Article

Continuous training of the teacher-educator: constitution of the professional knowledge in collective reflective processes

A formação contínua do professor-formador: constituição dos saberes profissionais em processos reflexivos coletivos

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Abstract

The objective of the research that motivated this article is to discuss the knowledge that characterize the teacher as well as the attributes related to teacher-educator and its relevance to the constitution of critical and reflective professional. This is a qualitative character study, in the perspective of investigation-action, resulting from interviews with semi-structured questions, conducted with ten teachers-educators, acting in the chemistry teaching degree course. The research reveals attributes and characteristics inherent in a good teacher and which associate with the teacher-educator, discussing how the interviewed correlate those two categories. Besides, it points to the necessity of reflective processes by the educator, signaling to this reflection to be able to break with the purely individual process and constitute in a collective social practice in intra-institutional space/time. The data also reveal that the teachers-educators have points of convergence with knowledge for teaching, and that those to be revealed and problematized in spaces/times the continuous training can contribute to a better understanding of the teacher's being and doing.

Keywords: Teacher-educator. Teaching knowledge. Reflexive researcher.

Resumo

O objetivo da pesquisa que motivou este artigo é discutir os saberes que caracterizam o educador, bem como os atributos relacionados ao professor-formador e sua pertinência para a constituição do profissional crítico-reflexivo. Este estudo é de caráter qualitativo, na perspectiva da investigação-ação, resultado de entrevista com questões semiestruturadas, realizadas com dez professores-formadores, atuantes em um curso de licenciatura em Química. A pesquisa revela atributos e características inerentes ao *bom professor* e que se associam ao *professor-formador*, discutindo como os entrevistados correlacionam essas duas categorias. Além disso, aponta para a necessidade de processos reflexivos por parte do educador, sinalizando que essa reflexão pode romper com o processo meramente individual e constituir-se como prática social coletiva, em espaços/tempos intrainstitucionais. Os dados revelam, ainda, que os professores-formadores apresentam pontos de convergências com saberes para a docência, e que esses ao serem revelados e problematizados em espaços/tempos de formação contínua podem contribuir para uma melhor compreensão do ser e fazer docente.

Palavras-chave: Professor-formador. Saber-docente. Pesquisador reflexivo.

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Introduction

The teaching occupation is an important element for comprehending the transformations that take place in society, since it is one of the ways of producing and socializing the knowledge accumulated throughout the history of humanity. In order to understand the complexity of the issue, the perception of the unfolding of teaching is important, above all where the pieces of knowledge demanded and the articulations required for the professional activity are concerned.

Several studies have investigated the pieces of knowledge educators mobilize in their daily routines seeking to understand the complexity and the modes of producing such pieces of knowledge, therefore, the acknowledgment is notable that "[...] we may become aware that the teaching activity within the school context is nowhere near simple and natural, but is a social construction that holds multiple facets and whose methodical description necessarily implies epistemological choices" (TARDIF; LESSARD, 2013, p. 41).

The teaching occupation involves necessarily interactive processes, since it is founded on the action of individuals who interrelate to trigger the learning process. In this process, the teacher constitutes and constructs a set of pieces of knowledge and perceptions about their occupation, however "[...] although teaching has been realized for centuries, it is very difficult to define the pieces of knowledge involved in performing such occupation, due to the size of its ignorance about itself" (GAUTHIER et al., 2013, p. 20) and, additionally, such piece of knowledge remains "confined to the secret of the classroom, it resists its own conceptualization and is barely able to express itself" (GAUTHIER et al., 2013, p. 20).

Not being expressed makes it difficult to be accessed by others, and becomes extinct every time teachers leave their classroom, as their teaching *modus* will no longer be put into practice and therefore will not be accessible to other educators. Moreover, "teaching is an occupation whose object is not comprised of inert matter or symbols, but of human relations with persons capable of taking initiatives and doted of a certain skill of either resisting or participating in the teachers' actions" (TARDIF; LESSARD, 2013, p. 35). And for such an action to occur, there are conditioners specific to the nature of the teaching occupation.

I has become important to comprehend the conceptions and constructions surrounding the pieces of knowledge held by teachers and the profession of a group of acting teacher-educators from a graduation course, since such comprehension may be present in a differentiated form, with distinct degrees of intensity, in the action of those teachers and, thus, will influence in the constitution of the *modus* of the future educator trained by them.

Researches indicate that the teaching practice is coated with a huge complexity that is not always very clearly understood by educators, especially in regards to the act of teaching from the point of view of an action with a simple character, in that "[...] the piece of knowledge needed to teach is reduced solely to the knowledge of the contents of the discipline" (GAUTHIER et al., 2013, p. 20). As stated by Maldaner (2013, p. 54), "all that could be translated as *(tacit) curriculum conceptions* that the teachers adopt" (author's emphasis). In order to reflect upon and rethink those tacit conceptions, mainly by teacher-educators, it is important that there be training spaces/times that make this process viable.

With such needs having been acknowledged, this text is a result of an investigation about the teachers' knowledge from a group of teacher-educators that brought to evidence what the interviewees think about the aspects that characterize educators highlighting the characteristics pointed out as being inherent to the *good teacher* and further verifying how much of those characteristics the interviewees relate to important attributes of a *teacher-educator*. The investigation elucidates in detail that pieces of knowledge are mobilized and how they constitute as pieces of knowledge for the pedagogical practice of teacher-educators by constituting them in the critical-reflexive dimension within a context of dialog and interaction among peers that occurred at the Chemistry Education Nucleus (CEN).

