of needs in personal and Professional lives, appear as elements to be taken into consideration. Questions of this nature must be articulated, having participation and tuning between what is taught and the educational demands required in the contemporary world (URSI; BARBOSA, 2019).

In front of this problem, we agree with Perrenoud et al., (2002), who estimate the teacher as that who must be capable of identifying and valuing the personal competences not only inside the profession, but also allied to other social practices. Furthermore they must develop Professional qualities which help them to work in their relation with the knowledge and propose means of promoting the interest for the knowledge not as an end in itself, but as a possibility of understanding the world and their action over it.

METHODOLOGY

In this research, we used the method of documental analysis, which is characterized by the factual study and analytical treatment of documents and their relations to questions and hypothesis of interest. The usage of this

procedure widens the understanding over objects whose comprehension need contextualization and consists in a generalized manner in the extraction of information from the investigation, handling, analysis, organization, categorization a synthesis of documents (SÁ-SILVA; ALMEIDA; GUINDANI, 2009; CECHINEL et al., 2016).

With this, we search to investigate the motivational principles present in official documents of teacher training in Brazil. Between these documents we analyzed the *Diretrizes Curriculares Nacionais* for the graduation of teachers (DCN-P) from 2015 and 2019, and more specifically, the *Diretrizes Curriculares Nacionais* for the graduation of Chemistry teachers (DCN-PQ), of 2001. We also investigate possible relations between the information found in these guidelines with those presented in the *Projetos Pedagógicos de Cursos* (PPCs) of graduation in Chemistry offered in the city of Manaus, from *Instituto Federal do Amazonas* (IFAM) and *Universidade Federal do Amazonas* (UFAM), of 2014 and 2016, respectively. We stress the choice of these documents occurred as result from their terms at the moment of the research.

The data gathering, from their documents, was realized based on the construction of a Documental Analysis protocol (Board 1), formed by procedures which constitute the technique (SÁ-SILVA; ALMEIDA; GUINDANI, 2009; CECHINEL et al., 2016). In this protocol, we described the guiding parameters adopted for the information selection which interest the study.

Board 1 – Documental Analysis Protocol.

Items	Description
Documents	<i>Diretrizes Curriculares Nacionais para a Formação Inicial de Docentes</i> (2015 and 2019), <i>Diretrizes Curriculares Nacionais para os Cursos de Química Licenciatura</i> (2001), <i>Projeto Pedagógico do Curso do IFAM</i> (2014) and <i>Projeto Pedagógico do Curso da UFAM</i> (2016)
Codification	DCN-P (2015 and 2019), DCN-PQ (2001), PPC 1 and PPC 2, respectively.
Context	In face of the sociopolitical and technological dynamics, it is aimed to form the students from Basic Education as a whole, preparing them for the demands of the contemporary society. Thus, the teachers must be prepared to handle new scenarios, challenges and dynamics, in a manner which their formation is one of the kernels in the search for transforming education, promoting the construction of guidelines and pedagogical projects which aim to help them with the educational demands.
Authors	DCN-P; DCN-PQ: <i>Ministério da Educação, Conselho Nacional de Educação.</i> PPC1 and PPC2: professors from the graduation courses in Chemistry, administrative members and pedagogical support agents from the institutions.
Reliability of Texts	Documents redacted in experts from the educational field.
Nature of the Texts	Guidelines and educational projects.
Keywords	Motivation, interest, engaging, emotional, involvement, learning competences and strategies.
Categories	1. Emotional dimension and promotion of well-being;

Items	Description
	2. Students' competences and interests; 3. Motivational approach and didactic.

Source: Authors (2022).

In the DCNs and PPCs analysis, we considered the documents as a whole, using keyword (Board 1), as guidelines in the process of searching the subjects of interest. The keywords were important in the analysis procedure, because they optimized the location, acted as describers and presented, briefly the general and fruitful aspects of the investigation.

We also stressed the categories in the Documental Analysis Protocol (Board 1) passed through a process of reworking as we had a wider and more consistent comprehension of the documents in the proposed analysis bias. Initially, these categories were defined as 1) care with the emotional dimension as primordial factor for the well-being, 2) competences which promote the interest for learning and 3) usage of motivational approaches and didactic resources. This improvement occurred with the objective of widen the representation of the categories and enabling the document analysis in a uniform manner.

In order to systematize the data, we employed the Discursive Textual Analysis (ATD) procedure, undertaking ourselves in the comprehension and organization of the interest information. Between the mains stages of the ATD employed in this study, were the disassembling of the documents, data reorganization in categories and subcategories of analysis, meaning capitation and textual organization for presentation (GALIAZZI; SOUSA, 2019). In Board 2, are presented the categories and subcategories defined for the comprehension of the documents. It is worthy to highlight the absence of subcategories in the category Competence and Interest of the Students, having in view the category itself is capable is representing the elements analyzed in the documents.

Board 2 – Categories and subcategories of analysis.

