

Development of the Theoretical framework for university training on education: some clues to understand its implications

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Received: 26/02/2019 Revised: 27/07/2019 Published: 15/12/2019

Abstract

This article presents a qualitative analysis regarding the possible implications of the development of the theoretical framework for university training on education. On the basis of the theoretical research, the need to recognize the context in which the students' research experience takes place is identified, apart from recognizing and differentiating the components of the theoretical framework. All of the above should be based on the promotion of critical thinking and argumentative capacity from the beginning of the university studies in order to develop a critical and reflective capacity so that it can be extrapolated in the future teaching action in the classroom. The tutorial action, the hypothesis of progression and the curriculum design must allow the establishment of strategies that improve the personalized attention of the students once they begin their research experience. Finally, training is crucial both for the teacher who guides the future educators and for the students themselves, since motivation and the strengthening of the teaching vocation are binding elements when it comes to integrating the skills pertaining to the professionals of the twenty-first century, more so when it comes to the teaching discipline as a field of study and training.

Keywords: University teaching; teacher training; critical thinking; theoretical analysis; educational research

Elaboración del marco teórico en la formación universitaria docente: algunas claves para comprender sus implicaciones

Resumen

En este artículo se presenta un análisis cualitativo sobre las posibles implicaciones de la elaboración del marco teórico en la formación universitaria docente. A partir de la exploración teórica, se identifica la necesidad de reconocer el contexto en el que se desarrolla la experiencia investigativa de los estudiantes, además de reconocer y diferenciar los elementos constitutivos del marco teórico. Todo lo anterior debe estar sustentado en el fomento del pensamiento crítico y la capacidad argumental desde el inicio de los estudios universitarios con el objetivo de asumir la capacidad crítica y reflexiva de forma que se pueda extrapolar a la futura acción docente en las aulas. La acción tutorial, la hipótesis de progresión y el diseño curricular deben permitir el establecimiento de estrategias que mejoren la atención personalizada de los estudiantes una vez que inician su experiencia investigativa. Finalmente, resulta determinante la formación tanto para el docente que orienta a los futuros educadores, como para los propios estudiantes, ya que la motivación y el fortalecimiento de la vocación docente

constituyen elementos vinculantes al momento de integrar las competencias propias de los profesionales del siglo XXI y más al tratarse de la disciplina docente como campo de estudio y de formación.

Palabras clave: enseñanza universitaria; formación docente; pensamiento crítico; análisis teórico; investigación educativa

Elaboração do marco teórico na formação universitária docente: algumas chaves para compreender suas implicações

Resumo

Neste artigo, apresenta-se uma análise qualitativa sobre as possíveis implicações ao se elaborar o marco teórico na formação universitária docente. A partir da exploração teórica, identifica-se a necessidade de reconhecer o contexto em que se desenvolve a experiência de pesquisa dos estudantes, além de reconhecer e diferenciar os elementos constitutivos do marco teórico. O supracitado deve-se sustentar no fomento do pensamento crítico e a capacidade argumentativa desde o início dos estudos universitários com o objetivo de assumir a capacidade crítica e reflexiva e, assim, extrapolar a futura ação docente nas aulas. A ação tutorial, a hipótese de progressão e o desenho curricular devem permitir o estabelecimento de estratégias que melhorem a atenção personalizada dos estudantes quando iniciarem atividades de pesquisa. Finalmente, a formação é determinante tanto para o docente que orienta os futuros educadores, quanto para os próprios estudantes, visto que a motivação e o fortalecimento da vocação docente constituem elementos vinculantes no momento de integrar as competências próprias dos profissionais do século XXI e, mais ainda, ao tratar a disciplina docente como um campo de estudo e de formação.

Palavras-chaves: ensino universitário; formação docente; pensamento crítico; análise teórica; pesquisa educativa

Como citar:

Toledo, G. (2019). Elaboración del marco teórico en la formación universitaria docente: algunas claves para comprender sus implicaciones. *Revista Digital de Investigación en Docencia Universitaria*, 13(2), 53-66: <https://doi.org/10.19083/ridu.2019.1083>

The set of skills to be acquired in higher education must allow for the fulfilment of one's duties, that is, at the end of the studies it is expected that the accumulation of experiences will make it possible to synthesize what has been learned (Serrano & Pontes, 2015). All this translates into the elaboration of a final work. However, from a methodological point of view, this work must include a series of elements that can transmit some findings in a harmonious, organized and methodological way, and, if necessary, the applicability of a proposal.