The ten interviewees work at a Chemistry Licentiate Degree course and integrate the Nucleus that, in turn, constitutes a space/time for training of and reflection by the teachers, which offers to those involved opportunities to resignify the teaching practice in the interaction with their peers by establishing a collective action-reflection-action process.

This space/time has become a main focus of attention as far as it can be constituted into a *locus* for resignifying the environmental/tacit training of teacher-educators, who by confronting ideas with their peers are able to reconstruct their knowledge and unveil new pieces of knowledge needed for the teacher occupation. Teacher-educators, being professionals who aim to contribute towards training future teachers must control much more than the knowledge related to their occupation subject, they must have knowledge that is "[...] plural, composite, heterogeneous, since while performing their job, it involves very diverse pieces of knowledge and know-how that originate from varied sources and probably from a different kind" (TARDIF, 2014, p. 18), in such a way that they generally need some problematization to become "knowledge itself" and contribute effectively to the teaching-learning process.

Research methodological principles and the individuals involved

The research is of a qualitative nature with investigation-action or research in action characteristics, since it aimed to comprehend and explain the educators' praxis by means of its implications within the experienced contexts. The analysis envisioned the discovery, the contextual interpretation seeking the thorough reality through the use of several sources of information (BOGDAN; BIKLEN, 2010; LÜDKE; ANDRÉ, 2013). Also, as Lüdke & André (2013) state, for this type of research knowledge is constantly made and remade and thereof new elements emerge along the process.

Research in action allows to recognize and interpret the context within which studying takes place and emphatically drawing the natural complexity of the situation under investigation; makes feasible the use of a variety of pieces of information to reveal vicarious experiences and allow for naturalistic generalizations, also making it possible to represent the different and, at times conflicting, points of view that are present in a social situation, manifesting the concern with clear and objective communication of the results.

The present study was carried out by means of an interview with semi-structured questions involving ten teacher-educators who work at a Chemistry Licentiate Graduation course and who are members of the Chemistry Education Nucleus (CEN). The CEN comprises professors who integrate the area of Chemistry at a private

university. All professors were invited to take part in the research, two of whom did not accept the invitation.

Each interview was carried out individually between only the interviewer and interviewee and recorded in audio in a room with no outside interference and that was then transcribed. This article focused on the questions below, which guided the interviews in such a way that they were not completely structured or exclusive, since, when required, complementary questions were made that would help to obtain further information or clarifications about the interviewees' statements.

1) There are several pieces of knowledge that guide the teaching profession. Some of them are incorporated during teacher training, others along the teaching practice. There are also those that are constructed in a tacit way. Several authors have presented reflections/studies about such pieces of knowledge and their pertinence for the teacher's training/constitution.

a) Which teaching piece of knowledge would you highlight as being important for educators?

b) Is it possible to constitute an educator based prioritarily on the knowledge originated from or constructed during practice in the teaching action? Why?

2) In your understanding, which characteristics are inherent for a "good" teacher?

3) What do you consider to be necessary for someone to constitute themselves as a teacher-educator, especially in a licentiate graduation course? Why?

4) Please point out one or more aspects you consider as being relevant and that you changed in your action as an educator that originated from what has been studied/discussed at the CEN?

In order to preserve the identities of the research participants and to identify them throughout the text in their different manifestations, monikers were adopted based on the names of personalities from the History of Nature Sciences. All participants filled in and signed the Consent Forms to authorize the use of the data.

The research also enters the perspective of a case study, since, as Lüdke & André (2013) state, a case study is applied when the researcher is interested in researching a singular, specific situation aimed at discovering and interpreting within context through the dimensional multiplicity of a given daily routine. Also, according to Yin (2001), a case study becomes useful when what is presented is vast and complex and cannot be analyzed outside the space within which it occurs.

The data description and analysis were based on Moraes & Galiazzi (2011, p. 13), in such a way to make it possible to "[...] express new comprehensions attained along the analysis", describe and interpret them with aims to reach a more complex understanding of the discourses. Discursive Textual Analysis may be understood as being a "[...] process of deconstruction followed by the construction of a set of linguistic and discursive materials to produce thereof new understandings about

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Chart 1: Characterization of participants' Background and teaching activity

			Number of Participants
Background[3]	Graduation	Licentiate	5
		Bacharel-industrial/Licentiate	4
		Chemical Engineering	1
	Post-Graduation	Doctorate	2
		Master	7
		Specialization	1
Specialty Area:	Post-Graduation	Organic Chemistry	2
		Inorganic Chemistry	2
		Analytical Chemistry	2
		Chemical Engineering	1
		Education and/or Education in Sciences	3
Teaching activity	Disciplines	Organic Chemistry	1
		Inorganic Chemistry	2
		General Chemistry	2
		Pedagogical and Internships	2
		Technological	1
		Analytical Chemistry	1
		Practical Organic Chemistry Groups	1
Higher Education Teaching Time		Under 3 years	4
		Between 3 and 10 years	2
		Between 10 and 20 years	3
		Over 20 years	1
CEN Participation Time		Since its installation (2003)	4
		5 years	2
		Under 2 years	4

Source: Elaborated by the article authors.

the phenomena and discourses being investigated" (MORAES; GALIAZZI, 2011, p. 112). Considering the qualitative character of the research, the enunciations were deconstructed based on what the interviewees presented and, later on, reconstructed in such a way as to express the main ideas about the issue.