Categories	Subcategories
Emotional dimension and promotion of well-being	<ul style="list-style-type: none"> - Role of education in the emotional development. - Characteristics and educational environment attribution in the generation of the well-being and promotion of motivation.
Competences and interests of the students	—————
Approach and motivational didactic resources	<ul style="list-style-type: none"> - Approaches and teaching strategies in the promotion of motivation for learning. - Applicability of the approaches and didactic resources as motivational instruments.

Source: Authors (2022).

RESULTS AND DISCUSSION

Initially, we presented in a general manner the degrees of representativeness found in the documents (Board 3). The results showed there was low representativeness in the category Emotional Dimension and Promotion of Well-being, both in the DCN-P/2015 and DCN-PQ, and in the PPCs. It means these documents practically do not present politics and direction in this category, in

special the DCN-PQ, which has a bias more conceptual and technical of Chemistry teacher training. However, we verified an improvement of this panorama when comparing the DCN-P of 2015 and 2019, with larger representativeness of the categories in the most recent guidelines.

Board 3 – Degree of representativeness of the motivational aspects in the structuring of official documents of teacher training.

Categories	DCN-P		DCN-PQ	PPC1	PPC2
	2015	2019			
Emotional dimension and promotion of well-being	□	■	□	□	□
Students' competences and interests	□■	■	□	□■	□■
Motivational approach and didactic resources	■	■	□■	■	■

Note: ■ – good representativeness; □■ – average representativeness; □ – low representativeness. Source: Authors.

The results (Board 3) also reveal a low representativeness of the category “students’ competences and interests” in the DCN-PQ, and average representativeness in the DCN-P/2015 and PPCs. This indicates a lack of guidelines and politics in these documents which guide the graduation institutions to work this aspect during the formation. In what concerns the DCN-P/2019, there was an improvement in the representativeness of competences which direct about the graduates need of being capable to develop motivational practices. Lastly, the category “motivational approach and didactic resources” presented the Best parameters, having good representativeness in the DCN-P and PPCs and average representativeness in the DCN-PQ.

Emotional dimension and promotion of well-being

Currently, one of the main demands from the Brazilian educational politics are turned to the formation of the students of Basic Education as a whole, guided by paradigms, competences and thematic proposals which aim to strengthen and guide the institutional and teaching practices. In this domain, we highlight the emotional formation as an important constituent for the formation stages, because it involves the dimension of “being” which influences directly the human attitudes, behaviors and motivations. About this, we defend the search for developing teachers which know how to handle their own feelings and dealing with emotional phenomena from their students.

In front of the exposed, we search for representative elements in the subcategory Education Role in the Emotional Development, noticing the DCN-P/2019 orients the graduation institutions about the graduated need of

Knowing themselves, appreciating themselves and take care of their physical and emotional health, understanding themselves in the human diversity, recognizing their own and the others emotions, with self-criticism and capacity to deal with them, developing the self-knowledge and self-care in the students (BRASIL, 2019, p. 13).

Therefore, it is needed to make it possible to the graduated the acquisition of skills to handle their own emotions and with those of the students in situations of teaching and learning. The DCN-P/2019 also highlights the graduated must develop a “wider vision of the training process and the socioemotional as relevant for the development, in the students, of the competences and skills for their lives” (BRASIL, 2019, p. 6). This reaffirms the responsibility of the teacher training courses in the work and promotion of emotional skills.

When compared to the DCN-P/2015, the latter turns prominently for cognitive and didactic-methodological matters, not involving explicitly the emotional dimension and leaving this subjacent domain to the document rules. Therefore, we perceived a notorious improvement of the DCNs about the emotional needs, in a manner which it passed to consider the socioemotional practices as mobilizing of skills for the resolution of complex demands from the daily life and the working world (RÊGO; ROCHA, 2009).

Between the implicit emotional indicators in the DCNs, it is found the duty of conceiving teachers capable of favoring social inclusion, promoting significant, contextualized and interdisciplinary teaching, applying psychological knowledge to the education, acting in an ethical, respectful and impartial manner, based on social justice principles and using the multidimensional knowledge about the human being. Working these aspects may arouse professionals capable of favoring satisfaction and well being of the individuals in situation of learning (BORUCHOVITCH; BZUNECK, 2009).

Considering the DCN-PQ, there is a group of guidelines based on the conceptual, technical and instrumental perspectives. This may be identified in components connected to the desired profile of the graduated in Chemistry, in which the document defends the formation must be generalistic, but “[...] solid and embracing in content from the diverse fields of Chemistry, adequate preparation for the pedagogical application of the knowledge and Chemistry experiments and related areas in the professional actuation as educator” (BRASIL, 2001, p. 4). In this sense, in the guidelines it predominates the model which during the Chemistry teacher training, there must be conceived professionals who know how to “apply” knowledge and chemical experiences.

It is important to ponder the DCN-PQ needs updating, because it antecedes a significant period to the current sociopolitical demands of Brazilian education, which includes the *Base Nacional Curricular Comum* in validity since 2018. Thus, seen that the formative needs are subject to social, political and economic influences, it is fundamental that the DCN-PQ passes through a rework and guide the Chemistry teacher training institutions in a current perspective, establishing needs such as chemical content signification to those who learn and presenting socioemotional politics to the formation of these new professionals.