In the context of teacher training, the reality is not different, only that the connotation of teacher training should allow, in this case, for a theoretical approach based on analysis, synthesis of in-

formation, argumentation, and critical thinking (Amarillo, Corredor, & Ávila, 2016; Mero, 2019). In view of this reality, there are several theoretical contributions that criticize the current learning model at the university level, which does not seem to effectively promote this type of competencies (Bezanilla-Albisua, Poblete-Ruiz, Fernández-Nogueira, Arranz-Turnes, & Campo-Carrasco, 2018; Palacios, Álvarez, Moreira, & Morán, 2017; Vidal-Moscoso & Manríquez-López, 2016).

Now, is the theoretical framework a problem? If we understand this aspect as research itself, which also needs analytical reading, contrast of theoretical contributions, or of arguments that can explain the correspondence of that theoretical framework with the central subject of the

work, it seems to be a problem. This practice is not always present throughout the studies and it is precisely at the end of these that the existence and formality of this type of work is discovered (Moyano, 2018; Yubero & Larrañaga, 2015).

Taking up again the context of teacher training, it can also be a problem, since there is a tendency to associate this training almost exclusively with the aspect of classroom work, that is, with learning the practice of teaching, thus obviating the fact that, if education is intended to train citizens in critical, analytical and interpretative thinking, it would be appropriate to train teachers in this type of skills (Yubero & Larrañaga, 2015). That way, when the time to present the fruit of this critical process in a piece of work comes, they are familiar with it.

The sense of utility and immediateness around what is learned goes precisely against the aspect mentioned above, since priority is given to the acquisition of tools that need to be applied directly in the classroom, and the capacity for analysis or critical thinking is not usually considered to be of direct application (Santibáñez, 2014). This capacity is not deemed necessary to complete the teacher training studies and even less as an essential element in practice. From there, the main objective of this analysis is to explore the connotations and implications of the elaboration of the theoretical framework, from the perspective of teacher training.

To achieve this objective, on the one hand, it is necessary to try to explain the real purpose of the theoretical framework in a scientific research process, and on the other, to propose some keys to understanding whether the methodological and analytical process that accompanies every theoretical framework is in fact proper to teacher training.

The Real Purpose of the Theoretical Framework in a Scientific Research Process

In Guadarrama's (2016) opinion, science cannot continue to advance without a theoretical framework, even if it is fragile in its construction. This means that it is more than imperative to have a theoretical context that allows for the location of the theories that are part of the object of research. Insofar as the theoretical framework constitutes

the pillar of every study (Tusco, Quesocala, & Tito, 2011), here, not only the theories converge, but also the contribution to new knowledge as a result of the analysis, inference and argumentation that can be made while the research process is developing.

If we start from the point of view that this is a qualitative research, we also agree that it has to do with a methodical and orderly study in which case the sources of information constitute the base on which the possible understanding of the problem rests. For example, qualitative research deals with phenomenology that "seeks to know the meanings that individuals give to their experience and the important thing is to learn the interpretation process by which people define their world and act accordingly" (Guerrero, 2016, p. 5). Moreover, in phenomenology, "much emphasis is placed on the role of human intentionality and the primacy of immediate subjective experience" (Guadarrama, 2016, p. 149).

This type of research calls for an extremely dense, complete and complex theoretical framework in which the descriptive aspect barely has a place, whereas the argumentative, critical and interpretative aspect becomes particularly important, since it is the most characteristic facet that, in this case, is expected from this type of research (Risco del Valle, 2018). In this way, the theoretical framework, which is a research in the strict sense of the word, will serve as a crossroads of knowledge and theory. It is the researcher himself who is going to integrate in his discursive and argumentative thread everything he has been able to research, review and process.

In this case, it must be taken into account that there is a strong risk of dispersion of arguments in the theoretical framework. This means that the argument produced by the researcher himself may deviate, thus making the contribution of the theoretical framework an addition with no links to the sub-themes or elements believed to be specific to the object of study.