The group of ten researchers comprised educators who are all Chemistry graduates, with some who worked on disciplines of specific course knowledge and others who taught disciplines of a practical-pedagogical character. Participation in the CEN was conditioned to the link of the professor with the Chemistry Area, thus it included hourly, temporarily contracted and full-time professors For this reason, from the ten interviewees, some had recent participation and others have participated since the beginning of construction of the nucleus in 2003. Chart 1 presents the interviewees' graduation and post-graduation level backgrounds and their specialties, as well as their disciplines and time of teaching higher level and their participation in the CEN.

The researchers educators are involved in teaching, research and extension processes in Chemistry and Chemistry Teaching aiming at exercising critical-reflexive training. Nóvoa (1995) presents the critical-reflexive dimension as a way of identity reconstruction and to mediate processes that develop autonomy, where the praxis

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[3] Professor who has specialization is studying mastership; of the seven professors with masters, five are undergoing the process of Doctorate Graduation.

is a place of knowledge production, experience knowledge, which upon arising from reflected actions may eventually become legitimated pieces of knowledge.

At the CEN, the proposal is to constitute researchers in the field of chemistry education teaching and learning. As Cachapuz et al. (2005) state, investigation in the field of science teaching and learning is recent, and in the early 1980s was not yet integrated by a coherent body of knowledge. This way, the CEN seeks to break off from what Del Pino (2012, p. 98) points out by stating that "often university professors are not specialists of investigators in their teaching areas, and, in many situations, they analyze teaching in an empiric, unsystematic and intuitive manner".

Being an intra-institutional space/time, the CEN is one of the places where that group of teacher-educators is able to establish interlocutions to think over their practice, which, upon being analyzed, may generate a theory "and the theory allows for the development of a better founded practice" (DEL PINO, 2012, p. 98). This way, in this space/time for interaction, where the personal and professional dimensions, conceptions and understandings are confronted, it is possible to generate a cycle of successive movements that may improve the teaching and learning process in each discipline teachers work with and, thus, improve the didactic transposition.

Data analysis presentation is organized into three parts in the sense of making the understanding of the aspects presented by the interviewees and their articulations feasible. At the same time, those parts are interrelated with the aim of showing what teaching pieces of knowledge those individuals who participate in the research express and how they articulate them towards their constitution and teacher-educators. The first part presents the pieces of knowledge revealed and their pertinence for the constitution of educators. The second part highlights the attributes researchers understand as being inherent to the *good teacher* and those that are linked with the *teacher-educator*. And the third part highlights how far may an intra-institutional space time may be the *locus* to construct the professional identity and to resignify teaching practice.

Teacher knowledge and the constitution of educators

The complexity of teaching practice involves a set of pieces of knowledge that are mobilized towards the educators' actions within the context of their space of activity. As they work on and develop their work, a process of changes occurs, since as Tardif (2014, p. 57) states "if work modifies workers and their identities, it will also modify, *always, with time*, their 'knowing how to work'. [...] *working refers to learning how to work, that is, the progressively control the knowledge needed to perform the job* [...]" (author's highlight).

Such a perspective points to the fact that, during the development of teaching work, the knowledge needed to perform it are obtained, and according to Tardif (2014), there will be situations that will demand that the worker progressively develop pieces of knowledge generated and based on the work process itself. This way, practice does not constitute a place to apply scientific and pedagogical knowledge, but a space for creation and reflection in which new pieces of knowledge are constantly generated and modified.

And how can those pieces of knowledge produced during the educator's routine practice be accessed? It is necessary for intra-institutional spaces make it feasible for educators to gather so that, through a dialog about pieces of knowledge, they may socialize and reflect, thus providing greater meaning to their own work and to what they produce in their routines as a result of their practice. This way, as Marques (1996, p. 14) states, allows for

> [...] a dialog about pieces of knowledge, not a plain exchange of information nor mere uncritical assent of other's propositions, but in pursuit of a shared understanding among all who participate in a common life and work community, a discursive community with argumentation.

It is worth mentioning the meaning of know this text refers to. Tardif (2014, p. 60) argues that "[...] we attribute the idea of 'know' with a broad meaning that encompasses all pieces of knowledge, competences, skills (or aptitudes) and attitudes teachers hold, that is, what has often been named as know, know-how and know-be".

In the teacher's *praxis*, several pieces of knowledge are being appropriated and incorporated, among which are those from training, experiencing, from the pedagogical action, disciplinary, those of a reflexive, researcher teacher, among others (GAUTHIER et al., 2013; TARDIF, 2014). Some are originated from the training process, others from teaching practice.

In Gauthier et al.'s (2013) view, *experiential knowledge*, or *knowledge from experience*, is that which teachers construct and it is constituted of moments, either unique or repeated infinitely, but that remain confined to the scope of the classroom. Within certain contexts, "that experience then become 'the rule' that, by being repeated, often takes on the form of a routing activity" (GAUTHIER et al., 2013, p. 33). *The pedagogical action knowledge,* in turn, happens when the *experiential knowledge* becomes public and is tested by means of classroom research, providing conditions for others to assess, compare, understand and apprehend the pieces of knowledge produced within the context of practice (GAUTHIER et al., 2013).

This way, one focus point of the interview with ten teacher-educators was to identify their comprehensions about such pieces of knowledge that guide the teaching profession. Pointing out that some pieces of knowledge are constructed during training, others, however, result from a construction based on teaching practice. There are also those that are linked to a tacit construction, through each one's experience throughout their schooling process.