Despite it, we identified some formative elements in the DCN-PQ which may contribute for the emotional formation of Chemistry teachers. Between these elements, the document highlights the teacher must have humanistic formation, and in the professional acting must respect “[...] the right to live and well-being of the citizens” (BRASIL, 2001, p. 6). The humanistic formation and the respect to the well-being contribute for the teachers development in the emotional field while experience it in their own development. Nevertheless, the document does

not clarify the specific competences which should be worked in order to reach this objective.

About the PPCs, there is not either highlight about the emotional formation of future Chemistry teachers. However, it is possible identifying some guiding principles which relate to those treated in the DCNs, involving the development of educational practices capable of awakening positive emotions during the learning. Between these practices, we stress the search for humanistic, interdisciplinary, contextualized and significant formation, both present in PPC 1 and PPC 2.

In PPC 1, these ideas might be represented from the valorization of formative aspects like “having a critical view in relation to the social role of Science and its epistemological nature, understanding the social-historical process of its construction” (PPC 1). About it, it is valued the need of forming Chemistry teachers who use the scientific knowledge as transforming object, helping the student to use it in the demands of the daily life.

The PPC 2 ponders the course must “enable the investigative, problematized, interdisciplinary and contextualized teaching” (PPC 2). By providing teaching and learning experiences with these characteristics, the course is contributing for the Chemistry teacher training which know how to diversify and alternate satisfying and motivational practices, result from their own lives and development of skills which search for teaching alternatives.

In view of this, the projects present curricular components turned to the comprehension of the learning under psychological approaches. In PPC 1, there is the subject Psychology of Education, and in PPC 2, the subject Psychology of Development and of Learning. These curricular components present contents which offer subsidies for emotional matters and may collaborate in the acquisition of basic notions about this object. Some of these subsidies consist on understanding motivational factors in relation to the school and learning, being the motivation a psychological factor which influences the emotional state of the individuals.

Considering these results, we also perceived the exiguity of politics directed to the formation of emotionally intelligent teachers and capable of dealing with inconstant emotions of teenagers in Basic Education. This should generate concern, because individuals which feel emotionally well and can self-regulate their own feelings, tend to present an inclination for learning and qualitative motivations (RYAN; DECI, 2000a, 2000b).

In this strand, in order to evaluate elements connected to the subcategory Characteristics and Educational Environment Attribution in the Generation of the Well-being and Promotion of Motivation, the SDT provides us important subsidies on what concerns proper environments to the satisfaction, growth and personal motivation. Inside this model, the sub-theory of Basic Psychological Needs presupposes the feelings of autonomy, competence and belonging act as nourishments capable of strengthen the emotional, awaken self-determined motivations and optimize more consistent (RYAN; DECI, 2000a).

Therefore, it is fundamental that the satisfaction of these psychological need occur during the formative process and the graduated experience forms of

promoting environments which unleash these self-perceptions. About this, the DCN-P of 2015 orients the graduation institutions to build curriculums and develop pedagogical proposals which form teachers capable of “identifying sociocultural and educational questions and problems, with investigative, integrative and propositional posture in front of complex realities, with ends of contributing for the overcoming of social exclusions” (BRASIL, 2015, p. 8). These politics require the graduation environments are inclusive, satisfying the sense of belonging.

The DCN-P of 2019 approaches the basic psychological needs in more apparent form. Despite the sense of belonging, there are representations involving the autonomy and competence. In these domains, the document stresses that there must be promoted the “[...] development of autonomy, the capacity of problem solving, the investigative and creative processes, the exercise of collective and interdisciplinary work, of analyzing challenges of the daily life and in society and of the possibilities of their practical solutions” (BRASIL, 2019, p. 5). To do so, the individualities must be respected, diversifying the methodological proposals and evaluations, considering the limitations, individual skills, the educational contexts and allowing the graduated to be active in their development process.

In its turn, the DCN-PQ treats of few formative questions involving the basic psychological needs, presenting some highlights to the autonomy. The document defends the creation of “[...] a model of higher education, which privilege the role and the importance of the student in the learning process, in which the role of the teacher of ‘teaching things and solutions’, passes to be ‘teaching the student to learn things and solutions’” (BRASIL, 2001, p. 1). The fulfillment of this orientation requires the graduated to have their need for autonomy suppressed, opening possibilities so they may experience and exercise these practices in the school.

Comparing the general guidelines and those of Chemistry teacher training, there is more deepening of the DCNs in factors which value the emotional balance during the formation, in special in the version of 2019. In the DCN-PQ, there is a scarcity of politics about the subject, not contributing for the emotional domains. In this perspective, considering the sociocognitivist models of motivation, eh educational environments are fundamental for the generation of quality motivation processes, influencing in the actions, interest and engagement of individuals. This is consequence of numerous factors, such as the person constantly interacting with the environment, this environment having influence over the person and the capacity of modifying the context in which is inserted (APPEL-SILVA; WENDT; ARGIMON, 2010). Thus, we believe fulfilling necessities such as those pointed by the model of the basic psychological needs must be one of the educational objectives.