In order to avoid the dispersion of arguments, it is necessary to establish a series of categories of analysis that allow both discussion and interpretation to be located and condensed, so that the text generated is not lost in explanations or details that are not always relevant or binding

to the research. Therefore, and from a context of educational research, it will always be necessary to determine the method to carry out the analysis without ignoring the fact that the results obtained must obey a set of constructions of a theoretical order aiming to help understand the subject matter (San Martín, 2014).

The purpose of the theoretical framework has to do with the recognition of the fundamental stages linked to its development. It is impractical to put into a text a set of ideas in which a previous review coming from the exploration of the theoretical contributions resulting from the research is not observed. In this order of ideas, the so-called state of the art becomes the first step of the research, since the theoretical framework builds from it. Therefore, it is an aspect of key importance at the moment of developing the research itself (Guevara, 2016).

In the development of the theoretical framework, a series of aspects can be found. And although they are linked, they have differences in terms of their purpose within the framework. We are talking then about the state of the art, the documentary research, and the theoretical framework. The state of the art aims to present a set of theoretical and methodological proposals on the object of study, which is what is being researched, thus showing the current discussion on this topic (Gómez, Galeano, & Jaramillo, 2015). When it comes to documentary research, it is the exploration made of both published texts and research experiences that have been developed around the object of study (Guevara, 2016). In relation to the theoretical framework, it is necessary to reaffirm the idea that it seeks to communicate and share the critical and argued result of specialized texts directly linked to the context of the research being conducted (Herrera, Guevara, & Munster, 2015).

Another important aspect of the theoretical framework is the so-called conceptual framework. There is a tendency to erroneously confuse the theoretical framework with the conceptual framework, since, by looking at the final text of the work, concepts can be woven together with the theoretical and argumentative development (Tusco et al., 2011). However, the conceptual framework is in no way a compilation of concepts, that is, it implies a theoretical relationship that will be used precise-

ly by the researcher to determine which are the basic instruments for the understanding of the phenomenon being researched (concepts) with the main purpose of establishing what is assumed from a given concept in the research.

Therefore, in any theoretical framework, conceptual precision is necessary and, based on this, the theoretical contents must be correctly established in such a way that it can contribute in some way to locating the problem being researched and its relevance to the corresponding field or area of knowledge.

It should be recognized that, at least in most research projects in education, there is a tendency to include a theoretical framework based on the integration of the above-mentioned aspects. Obviously, these elements will be modified and adapted according to the type of research and the level of studies. In other words, the density and complexity of the theoretical framework will not only be determined by the subject matter and nature of the study, but also, as progress is made in the training stages (undergraduate, master's, or doctor's degrees). This framework may include other elements provided that these respond to the objectives of the research and, in short, that they make a significant contribution to the development of the work.

When working on a theoretical framework, it is necessary to take into account that, as part of a research process, we must see it as a progression of methodological phases which can be differentiated as the research process advances. This progression of phases is not linear, that is, it is accepted that the research process is processual and gradual, but it is not a path that is followed in a straight line (Di Marco, 2015).

In relation to the parts that will make up the theoretical framework, these are subject to the need to structure the framework in the best way so that its content is not only relevant to the research, but also shows that the researcher has the necessary skills to organize the information, express the result of analysis and the critical and reflective process, and the possibility of giving an account of the research that has been carried out on the subject under study.

It must be done in such a way that the tendency to be descriptive can be overcome and progress

can be made towards an analytical-interpretative approach (Palacios et al., 2017). Although it is true that a set of characteristics could be encountered depending on the object of study, these should not become an addition of descriptive elements, but should be part of the argumentative development of the theoretical framework.

It should be noted that there is no consensus on what parts should make up the theoretical framework. This absence is the result of the multiple visions that can exist around the methodology of the research and, evidently, the own nature of what is being researched. It can then be inferred that the theoretical framework is composed of theories that account for the results achieved in the research, so that the problem can be defined from one or more theories or ideological currents and, in short, can help the researcher not to deviate from the original approach to the problem or object of study (Rivadeneira, 2017; Tusco et al., 2011). Maya (2014) states that the theoretical framework must include the following elements: 1. theoretical approaches as the basis of the problem under research, 2. a set of observations or a list of experiences on the subject under research, and 3. a bibliographic review linked to the subject under research.

All of the above must be accompanied by two levels of work that consist of: 1. the review and exploration of theories related to the subject and 2. the generation of concepts based on the information gathered about the reality being studied. The latter involves both conceptual definitions (concepts drawn from reading and analysis) and operational definitions (concepts resulting from adapting other known concepts in accordance with the work).