This way, upon analyzing the interview transcriptions, it is possible to identify that teacher-educators feature elements relative to two pieces of knowledge: *knowledge from experience* and *knowledge from pedagogical action*, and also make reference to how important or pertinent they are for the constitution of educators. Below, excerpts of the interviewee enunciations are presented about *knowledge from experience* and *knowledge from pedagogical action*, and also about the possibility of constituting and educator based on these pieces of knowledge. Observe that:

> Pierre: *Knowing from experience: knowledge teacher have arising from their own work, but it is a piece of knowledge that is not found in universities, so to speak, it is a piece of knowledge that teachers perfect as the methodology develops. This perfecting is creates through experience, so it is a mutating piece*

*of knowledge, in this case. It is always updated, a piece of knowledge that is
acquired from practice.*

Max: *It is that knowledge that originates from practice. I nay be there for years
on end, and have experiences [...]. So, it seems like, the teacher also, with time,
acquires those pieces of knowledge from experience. Experience provides greater
confidence from that the teacher lives, rights and wrongs, these possibilities,
knowing from experience.*

Thomas: [...] *Knowledge from experience is related to actual practice, in a
relation with what I have put into practice, that I exercised, so, I have had an
experience related to that.*

The statements from both professor Pierre and professor Max are close to those
pointed out by authors Gauthier et al. (2013) and Tardif (2014) on the idea of
knowledge from experience. Professor Thomas did not make his comprehension clear.
However, these asymmetrical comprehensions, when socialized in continued teacher
training spaces/times, may become an important element for problematization and
help each one develop new, increasingly more complex comprehensions, giving new
meanings, contributing towards the constitution of a better prepared professional
for the teaching action.

As to being possible to constitute an educator solely with *knowledge from experience*,
most interviewees point out the limitation this aspect presents. Professor Irene
pronounced that:

Irene: *I think not, because this piece of knowledge belongs to me, it is individual,
and I will not be able to confront it with other pieces that may be better, there
may be other practices that are better than mine. So, if I am restricted to solely
to my practice, I will stay that way, and I may be doing it in a very wrong way.*

In professor Irene's statement, it is possible to perceive the understanding of the
limitation of knowledge from experience as a piece of knowledge that is configured
by an individual construction, she points out the need to confront that piece of
knowledge in practice with other people's pieces in order to evolve as an education
professional. As Tardif (2014, p. 52) states:

It is by relating with peers and therefore by confrontation among the pieces
of knowledge produced by the teachers' collective experience that experiential
knowledge acquire a certain objectivity: subjective certainties must then be
systematized in order to become a discourse from experience capable of informing
or forming other teachers and to provide an answer to their problems.

Towards that idea, Gauthier et al. (2013) propose the *knowledge from pedagogical
action*, which is *knowledge from experience* that is revealed and made public so
that, this way, they may be apprehended by other teachers and its relevance is
acknowledged. Note what one of the interviewees signals in relation to *knowledge
from pedagogical action*, especially at the end of her statement, when she relates
theory and practice.

Marie: *I think that part would be the more, I do not know of the guidance, what
is already known, what knowledge, let's say, laws, proposals, that are always
changing as does the context of the thinkers themselves about the pedagogical*

> *part, they are always reformulating, that is what I think. It is what they get*
> *to understand about teaching, about learning, about this doing, something*
> *that is more theoretical, not theoretical, theoretical but from the practice they*
> *studied, they analyzed.*

Upon revealing their comprehensions about teaching pieces of knowledge, the interviewees point out ideas that lean towards what Gauthier et al. (2013) and Tardif (2014) express about *knowledge from experience* and *knowledge from pedagogical action*. Thus, the interviewees signal towards a rupture with conceptions anchored on instrumental rationality, which indicates a positivist outlook of science and professional training. Technical or instrumental rationality is "[...] an epistemological conception of practice inherited from positivism, which prevailed throughout the 20th Century and served as reference for the education and socialization of professionals in general and teacher in particular" (PÉREZ GÓMES, 1995, p. 96).

Such a conception strongly influenced educators' way of thinking and acting in such a way that there is a dichotomy between practice and theory among those who research and those who execute/apply. Nowadays, a new rationality is sought, the so-called rationality from practice that an educator is thought of as an autonomous professional who reflects upon, makes decisions *upon, about* and *after* the actions (SCHÖN, 1995). However, it is a complex phenomenon, and therefore must be comprehended/apprehended not only by the teacher-educator, but also by the educator in training so that new possibilities occur during training for teaching. One possibility is the constitution of teacher-researchers, who analyze and reflect upon their practice. This way, in order to corroborate such a comprehension, the idea of teacher-researcher proposed by Maldaner (2013, p. 88) is taken as a foundation:

> Research as a training principle and as practice, should become a constituting part of teacher activity itself for being the most coherent form of construction/reconstruction of knowledge and culture. [...]. Developing a new metaphor, of the teacher/ researcher within a reflexive practice upon the action and about the action, overcoming the dichotomy that belongs to technical rationality, that conceives some professional as producers of knowledge and other that apply it (author's highlight).

Towards that sense, it is understood how important is the constitution of continuous, intra-institutional training spaces/times for teacher-educators, where they may establish an interlocution with their peers. Once, as Tardif (2014, p. 297) states:

> The teachers, when performing their professional activities, are supported by several forms of knowledge, [...] the teachers' professional knowledge does not constitute a homogeneous body of knowledge, but helps itself, contrarily, from a broad diversity of knowledge and makes use of several types of competences.