In what concerns the PPCs, we observed principles which involve the necessity of autonomy, where it is highlighted the teacher training must be “realized through thought and argumentation emancipation, in a permanent exercise of autonomy and intellectual creativity” (PPC 2), and belonging, in a manner which the graduated in Chemistry is prepared to promote the “social inclusion” (PPC 1). In relation to the feeling of competence, there are no references which consider individualities and cognitive and personal limitations of the students. About this, Ryan and Deci (2000b) stress the feelings of autonomy and competence must be

simultaneously present so the intrinsic motivation is highlighted. Consequently, as important as promoting the autonomy, it is favoring the feeling of competence, this involves the consideration of the learning and particular levels of the involved students.

Other point which is worthy highlighting, relates to the current models of the PPCs, which search for following the current required demands in Basic Education, breaking from the predominantly conceptual and technical perspective from the DCN-PQ. In this manner, it is obverted the projects of Graduation in Chemistry from UFAM and IFAM aim to dialogue and incorporate more current and needed components to the teacher training.

Competences and interest for learning

By focusing our interest in the observation of competences linked to the motivational processes, we can raise some questionings about the “form” or “if” the national educational documents structured by competence encompass elements which concern the promotion of interest for the learning. Or even “what” formative aspects are emphasized by the guidelines and pedagogical projects are capable of guiding in relation to the development of practices which evoke motivated subjects to learn.

The DCN-P/2019 orients about the need of stimulating the graduates to the professional commitment, enabling them for the construction of

[...] professional planning using different resources, based on self-evaluation, in which is possible to identify the potentials, the interests, the needs, the strategies, the targets to reach their own objectives and reach get to their realization as a professional of education (BRASIL, 2019, p. 19).

These guidelines involve the acquisition of skills which capacitate the teacher to mobilize the interest of the students, taking into consideration the contextual possibilities and individual and collective needs. Considerations of this nature collaborate to enable the education to and in citizenship, making the subjects capable of utilizing the learned knowledge to understand and take a stand in society. The DCN-P/2015 does not highlight the competences related to the need of promoting motivation and the interest. Underlying, the document orients that during the initial formation the graduated is going to have to “understand their role in the formation of students from basic education from a wider and contextualized conception of teaching and learning processes and development of this [...]” (BRASIL, 2015, p. 7).

When focused on the DCN-PQ, there is not either a deliberated guidance about the care the graduation institutions must have with the motivation of the graduated, neither with the promotion of competences which capacitate them to evoke motivation in the exercise of the profession. Pozo and Crespo (2009) point the importance of the deliberate and intentional educational purpose to change the attitudes of the students in front of the Science study. The teacher needs to be capable of provoking motives which take the student to mobilize and prioritize the learning, this involves attributing value to the scientific knowledge and awakening the interest. By not working questions of this nature, the DCN-PQ is centered in the domain of rational and technical skills, favoring the formation of

Chemistry teachers with traditional bias of transmission, which involves repetition, memorization and decontextualization from the subjects.

In what concerns the PPCs, in PPC 1 we perceive relations with the competences pointed by the DCNs. In one of these dialogues, the project predicts that the teachers are stimulated to “have interest in the continuous self-improvement, curiosity [...] investigative spirit, creativity and initiative” (PPC 1). Moreover, they must search the citizens’ well-being while professional, establishing innovative practices which consider the sociocultural, economical and political aspects, integrating the teaching of Chemistry to a language more accessible and significant.

PPC 2 follows a similar model, proposing competences which evoke critical reflexive teachers and who diversify the educational practices. It defends these professionals are capable of “awakening the interest of their students for the scientific knowledge” (PPC 2). To do so, the project outlines paths as the academic integration by means of research, teaching and extension, providing to the graduated, the learning and experimentation of didactic-methodological alternatives.

In front of these assumptions, there are relevant orientations in the DCNs in what refers to the search for the shift of some traditional paradigms in the early formation. These actions, by being put into practice, might contribute so the Chemistry teachers are able to awaken subjects which are more motivated in the school environments and interested for the scientific knowledge. On the other hand, there are limitations and needs of specific politics, in special in the DCN-PQ and PPCs, about the proposition of competences which favor self-determination and reclaim socioemotional practices.

Working competences which help to approach the scientific knowledge of the daily experiences and transcend this knowledge from the reality of the students, the need of start from the interests, convictions and expectations of that who learns and develops autonomy, self-efficiency and belonging, constitute part of the needed knowledge for the promotion of behavior and self-determined motivation (SHULMAN, 2005; POZO; CRESPO, 2009; RYAN; DECI, 2000b). These actions require a true interaction between the planning, curricular development and didactical-methodological procedures, configuring part of a complex and needed system to the teachers training.

Therefore, the courses need to enable the future teachers to use concepts, procedures, resources and activities which may be attractive to the students. Consequently, they must be capable of incorporating motivational objectives to the educative project, incrementing the group of competences satisfying different dimensions in its work, creating and innovating by mean of the educative practice (TAPIA; FITA, 2003).