Based on the previous lines, it can be inferred that the development of the theoretical framework is an extremely complex and difficult task. In fact, it will be so if the habit of reading is not acquired and critical and reasoned reflection is not exercised from the beginning of a person's training. Without denying the importance of the other elements making up the research report (whether it is called Final Degree Project, Master's Project or Doctoral Thesis), the theoretical framework is always seen as the most misunderstood element, not only because of certain generalized customs

among students, but also because of the fear of descending into a bottomless pit in which there is no clear picture. This gives the theoretical framework a sense of uncertainty and even rejection in many cases, a vision favored by the pressure to finish soon, in the shortest time, and with the minimum acceptable.

It may be necessary to redefine the concept of teacher and begin to look at them as a professional who actively transforms education (Martínez, 2016). To reach this point, a systematic and progressive process of educating in critical thinking is required, without leaving aside the idea that learning and the quality of it will have the teacher as one of the most influential variables in terms of their performance and possible impact (Rivero & Porlán, 2017).

Analysis and Critical Reflection Capacity in Teacher Training

In the opinion of Martínez and Márquez (2014), the building and development of the set of research skills in university studies is an aspect that is present in a significant amount of educational research works. It can then be inferred that analysis and critical reflection capacity are also a necessity in what is understood as teacher training, which is developed at the university level.

Within university education, the components that make up the curricular structure that aims to organize this type of teaching can be identified. This structure must go hand in hand with the training and professional skills expected to be attained by future professional educators (Caneiro, 2015).

In this sense, the responsibility to train the person who will have the duty to train other human beings is not a trivial matter, since—without trying to repeat commonly popularized expressions—it is true that education is a fundamental pillar in the development of societies. Moreover, it is stated that education is a process that takes place within society and that actually has influence on a comprehensive education aiming to give the student an active role in his or her own pedagogical process. In this sense, it is necessary for students to acquire skills and competencies that allow them to face a variety of formative activities

for which they must rely on their problem-solving capacity and autonomy without forgetting that education must also promote democratic, moral and ethical values within a context of responsible citizenship (Moreno-Pinado & Velázquez, 2017).

However, if teachers are called upon to be a reference in terms of use of language, analytical capacity, critical understanding, or didactic use of new technologies, the State must guarantee the means to achieve this end. All of the above unquestionably implies care in everything that has to do with teacher training, and undoubtedly the teachers in charge of training must also be trained (Martínez, 2016). It seems to be a kind of symbiotic relationship in which both trainers and future teachers come together at university with the aim of laying the foundations for the most complete professional training possible.

Within this teacher training, the need to develop a reflexive habit, the construction of knowledge and the possibility of making contributions that aim to be innovative is also identified. Nowadays, trying to become a teacher involves the acquisition of a diverse and complex range of both skills and qualities in the social, professional and human context (Serrano & Pontes, 2015). This includes, for example, competencies related to pedagogical skills, reflective skills, and analytical and argumentative skills (Palacios et al, 2017; Risco del Valle, 2018).

In this case, we speak then of the so-called research ability, which has to do with the action carried out with the purpose of progressively overcoming a set of research-related tasks in the educational or labor context, effectively counting on the tools offered by the methodology of science. (Fernández & Villavicencio, 2017; Martínez & Márquez, 2014).

This will have a series of consequences of pedagogical and didactic nature, since training for research implies a range of actions designed to facilitate the promotion and generation of knowledge, attitudes, and skills required by students, so that optimum performance when carrying out actions directly linked to scientific research can finally be guaranteed (Guerrero, 2007). The research skill has two aspects that encompass its action (Quevedo, García, & Cañizares, 2018): 1.-the research-sustaining skill (related to those generic

skills that sustain contemporary knowledge) and 2.-the research-generating skill (linked to those skills to search and generate new knowledge).

According to Moreno-Pinado and Velázquez (2017), in many cases, students do not have the ability to analyze problems or assume a reflective position when learning, which leads to reproductive thinking with minimal mental effort and, generally speaking, a low level in terms of critical thinking development. Another situation that keeps occurring when undertaking this type of research activity and trying to put the result of the analysis and critical reflection in writing is what is known as plagiarism. However, this plagiarism is generally regarded as the student's fault and not as an element that needs to be reviewed by the entire university community (Ochoa & Cueva 2014).