It is thus understood that the teacher-educator may then, through these intra-institutional spaces/times, collectively reflect about how to make such pieces of knowledge more pertinent and applicable to the context of teachers in training, putting into practice a kind of training for teaching that includes the requirement to constitute a teacher within the critical-reflexive dimension (NÓVOA, 1995). This perspective allows to break from the contradiction that in teacher training there are, as Quadros e Mortimer (2016, p. 13) state:

> [...] disciplines of a didactic-pedagogical nature, specific to discuss "teaching and learning", they are included in all teacher training courses. However, the need for knowledge about "being a teacher" is not taken into consideration according to most university professors, even though they work with teacher training.

This way, if the teacher-educator does not problematize which pieces of knowledge constitute "being a teacher", seeking to appropriate them for a better comprehension of the complexity that teaching work involves, isolated changes, such as the inclusion of disciplines of a practical-pedagogical character, will not, on their own, solve the difficulties presented or allow for advancement in training future teachers.

Constituting teachers: characteristics required for such professional

This part of the analysis is related to the characteristics that are inherent to the *good teacher* and what is necessary to constitute a *teacher-educator*. One of the objectives is to perceive whether there would be a relation between the characteristics attributed to the *good teacher* and the *teacher-educator*, as well as to perceive which conceptions are present in educators, or how far they are aware that their teaching action contributes to the constitution of future basic school educators. Considering that they are all active in a Chemistry Licentiate course, in a way, when they state the characteristics of a *teacher-educator*, the interviewees were building an image of themselves, albeit not in a conscientious manner.

Despite being individual judgments, the attributes originated from the construction of each interviewee about the categories of a *good teacher* and a *teacher-educator* are located within a social-historic context that, in a way, picture the roles society projects onto those constructions. Thus, the enunciations remit to the conceptions and ideologies that constitute each being and to the manner each one perceives themselves within this context of individuals that constitute a *teacher-educator* around the idealization of the *good teacher*, because there is a social common sense about which behavior is expected in relation to that teacher. So, the attributes presented by the interviewees are permeated by their experiences, resulting in in each one's appropriation of social-historic practice and knowledge that constitute and differentiate them.

The analysis of the answers calls attention to the fact the attributes and/or characteristics linked to the *good teacher* are not necessarily repeated as being important for *teacher-educators* because the number of common attributes is much smaller than the total. One other aspect to highlight regards the existence of a much larger number of attributes cast to the *good teacher* in relation to the *teacher-educator*.

It also highlights that *mastery of content* was pointed out by five interviewees as being a characteristic of a *good teacher*, for the *teacher-educator*, in turn, three interviewees pointed out the need for the professional to *have knowledge*. Regarding *pedagogical knowledge*, it was more strongly mentioned as being an important attribute for the *teacher-educator* and more relativized for the *good teacher*.

With the large number of attributes presented, some that are specific for each category, *good teacher* or *teacher-educator*, and others that are common to both, it was decided to present them in the form of a graph, thus providing greater visibility

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and the possibility of making a comparison between them. Below is the graph 1 with the characteristics/attributes revealed by the ten interviewees.

For the teaching and learning process, educators must master the knowledge in their area of training, which was manifested by the interviewees as *mastery of content/having knowledge* and pointed out by Tardif (2014) and Gauthier et al. (2013) as *curricular knowledge*. Curricular knowledge is presented as resulting from the selection and organization teaching institutions make based on certain pieces of knowledge produced by the sciences and that will constitute the teaching programs in different courses. However, as Tardif (2014) states, educators have no direct or indirect control of that process of selection and definition of those pieces of knowledge that are socially elected to comprise the *corpus* of knowledge to be taught.

Studies that cover this same issue of the *good teacher* (FEITOZA et al., 2007; VENTURA et al., 2011; PACHANE, 2012; CÂNDIDO et al., 2014, among others) and that involved only students also point out among the characteristics highlighted as being the most important by the research participants is *mastery of content*. The study by Nunes & Helfer (2009) involving graduation professors and students to sought
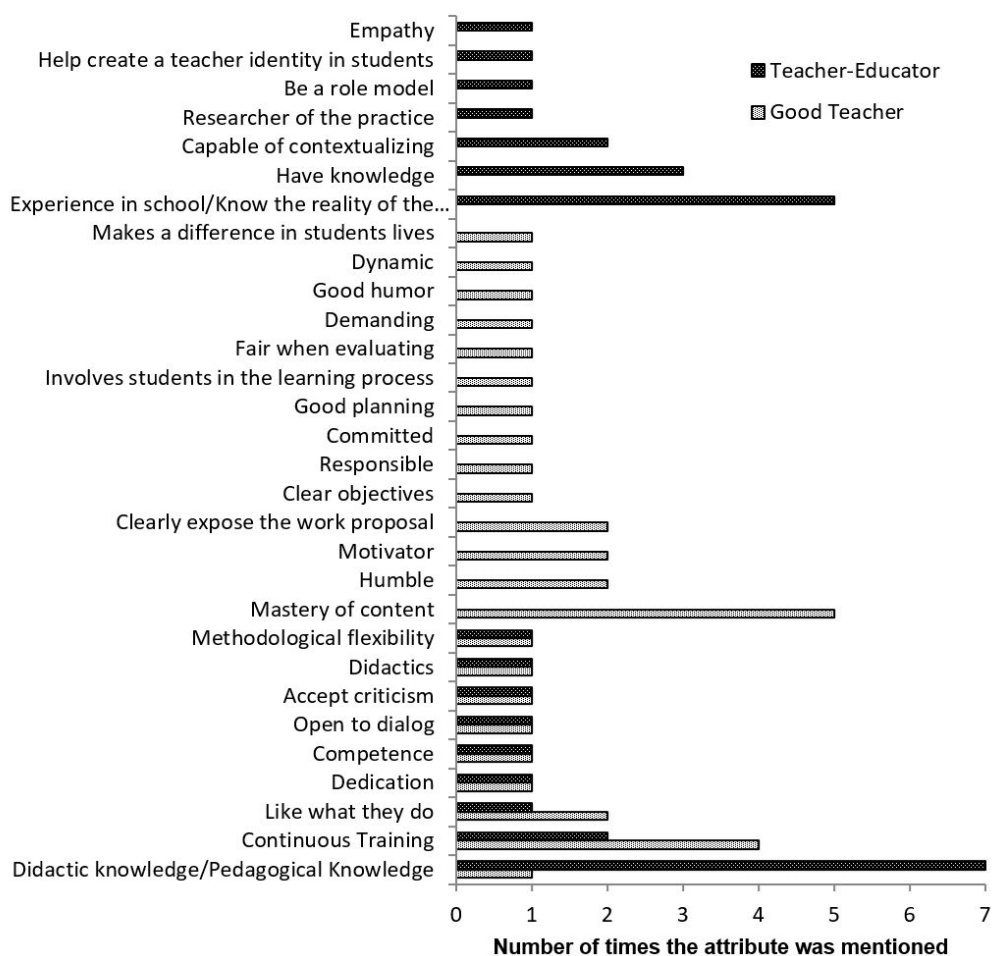
Graph 1: Characteristics attributed by the interviewees for the good teacher and the teacher-trainer
Source: Elaborated by the article authors.