Motivational approaches and didactic resources

In the subcategory Approaches and Teaching Strategies in the Promotion of Motivation for Learning, the documents were analyzed considering the attributes of the humanist, cognitivist and sociocultural approaches, relating to the Sociocognitivist Theories of motivation. We also highlight that as important as

the approaches are the teaching strategies elected for the consolidation of the educational objectives and the diversification of didactic resources, being constitutive elements of this analysis. These variables must dialogue between themselves and contribute for the consolidation of the educational practice by the teacher, making the learning more accessible to the students.

In front of this, the DCN-P/2015 highlights that it is the duty of the teaching courses providing conditions so the graduated develop educational practices related to contextualization, interdisciplinarity and transversality. According to this guideline, the future teachers must be conducted to “the curricular integration and interdisciplinarity, giving meaning and relevance to the knowledge and experience from the social and cultural reality” (BRASIL, 2015, p. 6), to the exercising of the critical thinking and the problem solving, developing a multifaceted vision of the educational phenomena. These skills offer methodological tools to the exercise of motivational practices.

The DCN-P/2019 also follows a similar bias, highlighting the professionals of education must be capable of understanding the “[...] sociocultural contexts of the students and their educational territories” (BRASIL, 2019, p. 7). This is a reference to the need of working the sociocultural approach in the process of teaching and learning. The document presents a larger coverage when compared to the version of 2015.

In the formation of Chemistry teachers, the DCN-PQ does not present wealth of details about the guiding approaches of this analysis. The document is driven mainly by the behaviorist approach (SANTOS, 2005). However, it is possible to highlight some concurrent principles with the DCNs, as the appreciation of the interdisciplinary formation connected to regional peculiarities and the formation of critical, reflexive and creative professionals. Furthermore, it stresses the graduated must “have humanistic formation which allows exercising the citizenship as a whole and, while professional, respect the right to live and well-being of the citizens” (BRASIL, 2001, p. 6).

In what concerns the didactic resources, the DCNs emphasize the need of the teacher dealing with different didactic resources, among which, they highlight the Information and Communication Technologies (TICs). In the proposal by the DCNs, the training institutions must develop professionals who know how to “relate the language of the means of communication to education, in the didactical-pedagogical processes, demonstrating domain of the information and communication technologies for the development of the learning” (BRASIL, 2015, p. 8). This highlight also appears in the most current version, of 2019, in a manner which the licensed must be empowered to

Realize educational curation, using digital technologies, the virtual subjects and other technological resources and incorporating them to the pedagogical practice, to potentialize and transform the learning experiences of the students and encourage an investigative attitude (BRASIL, 2019, p. 17).

This bias more technological might also be seen in the DCN-PQ, which, despite exploring the need of using laboratorial resources for the realization of chemical experiences during the teacher training and exercise, it highlights the need of graduating Chemistry teachers who know how to make usage of the “[...] rich

instrumental which informatics and technology renovate incessantly (BRASIL, 2001, p. 2).

The biggest highlight of the DCN-PQ, in what concerns the laboratorial activities and their possibilities, reaffirms the preoccupation with the technical formation of Chemistry teachers. About this, we considered the experimental activities of Chemistry are fundamental to the understanding of subjects and establishing relations between theory and experimental practice. We see these activities as strategic part of the creation and resolution of problems, being important the contextualization and encouragement of the apprentices to the curiosity, investigation and, consequently, the appearance of the self-determined motivations (GUIMARÃES, 2009). However, they must be associated to different didactic alternatives which enable and enrich the process of teaching and learning of the chemical subjects and their relations with science, technology and society. This makes fundamental the involvement of the social body, in the mobilization and search for formation institutes, in the scopes of teachers and students, with politics, structures and adequate actions to the teaching exercise and learning by the students.

In this context, the educational practices must be motivational and capable of contemplating the demands from the contemporary world. These educational practices must result from the comprehension of the educational phenomena in a fluid, complex and procedural perspective, influenced by institutional and organizational parameters, methodological traditions, real possibilities of the teachers, of the means and physical conditions existing in the reality. These elements must be considered in the planning, application and evaluation, being processes constituted by different unities which involve variables such as activities and formative tasks (ZABALA, 1998).

Aspects of this nature which constitute educational practice, must be based on consolidated theoretical models, and in the context of sociocognitivist theories of motivation, it is indispensable considering the human needs, their interrelations with the social mean and the internal and external regulations of the subjects (FRADE, 2015; DAVOGLIO; SPAGNOLO; SANTOS, 2017).

Thus, the political institutions, institutional and organizational must conceive tools so the teachers are able to exercise their profession effectively, having the possibility of proposing a motivational educative practice. In order to do it, despite the competences and knowledge inherent to the profession, resources which allow the teachers to develop and diversify their educational proposes must be offered, contributing for the scientific and citizen formation of the students, (GUIMARÃES, 2009). About these aspects, we believe in Education as a “[...] complex social practice turned to the formation of subjects and the construction of their subjectivities, searching to integrate them to interests and compromises related to society projects” (COSTA; DANTAS; FREITAS, 2022, p. 64). Consequently, and in a more specific way the educational finalities of the DCN-PQ, beyond the experimental aspects in an specific level of chemical formation, also must involve the human side, the life reality, teaching, organization and relations of the learned knowledge with the sociocultural aspects of the people, allowing their actuation in society.