This will make the learning experience at the end of the studies possibly not so satisfactory due to the feeling of uncertainty that wanting to express and argue at a certain level may generate. Obviously, it is necessary to hope and even expect that the students have a certain degree of autonomy and initiative for their studies as well as having adequate accompaniment. However, and even counting on the above, that critical, analytical, and reflective competence, which in this case has to be expressed in the theoretical framework, may not be familiar in many cases.

Understanding critical thinking as the intellectual process that is in motion from the moment information is processed, analyzed, and interpreted, leading to new knowledge that must be applied in the real world (Moreno-Pinado & Velázquez, 2017), there is a series of considerations that must be taken into account within the subject of teacher training. The university reformist currents coincide in most cases on the need to train citizens under certain competences and skills that allow them to take the step to get involved and participate in the development of societies, thus picking up the idea that what has been learned throughout the years of study can be applied in the real world (Fernández & Villavicencio, 2017; Morales-Gómez, Arteaga-Rolando, Gallegos-Samaniego, Yanchapaxi-Sánchez, & Stay-Zúñiga, 2016). This obviously includes teacher training.

The detail is that critical thinking is not always favored in this case. Instead, there is a di-

rect or indirect encouragement of the idea that disciplinary knowledge and the memorization of techniques of direct application in the classroom is what a person is expected to learn in order to be a teacher. This is to the disadvantage of a vision of the teacher as a researcher of his or her own practice (Davini, 2015), or as a reflective practitioner (Carbonell, 2017). Therefore, it can be assured that critical pedagogy rejects the role of the teacher as an agent that transmits other people's ideas, leaving aside the problematization of the pedagogical action and, therefore, the absence of the promotion of critical thinking (Tamayo, Zona, & Loaiza, 2015).

That said, it is necessary to recognize that developing critical thinking will require a set of skills that revolve around analysis, interpretation, evaluation, and inference (Moreno-Pinado & Velázquez, 2017). All of this is accompanied by a world view that favors the construction of the student's own criteria, in other words, that the student can progressively develop a critical and well-founded position that allows them to draw inferences, explain themselves and, if necessary, propose solutions. We propose then that, in the university and within the context of teacher training, initiatives compatible with the implementation of metacognitive strategies must be favored, which involves the conception that problematizes what is being studied and researched.

Tutorial action in teacher training is a responsibility that is shared between the student and the director or tutor, in this case, of the research process and its development (Quevedo et al., 2018). Taking up again the idea of the connotations derived from the moment when a theoretical framework has to be developed, given the above considerations, the tutorial action has a particular context, since at least in theory it is an experienced teacher who is training a future teacher in terms of the development of their research exercise. Up to this point, there may be a general consensus. However, this action has a series of implications that will determine the progression of this experience of critical analysis for which taking up the previous knowledge and the evolution of the student seems useful (Aguilar-Parra, Alías-García, Álvarez, Fernández-Campoy, Pérez-Gallardo, & Hernández, 2015; Caneiro, 2015).

The object of this work is not the study of the tutorial action; however, this concept is decisive when initiating the research process. There is emphasis on the development of the theoretical framework and its implications for teacher training because this very characteristic part of all research entails a number of factors, ranging from the progression of studies, student and academic performance, to the possible impact of tutorial action on the development of the student's research (Venegas-Ramos & Gairín, 2018). In other words, this tutorial action promotes a bond of dependence because the beginner researcher requires orientation in many facets, thus the tutor or director stands as an agent that regulates and guides the scientific activities carried out (Quevedo et al., 2018).

The tutorial action is not only limited to overcoming the steps within research formality, but should not fail to consider that the interaction ability between the tutor or director and the tutorship will allow the recognition of the teacher's expertise, training, and willingness to teach on the one hand, and, on the other hand, a formative atmosphere will be created, where the tutor will be able to train the student by systematically observing them when faced with the challenges encountered at the beginning of the research (Ochoa & Cave, 2014).

From a pedagogical point of view, although it is true that the tutorial action implies guidance and accompaniment at a general level, it is also an exercise on the part of the tutor or director in terms of the recognition of the conditions and experiences that the student has once they begin their own research experience (Alcívar & Gorozabel, 2018). In this sense, both the motivation and the characteristics of each student become key aspects (Venegas-Ramos & Gairín, 2018), as they come to determine not only the way the analysis process and development of own arguments begins—in this case of the theoretical framework—but motivation and disposition can facilitate or hinder them.