to identify the concept of *good teacher* experienced during the course practices, students also brought to evidence that the most important factor is the knowledge of the discipline contents.

Based on those studies and from the prominence the interviewees gave to this attribute, the importance of this aspect is perceived as being one of the markings in the training of those subjects, in which the emphasis was placed on the contents. Professor Irene brought to evidence that emphasis by stating that: "[...] I belong to that group of trained teachers where the contents were extremely important, so we spent most of the graduation discussing contents and pedagogical discussions were highly restricted or inexistent". It is pointed out that simply mastering the content does not assure teacher activity efficacy, since such action requires several other attributes and characteristics that constitute knowledge in a composite of several elements that need to be harmoniously linked.

Fiorentini et al. (2011), upon discussing Shulman's ideas, point towards the importance of theoretical and epistemological reflection by the teacher over the teaching contents, emphasizing that such mastery be not only syntactic, but also substantive and epistemological. Also, Fiorentini et al. (2011) call attention to the fact that profound mastery of content is one of the aspects that makes the development of teachers' intellectual autonomy feasible, and that such autonomy allows for educators to produce their own curriculum by not "adopting" those produced within contexts that are different from those in which they work.

The attribute regarding *pedagogical knowledge*, also referred to as *didactic knowledge* or *didactics*, was pointed out more as being important to the *teacher-educator*. This attribute the interviewees presented may be related to what Tardif (2014) treats as *professional training knowledge* and that Gauthier et al. (2013) characterize as *knowledge of education sciences*. Such knowledge only makes sense for education professionals, being specific to them and unknown to other professionals from different areas.

Thus, Tardif (2014, p. 37) points out that "teaching practice is not simply an object of knowledge of education sciences, it is also an activity that mobilizes several pieces of knowledge that may be called pedagogical". As Gaulthier et al. (20013, p. 31) state, "This type of knowledge permeates how teachers exist professionally".

Grillo (2008) states that higher education professors being their activities without knowing the complexity of the profession, with no clear notion of what is expected of those professionals and the teaching process they will propose. The author signals that, in many cases, teachers must break off from the way they were taught by thinking of new ways of teaching and consolidating a professional identity "[...] that is constituted by knowing specific pieces of knowledge of the profession that are always being strengthened through confrontation with practice" (GRILLO, 2008, p. 67).

This way, *pedagogical knowledge*, as pointed out by researchers, corroborates the need for an articulation between teaching and learning, a comprehension that may be broadened, constructed, improved on in continuous training processes. *Continuous training* is an attribute pointed out by the interviewees with greater relevance for the *good teacher* than for the *teacher-educator*, which characterizes a certain misstep, as this perhaps is a sign that teacher-educators do not recognize its importance as an element that may contribute towards their constitution as educators.

It is worth stressing one characteristic pointed out by one interviewee as being important for the teacher-educator, namely, being a *researcher of their practice*. In rupturing with a positive training perspective, as previously presented, research practice takes on a sense of involving teachers with the task to investigate and analyze their doing, where the reality experienced by educators gets to be apprehended and reflected upon, not only reproduced from a knowledge that originated from others, produced in places that are different from the context within which the learning practices are established (GALIAZZI, 2011; MALDANER, 2013; NERY; MALDANER, 2014; GHEDIN et al., 2015). Maldaner (2013, p. 90) corroborates this idea by stating that:

> [...] the pedagogical act is complex and requires the permanent presence of the who is observing, being surprised, pursuing answers that are not evident at first sight, seeking to understand the teaching and learning process in its concreteness, perceiving the context and surroundings in which education takes place.