In what concerns pedagogical projects, the PPC 1 guides the course of Graduation in Chemistry in the development of the “[...] comprehension that the learning of the Chemical Science contributes for a world reading and, therefore, has its educative value” (PPC 1), supporting itself in the constructivist methodological conceptions with focus “[...] in cognitivist and sociocultural bias both in teaching methodologies and learning, as in methodological approaches for the scientific research” (PPC 1). Referent to the didactic courses and dialoguing with the DCNs, the PPC 1 also presents the TICs as important tools, in a manner which the graduated must familiarize with these resources and become capable of using them in the exercise of the profession.

Subjects as Curricular Practice I and II and Instrumentation for the Teaching of Chemistry I, are examples of curricular components of the PPC 1 in which there is larger emphasis in technological resources. In the subjects of Curricular Practice, it is considered as one of the objectives making the graduates reflect on “the importance of the usage of Information and Communication Technology in the formation and actuation of the Chemistry teacher” (PPC 1). In instrumentation, there is the proposition of blended activities mediated by the usage of the TICs as chats, forums of discussion, hypertexts, films and documentaries. These strategies favor the fulfilling of formative guidelines, approach the graduates to the TICs and enable the acquisition of technological proposals in the exercise of teaching in the classroom.

Turning to the PPC 2, the teaching approaches emphasize the need of training “teachers-researchers capable of solving problems and acting from the reflection-action-reflection in a more contextualized, interdisciplinary and transversal manner” (PPC 2), promoting the social transformation, criticism and dialogicity. Furthermore, the document stands for the autonomy, in a manner which each individual has active participation in their learning and is encouraged to try, experiment and project new forms of interacting as a subject. In this dynamics, the document still highlights the teachers in initial training must be capable of “[...] abandoning passivity in the perspective of meaningful knowledge construction and contextualized in investigative, reflexive, humanist, historical-critical and ecological manner” (PPC 2). In this, we perceive relations with the approaches which subsidized the document analysis, having dialogicity with the motivational references from the sociocognitivist models.

In what concerns the didactic resources, the PPC 2 stresses it is one of the objectives of the course promoting “the learning of new technologies of communication and teaching” (PPC 2), in a way the knowledge related to the “scientific and technologic innovation in the diverse branches of the curriculum” PPC 2 are applied to Basic Education. We highlight yet, that in this project there is a curricular component named Informatics Applied to Education, which has as objectives contributing so the graduates in Chemistry use informatics as a tool of teaching and learning. In this perspective, it is possible to stress the usage of different didactic resources, including the TICs, it is an effective mean in the construction of dynamic and satisfactory environments capable of ease the learning and provide positive behaviors and motivations (PORTO, 2006; OLIVEIRA; CIRILO, 2012).

Generally, the documental analysis evidences the scarcity of formative guidelines related to the promotion of emotional health in the DCN-P/2015, DCN-PQ and

PPCs. Despite it, we observed a significant refining between the DCN-P of 2015 and 2019, having deliberate consideration in the most recent version about the emotional dimension and its importance in the teaching construction. Ahead, in Board 4, we synthesized the defined focuses, main representative unities and general characteristics of the documents.

Board 4 – Synthesis of the Documental Analysis.

Focuses	Representative Unities	General CHaracteristics
<p>Role of Education in Emotional Development</p>	<p>DCN-P/2019: “Knowing yourself, appreciating yourself and taking care of the physical and emotional health, understanding yourself in the human diversity, recognizing your emotions as well as the other people’s, with self-criticism and capacity to deal with them, developing self-knowledge and the self-care in the students” (p. 13).</p> <p>DCN-PQ: respect “[...] the right to life and the well-being of the citizens” (p. 6).</p> <p>PPC1: “having a critical view with relation to the social role of Science and its epistemological nature, understanding the social-historical process of its construction”.</p> <p>PPC2: “enabling the investigative, problematizes, interdisciplinary and contextualized”.</p>	<ul style="list-style-type: none"> - The DCN-P/2019 highlights the importance of socioemotional factors in the teacher training as a form of selfregulating the emotions and supporting others. - The DCN-PQ turns to a more conceptual, technical and instrumental perspective. - In the PPCs there are no deliberated points about the emotional training. As well as in the DCN-PQ, we could only highlight indirect elements.
<p>Characteristics and attribution of the educational environments in the generation of well-being and promotion of motivation</p>	<p>DCN-P/2019: deffends the “[...] development of autonomy, capacity of problem solving, of investigative and creative processes, of the exercise of collective and interdisciplinary work, of analysis of the daily life challenges and in society and of the possibilities of their practical solutions” (p. 5).</p> <p>DCN-PQ: highlights the creation of “[...] a model of higher education, which values the role and the importance of the student in the learning process [...]” (BRASIL, 2001, p. 1).</p> <p>PPC1: the graduated in Chemistry must be prepared to promote “the social inclusion”.</p> <p>PPC2: to be “realized through emancipation of thinking and argumentation, in a permanent exercise of autonomy and intellectual creativity”.</p>	<ul style="list-style-type: none"> - The DCN-P/2019 approaches in a more apparent the NPB pointed by SDT. - The DCN-PQ approaches few aspects relating only the NPB of autonomy. - The PPCs indicate elements related to autonomy and belonging, without deliberation on the need of competence.
<p>Competences and interests of the students</p>	<p>DCN-P/2019: [...] Professional planning using different resources, based on self-evaluation, in which is possible to identify the potentials, the interests, the</p>	<ul style="list-style-type: none"> - The DCN-P/2019 is the document which claims the most the need of promoting the interest