In view of this possible scenario, we talk about the so-called progression hypothesis (PH) (García, Porlán, & Navarro, 2017). This hypothesis consists in recognizing the starting levels at which students are when they are confronted for the first

time with the issues they need to address. This recognition is based on the identification of previous knowledge, personal references, student experiences, and academic career (Ramírez-Casallas, 2018). When establishing the progression hypothesis, we try to personalize the tutorial action so that, in the tutorial process itself, we find in an indivisible way the particularity of each student, the objective to be achieved, and the possible limitations to work on, so that what is progressive, systematic and dynamic is present from the beginning (Espinel & Valbuena, 2017).

Logically, it is understood that every research process is not developed in a linear manner, and, in the case of the theoretical framework, the analytical vision and the construction of well-founded arguments require special follow-up and accompaniment, so that the effort is not diluted in aspects that are somehow or not binding at all to the subject under study. Therefore, progression hypotheses will help us identify those models that are in the minds of students in progressive states of complexity, while they allow us to build a set of sequenced activities in order to reduce those elements that may prevent learning (García, Porlán, & Navarro, 2017).

Areas to Be Considered to Enable Critical Analysis in the Educational Context of University Students

When establishing some guiding criteria to improve students' experience with regard to the development of activities that have to do with the promotion of critical thinking, argumentative capacity, and reflection, it is essential to take into account that it is a gradual and progressive process (Santibáñez, 2014). This particularity must be seen from several areas that, being related to each other, should help the students' educational context allow its analysis and written expression to be a usual practice throughout the studies that, in this case, is being contextualized when writing the theoretical framework.

Although it is true that the theoretical framework is part of the elements of the final works for university degrees, as has been mentioned above, it is not the only part that needs this reflexive and argumentative nuance. It is only that, in this case,

it is necessary to try to achieve this synthesis of knowledge and skills accumulated throughout the training, which are combined in the students' research experience. Thus, we identified five areas linked to the promotion of critical thinking in teacher training within the university context. These areas are: 1.-University, 2.-Operational, 3.-Didactic, 4.-Tutorial action, and 5.-Student.

- 1. University area:** This encompasses institutional policies that aim to promote analysis and argumentation as a learning strategy. Therefore, the university itself must establish lines of action leading mainly to the reduction of the gap between curricular designs and the professional and social skills expected from professionals (Caneiro, 2015; Ramírez-Casallas, 2018). On the other hand, there is a need to design training plans aimed at university professors in order to bring them closer to new didactic methodologies focused on university training aimed at teaching in this case (Alcívar & Gorozabel, 2018).
- 2. Operational area:** Generally, everything that has to do with memorization tends to be rejected without further consideration, associating it with practices that affect learning (Rodríguez & Pérez, 2017). Memorization will be contraindicated as long as it is the only way to prove learning and punitive measures are taken for unintended outcomes. In other words, if the lesson is not repeated, a punishment is received, and logically this procedure should no longer be present in any learning experience. However, students' memory capacity must be present throughout their university studies, since they must demonstrate the ability to combine what they have in mind with its application in the real world, that is, the transfer and inference of information (Amarillo et al., 2016; Vidal-Moscoso & Manriquez-López, 2016).
- 3. Didactic area:** When designing strategies that aim to favor the learning of teachers in training, it is imperative that the activities have a component that allows for progressive learning in terms of analytical capacity and writing at a university level (Rivero & Porlán, 2017).

The high number of insignificant tasks is not always going to be useful, especially when the final work that university students have to do becomes an almost unknown experience, since techniques related to this type of activity have not generally been learnt throughout their studies (Fernández & Villavicencio, 2017). In other words, future teachers who are being trained should not wait until the near end of the studies to be introduced to the scientific method and its implications (Rodríguez & Pérez, 2017).

- 4. Tutorial action area:** It is understood that the university student, in this case the student who is preparing at a university level to be a teacher, must possess a significant degree of autonomy and responsibility for their studies. However, the tutorial action the tutor may exert during their students' possibly first research experience is also decisive (Venegas-Ramos & Gairín, 2018).