Towards this sense, the question is: how is an important attribute of being *researcher of their practice* consolidated in the teacher-educator's experience? How can teacher-educators help constitute educators able to recognize the importance of transforming their *experiential knowledge* into *knowledge from pedagogical action*? It is known that this has not yet become a reality or materialized in all training spaces, especially, oftentimes, due to teacher-educators not knowing about it, since not all of them recognize such attribute as being important. In this case, there is a risk of happening what Gauthier et al. (2013, p. 34) state:

> [...] in the absence of a valid knowledge from pedagogical action, in order to found their actions, teachers will continue to resort to experience, tradition, good sense, in sum, they will continue using pieces of knowledge that may not only hold important limitations, but also do not distinguish them in any way, or almost any, from the common citizen.

Some attributes revealed by the interviewees are more related to affective aspects, and, as Tardif (2014, p. 130) states, "a large portion of teaching work is of an affective, emotional nature". In his study, Cunha (2012, p. 62) perceived that "[...] the attitudes and values of teachers who establish affective relations with students are repeated and become intricate in the way they handle the content and in the teaching skills they develop". However, such attributes cannot be separated, since the good teacher requires the knowledge of the content to be taught, but also the interrelation with students that must be harmonious and capable of producing learning.

One important aspect to be considered is that "although they teach collectively, teachers cannot act in any other way than to take into account individual differences, since learning takes place individually, not collectively" (TARDIF; LESSARD, 2013, p. 257). And in this case, those aspects that are more closely related to affective attributes and linked to the human dimension make a difference in the perspective of the constitution and perception of a *good teacher* as well as for the profile of a *teacher-educator*.

One characteristic the interviewees highlighted for both the *good teacher* and the *teacher-educator*, is to *like what you do*. In his study, Cunha (2012) highlights that the teachers who were pointed out as being good teachers expressed that

they "like what they do" and, furthermore, given the opportunity to make a new professional decision would choose teaching again. Evidently, when someone likes what they do, they seek to do it with the best quality, dedication, which, in the case of teacher-educators, gains greater visibility, as they may also serve as a professional example, another attribute pointed out during the interviews as being important for those professionals.

In this aspect, care should be taken for such example not to be perceived as normative or prescriptive didactic or psychopedagogical knowledge, but that teacher-educators be understood as holders of knowledge in their teaching action, a know-how and know-be that is being produced in the complex classroom situation and that the future educator should also learn it and problematize it for then to be able to deal with such aspects when inserted in a similar context.

Cunha (2012, p. 81) calls attention to the fact that "in some way, a certain reproduction in teaching behavior can be seen. And, if there are positive aspects in that, there is also the risk of repeating practices without reflecting upon them". So, this good teacher, who may constitute an example must be problematized in order that there be reflections about their practice. Teacher-educators need to develop an awareness of their condition of someone who helps created a *teacher identity in students*, another attribute pointed out as being relevant by one researched individual.

Reflections upon teaching: pointing towards a possible path

And how can this good teacher, who aspires to be the teacher-educator, constantly be constructed/reconstructed for their occupation? It is thought that one possibility lies in the constitution of intra-institutional spaces/times that would allow for permanent perfecting conditions aimed at turning them into reflexive professionals who research their teaching action in such a way that it would make it possible for that teacher to establish, under the perspective Schön (1995) advocates, a process of reflection *upon, about and after* the action, where moments for individual analysis and interlocution among peers take place. It is expected that this also result in interactions with other social players in the community by means of projects and actions that will be constructed there as results of articulations and reflections that make them more aware and dynamic.

It is understood that reflection upon the action in itself to be insufficient for the desired changes, as it is not possible for all analysis elements to focus on this interim. The reflection about and after the action contributes towards new focuses to be conjectured and not to commit the same mistake of using fossilized knowledge originated from a non-reflected action, as Peréz Gómes (1995) has warned. Zeichner (1995) highlights that reflection *upon* serves as a thought realignment process the moment the action happens, however, the author points out that reflection *about* the action is a retrospective analysis of reflections made *upon* the action.

The social conditions that influence the educator's action must not be disregarded, as Zeichner (1993) calls attention, it must not be thought of reflection as an exclusively individual movement. Very often, the exclusively individual reflection leads educators to the perception that the problems and situations they face are theirs only, with

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no relation to the collection of educators and other social players that make up that complex universe, not allowing for advancements.

According to Zeichner (1993), there are two necessary movements for the practice of reflection, one is where educators turn inwards to their practice, and the other is where they turn outwards to the social conditions they are inserted in, taking on a democratic and emancipating trend, recognizing the fundamentally political character of what they do. This way, the reflective practice process is inserted as a collective social practice that requires the insertion of teachers in reflection groups, especially with their peers in intra-institutional spaces/times.

After understanding how important reflection is and that this process is also developed within the collective of individuals who think about professional training and will work in teaching, professors Thomas and Irene highlight the relevance of CEN as an intra-institutional space/time. Note what they stated:

> Thomas: [...] *through debate, by discussing with colleagues, with peers who work no similar things, you are able to perceive other points of view, take the perspective of another individual who sees and analyzes that aspect in a different way. That will end up reconstructing your reasoning by always having an influence in some form. That provides an opportunity to work in a different way, modifying my pedagogical action. That is why I understand this space as being important to construct new views, new approaches.*

> Irene: *When I arrived here at [...] and started to attend the CEN meetings, I began to rethink what I was doing and managed to assess that the way I had been doing that, perpetuating my training was not not in accordance. That such discussion of contents [...] the importance of knowing the contents exist, but there is also great importance in knowing how I will be discussing that content, so all that I learned as I attended the CEN meetings, chatting with colleagues, discussing the importance of experimenting, the importance of taking care with the correct terminology; that was something I had no idea. Also about the relation with students, because in my view I used to use the examples of teachers I thought had been the best, and in this sense I was that teacher who entered the classroom and poured out that content and showed all the time the how well he knew that content.*

This way, the constitution of intra-institutional spaces/times may contribute towards breaking from the teachers' isolation, as pointed out by Quadros & Mortimer (2016, p. 14) by stating that teachers,

> in their path of professional activity learns to teach by reproducing strategies and practices from their previous teachers also seeking to place their identity onto the practice. However, most times, they develop a work of teaching in a very solitary fashion.