Focuses	Representative Unities	General Characteristics
	<p>need, the strategies, the goals to reach their own objectives and reaching the realization as a professional of education” (p. 19).</p> <p>DCN-PQ: there are no expressive aspects in the subject.</p> <p>PPC1: “Having interest in continuous self-improvement, curiosity [...] investigative spirit, creativity and initiative”.</p> <p>PPC2: “awakening the interest of their students for the scientific knowledge”.</p>	<p>of learning.</p> <p>- The PPCs have characteristics which relate, in part, to the DCN-P/2019. But there is no deepness and clear subsidies on the subject.</p>
<p>Approaches and teaching strategies in the promotion of motivation for the learning</p>	<p>DCN-P/2019: must be capable of understand the “[...] sociocultural contexts of the students and their educational territories” (p. 7).</p> <p>DCN-PQ: “must have humanistic formation which allows exercising their citizenship as a whole and, while professional, respecting the right to life and well-being of the citizens” (p. 6).</p> <p>PPC1: the course supporting itself on “[...] the cognitivist and sociocultural tendencies, both in teaching and learning methodologies, and in methodological approaches for scientific research”.</p> <p>PPC2: “[...] abandoning passivity in the construction of significant and contextualized knowledge in investigative, reflexive, humanist, historical-critical and ecological form”.</p>	<p>- The DCN-P/2019 values the importance of forming the future teachers in the biases of humanist, cognitivist and sociocultural approaches, emphasizing their impact in the educational process.</p> <p>- The DCN-PQ highlights superficially something related to the humanistic formation, but, turns mostly to a behaviorist approach.</p> <p>- The PPCs value the approaches in question.</p>
<p>Applicability of the approaches and didactic resources as motivational instruments</p>	<p>DCN-P/2019: “realizing the educational curation, utilizing the digital technologies, the virtual subjects and other technological resources and incorporating them to the pedagogical practice, to potentialize and transform the learning experiences and encouraging an investigative attitude (p. 17).</p> <p>DCN-PQ: enjoying the “[...] rich instrumental which informatics and technology incessantly renovate” (p. 2).</p> <p>PPC1: reflecting on “the importance of the usage of Information and Communication Technologies in the training and acting of the Chemistry teacher”</p> <p>PPC2: promoting “the learning of new technologies and teaching”.</p>	<p>- As well as in the DCN-P/2019, the PPCs emphasize the importance of Information and Communication Technologies in favor of the interest.</p> <p>- The DCN-PQ highlights the need of exploring laboratorial resources, citing something superficial about technologies.</p>

Source: Authors (2022).

We defend that during the initial training the teachers develop basic skills to deal with their own emotions and, at a second moment, (re)orient the students in

school contexts. We also consider the emotional quality of those who constitute the educational body influences in motivation and, consequently, in the performance, creativity, behavior, intelligence and sustainability of the social relations.

Our focus of analysis turned to identifying competences, approaches and didactic resources which contribute for the establishment of motivational environments and the formation of Chemistry teachers capable of constructing these contexts, We observe the current demands of Basic Education seem distant from the structural and organizational reality of the training institutions and their educational environments, in a manner which the projects still prioritize mainly the teaching of the subject by the subject. In the DCN-PQ and PPCs, there is still an elevated concern about teaching concepts and techniques without attributing the due importance to the emotions, well-being and personal and Professional satisfaction which the formation should provide. It is important to remember that, in its largest part, the future teachers will need to handle challenging situations and educational environments full of structural, cognitive, behavioral and emotional diversities.

In this manner, we believe it is necessary to deviate a little more the look from the technique, traditionalism and exteriority, and turning more to the inner domains of "I", teaching the individual to manage personal feelings and emotions. When the people manage to administer better their emotions, they tend to present a higher balance and, consequently, acting in their psychological functioning. This scenario collaborates so the autonomous motivations are reached and provide the teacher and student, basic tools which aid in the handling and maintenance of these motivational conditions (RYAN; DECI, 2000a, 2000b).

The improvement of motivational conditions in the teacher's perspective, tends to collaborate and awaken a positive attitude of these professionals in front of their responsibilities, which involves professionalism and social commitment. Inside these domains, are the didactic activities, school managing, fulfillment and adaptation of educational politics to the school reality, protagonism and participation in the decision making in the school and wider technical-political spaces, despite the incessantly search for continuous formation and adaptation to the educational demands which keep emerging (DAVOGLIO; SANTOS, 2017).