Thus, it is not enough to have research experience to know how to teach research, since it is necessary to have didactics that match the training needs of the students (Aguilar-Parra et al., 2015). Here we can, for example, pick up the idea of the progression hypothesis in order to design personalized itineraries for each case. Respect for the person's identity also has to do with the recognition of their strengths and challenges and how this is to become a tool for guidance and accompaniment (García, Porlán, & Navarro, 2017).

- 5. Student area:** From the outset, it is assumed that the university student is an adult and as such, is expected to be in a position to assume responsibility for their studies. This responsibility takes on a special meaning in teacher training (Martínez, 2016). Teacher training is and must be one of the most regarded aspects, because it is about training those who are going to train other human beings, and this is not superfluous. The recognition of university training on education and its role in society should be a strong reason when deciding to train professionally as a teacher, while recognizing that the teaching vocation is indispensable to take this path (Davini, 2015).

The interaction between the actors in education allows for the emergence of pedagogical trends that, when considered as emergent, no longer characterize the evolution of education in terms of the classic teaching-learning binomial, but rather of inter-learning, in which both the teacher and the student relate in an elliptical way with both training (human development) and learning (scientific development) as pillars (Morales-Gómez et al., 2016).

In this sense, the research methodology focused on students' first research experiences will undoubtedly be influenced by the emerging pedagogies that are currently being developed (Morales-Gómez et al., 2016). It is thus possible to speak about self-gogy (fostering freedom, autonomy and personalization of education), hodogogy (the teacher as a guide and facilitator of processes), neurogogy (importance of cognitive processes, training, and learning) and infopedagogy (effectively integrating technologies into training processes). All of the above implies a gradual and systematic process that can guarantee an effective adaptation to the new training contexts. Therefore, didactic training in university is fundamental to adapt the university pedagogical model to the real needs of society from an integrating vision adapted to the new scenarios (Martín del Pozo, Pineda, & Duarte, 2017).

As we have been explaining, critical thinking not only becomes a relevant aspect throughout university studies, but also a determining tool when approaching research dynamics. Thus, three strategies are proposed to promote critical thinking in the university context: Problem-based learning, case study, and reflection circles (Gil-Galván, 2018; Gamboa, 2017; García, 2017). All this will be accompanied by the respective evaluation process of critical thinking, applying, if necessary, qualitative or quantitative instruments such as portfolios, direct observation, group discussions, open or closed-ended instruments (Ossa-Cornejo, Palma-Luengo, Lagos-San Martín, Quintana-Abello, & Díaz-Larenas, 2017).

At a general level, problem-based learning aims to develop skills and abilities compatible with research, posing hypotheses, and offering solutions, as well as developing work both in groups and individually, all of the above from the perspective

of the development of the future professional in training (Gil-Galván, 2018). With respect to the case study, it is also positioned as a good strategy when exercising critical thinking, since in-depth analysis, review, reflection, and the search for answers to one or several problems encourage both inquiry and analytical and certainly critical thinking (Gamboa, 2017). Nevertheless, it is decisive that teachers have adequate training so that the case study does not tend towards dispersion of arguments, but rather, without ignoring dialogue and interpretation, does not lose sight of the meaning of the case being analyzed. Regarding reflection circles, they offer a favorable context for students to share both their opinions and their questions (García, 2017). Thus, cognitive and socio-cognitive conflict are common denominators in this strategy, provided that this critical and reflective process can be guided from a real-world vision.

Conclusion

Throughout this article, we have tried to develop an approach to the key aspects that have a determining role when addressing the scientific method, specifically the theoretical framework of research, but contextualized within teacher training. Why within teacher training?

Although it may seem obvious, argumentative and analytical skills must be present in all university-level training. In teacher training, however, this ability should be addressed from the beginning because, in order to avoid memory to be the main aspect since the school level, it is expected that future teachers will be trained in critical and analytic-interpretative thinking as part of the skills of every teacher.

It seems that the theoretical framework is the most misunderstood aspect in research. The true meaning of this part of the research report begins just when it is recognized as a sort of crossroads of knowledge in which the theoretical contributions of the authors consulted, the topicality of what is being worked on and undoubtedly of the analysis, and the argument that researchers themselves imprint on this theoretical framework are com-

ined. Seen in this light, there does not seem to be any major confusion; however, the university level demands certain standards of complexity when reflecting all of the above in writing.