When there are no spaces for reflection, according to Pérez Gómes (1995), who discusses Schön's ideas, there is the risk of fossilizing the knowledge that originates from the action by repeating and applying the same schemes to situations that are increasingly less similar. Progressively, teachers become insensitive to the peculiarities

of the phenomena that do not fit into the categories of their impoverished practical thinking and, this way, make mistakes without perceiving so. And if that is a big risk for teacher-educators, it is certainly bigger for beginner teachers. Cavaco (1999) points out that beginner teachers:

> [...] when faced with the need to construct urgent responses for the complex situations challenging them, [...] may be directed to renew experiences from when they were students and to elaborate action schemes that become routine and descend from traditional models and even forget more innovative proposals they have theoretically advocated (CAVACO, 1999, p. 164).

Given the complexity of training for teaching, there is a perceived need for the insertion of teachers in a research-action process for changes to be produced. Research-action as advocated herein is in the sense of offering conditions for teacher-educators to reflect about the professional knowledge required for the activity in such a way that they comprehend research practice as a constituent of their training, and also to recognize their need to appropriate this principle to be able to help constitute basic education educators within that same dimension of research-action. It is believed that based on research-action, teacher-educators are able to reflect about the actions that permeate their practice to constitute a reflexive, autonomous individual capable of making decisions based on principles and elements that become conscientious, effectively contributing to prepare a more qualified professional for basic education.

This way, the CEN is an institutionalized space/time where the group of teacher-educators who took part in this research gather to socialize their practices and reflect upon it, in addition to reading articles, debating them, think of ways out of situations experienced in the teaching daily routines, turning this space/time into a context for continuous training among peers, since as Fiorentini et al. (2011, p. 318) state:

> [...] the capacity for teachers to produce, upon reflecting on their practice, an action that differs from that that was theoretically idealized depends on their theoretical-epistemological training. And it is that theoretical training that actually allows teachers to perceived the more complex relations of their practice.

This space/time has allowed for a rise in pedagogical discussions within the group of teacher-educators by treating what used be a subject restricted to some specialists as a compulsory theme for all teachers, both those who work in subjects of a more pedagogical nature and those who are linked to the more specific disciplines of Chemistry knowledge.

Final considerations

This study made it possible to perceive that the characteristics attributed to *good teachers* are also recognized as being fundamental for *teacher-educators* by demonstrating that those characteristics are essential for the teaching and learning process to develop in a more qualified fashion and constituting professionals in the critical-reflexive dimension (NÓVOA, 1995) and under the perspective of teacher-researchers (MALDANER, 2013). Considering the answers from the interviewees, it is denoted that the interaction among individuals in the process of

constructing educators' identities is necessary, as is the construction of knowledge for the professional practice, but with greater articulation among the players who co-exist within this context. There are still aspects that appear weakened and that require to be deepened and a better comprehension by teacher-educators.

The research pointed out that the teaching and learning process involves other factors beyond those of a merely cognitive order that interfere in that instance, with characteristics of caring, the capability of dialog, good humor, responsibility and commitment are some of the factors that may lead to improve and qualify this interaction process among individuals, and thus, establish the conditions to constitute *teacher-educators* who are aware of their practice and able to contribute towards training future committed and reflexive basic level educators who then lead to the professional development and constitution of teacher-researchers (ZANON et al., 2016; MALDANER, 2013; GHEDIN et al., 2015).

Within this context, the intra-institutional space/time, in the research case the CEN allows to qualify teacher-educators' work, since through systematic meetings that take place, direct intervention ways are instituted in the training process towards "the teaching", for which is the argument in favor of its existence. There is a continuous training action for trainers, where they debate their ideas, conceptions and representations of *being* and *doing* relative to the teaching action and becoming sensitized to review and broaden their beliefs and practices while interrelating with their peers, who have their own experiences, are more or less experienced in teaching and who equally contribute with their asymmetric way of mediation and construction of knowledge. That asymmetry that originates from the fact that the CEN professors hold differentiated graduation and post-graduation academic courses, as well as diverse professional experiences also is fundamental for the permanent training of university professors who are trainers of basic education teachers, since it is during such interlocution of knowledge that they may improve their practices, become strengthened education professionals and consolidate their professional identity.

Therefore, it is advocated that intra-institutional spaces/times are determining factors for a collective, reflectively managed proposal for teacher training courses aimed towards a new understanding, based on practical reasoning and committed to the requirements for the constitution of professionals who are researchers in their practices. By questioning the cultural diversity within the collectivity of individuals, it will allow teacher-educators to gain more complex comprehensions of the act of being teacher who are committed to training for fully exercising citizenship. Therefore, the (re)constructed piece of knowledge within this context allows to amplify/broaden professional knowledge and the constitution of a teacher within the critical-reflexive dimension.

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