Consequently, it is turned inevitable questioning the manner how the motivations of teachers are worked in the training institutes, searching not only to know the pedagogical proposes of the courses; but also, how these proposals are being developed in the reality of formation. During this process, it becomes important that the teachers experience and acquire competences and skills which help them to promote students more interested for the learning. In the field of Chemistry, this involves turning the scientific knowledge of this area in something which has value to the student, promoting autonomy, self-efficiency and belonging and diversifying the didactic-methodological proposals, considering the interests of the students and their contextual realities (POZO; CRESPO, 2009). As part of these actions, the teacher must be capacitated to help their students to think and learn, acting as advisor and presenting values, focusing positively in the promotion of interest, study, effort, solidarity and cooperation (TAPIA; FITA, 2003).

FINAL CONSIDERATIONS

Considering the sociocognitivist perspective of motivation, we verified a good representativeness of motivational aspects in the DCN-P/2019. The document approaches deliberately, important and necessary elements to the teacher training which know how to promote and preserve adequate motivational conditions for the learning, presenting politics which consider the subject as a whole. This does not occur in the other analyzed documents, having few references in the DCN-P/2015 harnessed to the emotional dimension and absence of this aspect in the DCN-PQ.

In this analysis, we considered the emotional dimension, necessary competences in favor of the interest to learn and kinds of approach and didactic resources which are fundamental for the motivation. In a representative manner, we analyzed two political projects of teacher training courses of Chemistry teachers, in which we noticed the necessity of updating and incorporating the emotional dimension and the competences harnessed to the promotion of interest to learn. In what concerns these questions, we judge as primordial these proposals are worked and experienced by the undergraduates, with the intention of empower them and help them to develop in the promotion of motivational socioemotional practices.

As part of this challenge, it is important the training institutions consider the motivation and the factors which drive this construct. This involves the comprehension of theoretical perspectives which point to important paths for the promotion of the well-being and academic satisfaction. In this sense, the SDT assumes the existence of three basic psychological needs, capable of making the educational environment more proper to the student, which consists in the satisfaction of autonomy, competence and belonging. These nourishments are interdependent between themselves, and must be satisfied concurrently in order to promote the motivates autonomous work of the apprentices, aiding them in the voluntary action, deep learning and inherent pleasure for the activities from the course (RYAN; DECI, 2000a, 2008; DAVOGLIO et al., 2017).

Lastly, we stressed the present study brings significant contributions to foment reflections and understandings which improve strategies and politics which favor motivation, diversity, interest, learning and the permanence of promising Young people in the career of teaching. This perspective is given from the possibility of environment construction, less conditioning and more autonomous, involving the usage of approaches, resources and educational principles more favorable to the formation of Chemistry teachers. This airs the future teachers to handle challenges of cognitive, emotional and socioemotional natures present in the educational environments. In order to do it, is the duty of political, administrative and organizational entities to strengthen the institutions, value the teaching profession and provide resources and structure to the teachers and students to develop in their most varied levels of Brazilian education.

Aspectos motivacionais nas diretrizes curriculares nacionais: foco na formação inicial de professores de química

RESUMO

Esta investigação teve por objetivo verificar a representatividade de aspectos motivacionais em documentos norteadores da formação de professores, especialmente em Química. Para isso, adotamos a perspectiva sociocognitivista da motivação como fundamento de análise. Dentro desse paradigma, consideramos, mais especificamente, a Teoria da Autodeterminação, que pressupõe que a qualidade autônoma da motivação resulta da interação equilibrada entre as demandas internas do sujeito e o contexto em que está inserido, resultando no bem-estar, interesse pelo aprendizado e melhoria do desempenho acadêmico. Isto posto, analisamos as Diretrizes Curriculares Nacionais (DCNs) de Formação de Professores e de Professores de Química, além de Projetos Pedagógicos de Cursos (PPCs) de Licenciatura em Química de duas Instituições Federais de Educação Superior em Manaus. Com esse objetivo, partimos de um protocolo de Análise Documental, sistematizando os dados a partir da Análise Textual Discursiva. Os resultados mostraram uma boa representatividade dos aspectos motivacionais analisados na DCN/2019, e uma carência de políticas socioemocionais na DCN de formação de professores de Química e PPCs. Sobre estes últimos, há uma necessidade premente de que sejam atualizados e dialoguem efetivamente com as necessidades atuais da Educação Básica, apresentando princípios norteadores que envolvam a motivação e necessidades formativas atreladas às práticas socioemocionais. Por último, ressaltamos a relevância do estudo para gerar reflexões e subsidiar compreensões sobre a motivação na formação de professores de Química, colaborando para o debate acerca de temas voltados ao bem-estar psicológico durante a formação e atuação docente.

PALAVRAS-CHAVE: Motivação. Formação de Professores de Química. Análise Documental.

NOTES

Translated by Serman Domaradzki - domaradzkipfi@gmail.com

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Correspondence:

João Bosco Paulain Santana Júnior

Av. General Rodrigo Octavio Jordão Ramos, n. 1200, Coroado I, Setor Norte da UFAM, Instituto de Ciências Exatas, Departamento de Química, Manaus, Amazonas, Brasil.

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