In addition, it has been noted that there is no single criterion with respect to the parts that must compose the theoretical framework together with the research expertise that the person in charge of accompanying the student in what may be the first or next research experience they may have, which may draw the route to be followed.

On the other hand, in teacher training, it is generally expected that the foundations can be laid for a future professional that is not only actively involved the education process, but that can propose and debate ideas and arguments from its self-recognition as a subject of education.

It is imperative to ensure that, in teacher training, everything that has been learned throughout university studies acquires its meaning and relevance. However, it must be recognized that activities designed to ensure future teachers' learning must be useful but linked together. This means that progress must be made in terms of the complexity of the activities and, evidently, in the habit of maintaining the characteristic forms of both a university and professionalizing context so that, when students are finally faced with their respective final works, the synthesis of knowledge can become a reality, instead of considering these final works as just another requirement to be met, which frequently turns out to be a not so satisfactory experience. It seems that the key may lie in what can be ensured from the beginning of the studies by avoiding numerous superficial activities at the expense of a wise balance between the number of these ones and their degree of complexity.

The research skill must be trained and it is related to the actions developed to face the requirements that, in this case, are present in research tasks. This notion has a number of implications, both curricular and didactic, but, in short, the student must be committed to their teacher training.

The big question is: When it comes to teacher training, why is it so difficult to reflect in writing the result of reflection and grounded critical analysis in the theoretical framework of a research work? In order to try to answer this question, it

will probably be necessary to review many influential variables; however, we will try to present some keys that can be taken into account when addressing this discussion.

First, recognizing that curricular balkanization has its effects on the development of studies. This means that the disciplinary polarization that is present in university studies results in the theoretical mastery of the disciplines or fields of study that make up the curriculum as the cornerstone of learning, ignoring the fact that the ability to explain, debate, and generate critical and analytical thinking goes practically unnoticed in most training activities, favoring mechanical or memory-related tasks. As it was pointed out at some point in this article, memorization will be contraindicated only if it is considered as the only strategy to ensure learning.

By virtue of the above, and together with the formal aspects that should accompany in this case the argument expressed in writing, it would not make much sense for the student to encounter these aspects practically at the end of the studies, and from there arises the idea of not knowing the uselessness of it, especially when making a balance between what is expected in terms of teacher training and what is needed to be so in practice. It should be borne in mind that the right thing to do is to evaluate the achievement of the objectives, not the contents.

It is necessary that universities themselves promote curricular designs in harmony with the objective that the competencies—in this case, analytical and critical-reflective—can be a substantial part over the course of studies. This should be translated into didactic proposals that favor the above, for which training aimed at university teachers is required, since having research experience does not necessarily imply knowing how to teach to research, argue or explain. It is fundamental to join efforts, unify criteria and keep in mind that, even if we have technological innovations in the educational context, without a well-founded capacity for argument that is capable of analyzing, interpreting and inferring, we will not be able to acquire the ability to propose improvements in the educational context as a result of experiencing systematic and organized inquiry and search, which we call research.

Continuing with the role of universities, it is also necessary to distribute with pedagogical criteria the number of students to be guided at the time of undertaking final works. This is in order to ensure a better personalization of the tutorial action that is obviously decisive for students who are starting or developing their first research experiences.

Curricular continuity can be positioned as a great opportunity when reviewing the possible alternatives in relation to the improvement of the research processes of university students. This means that, if the final work continues to be seen as a cumbersome and a not so useful requirement for achieving a degree, the real value of all that this training activity entails will obviously not be appreciated. All of this can be improved as soon as curricular proposals are designed, which focus more on the benefit of students themselves and less on the acquisition of a set of skills that are not always relevant.

Changes in the educational context are often slow, progressive and need to be scheduled. However, far from envisioning changes for the student, we'd rather envision changes with the students in such a way as to overcome the laudable statements that seek to establish a new university pedagogical model centered on the student, while continuing to demand scientific production from the university faculty to the detriment of effective and relevant didactic training focused exclusively on university work. In short, research skills should already be part of everyday university studies. On the one hand, it presupposes and demands a mature attitude from students, and, on the other hand, a commitment from universities and from university professors themselves to confirm the commitment made to society. The changes at the university will not come from publications or institutional statements, but from the recognition of everything that being a university that is pluralistic, socially relevant and in touch with reality entails.

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